DEPARTMENT OF PUBLIC HEALTH
GOVERNMENT OF MAHARASHTRA

PRIMARY HEALTH CENTRE
MANUAL
(Volume-II)



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Foreword



It is with great pleasure and a deep sense of responsibility that I present the Primary Health Centre Manual.

Maharashtra remains steadfast in its commitment to providing accessible, integrated, and high-quality healthcare to all, particularly to our rural populations and vulnerable groups such as women and children.

Today, through the National Health Mission (NHM), initiatives like Ayushman Arogya Mandir (AB-HWC) and the Pradhan Mantri Surakshit Matritva Abhiyan (PMSMA) have strengthened our efforts to ensure comprehensive healthcare at the grassroots level. These programs emphasise preventive care, maternal and child health, immunisation, and health awareness to address the needs of underserved communities.

The updated PHC Manual has been meticulously crafted to equip Medical Officers with the latest guidelines, strategies, and protocols aligned with national programs, including the Health Management Information System (HMIS) and the Reproductive, Maternal, Newborn, Child, and Adolescent Health (RMNCH+A) framework. This manual is designed to empower Medical Officers with the tools and knowledge necessary to deliver excellence in healthcare at PHCs and beyond.

In conclusion, I commend the effort put in by the Director of Health Services, Pune, & Executive Director SHSRC and the team for their dedicated efforts in revising this manual. This updated PHC Manual is also a testament to the tireless work of the State Health Resource Centre (SHSRC), the State Institute of Health & Family Welfare (SIHFW), and the hundreds of committed committee members of Public Health Department who have ensured it meets the evolving needs of our PHC Medical Officers and the communities they serve.

I am confident that it will contribute significantly to the improvement of primary healthcare services across the state. Together, we can make meaningful strides towards a healthier and happier Maharashtra.

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Preface

The Public Health Department (PHD) of Movement of Maharashtra, a vital role in ensuring the well-being of the state's residents. Public Health Department provide accessible and comprehensive healthcare, particularly at the primary develops serve as the foundation of Maharashtra's public health system. By focusing on prevention and early intervention, PHCs play a crucial role in reducing disease burden and improving overall health outcomes in the state.

Medical Officer is the backbone of the Primary Health system in Maharashtra. Their diverse skillset in clinical care, public health, and leadership is crucial for delivering comprehensive and accessible healthcare services to the community.

Previous edition of PHC Manual was published in २००७. Since २००७, the field of public health has undergone significant advancements. New medical practices, protocols, and guidelines have emerged, necessitating an update to the existing PHC Manual for Medical Officers.

The State Health Resource Centre (SHSRC), State Institute of Health & Family Welfare (SIHFW) and along with a cedicated Committee, has this revised edition of the manual. This comprehensive resource incorporates the latest medical knowledge and best practices to equip Medical Officers with the necessary tools to deliver exceptional care at the Primary Health Care (PHC) level. This manual serves as a cornerstone for Medical Officers working in PHCs across Maharashtra. It provides clear and concise guidance on various aspects of public health delivery.

I would like to thank the State Health Systems Resource Centre, Pune, for their effort towards the revision of this Primary Health Centre manual. I would also like to thank the Director, Bureau Chiefs, and officials from the state and district levels for their valuable inputs. Last but not least, I certainly wish to appreciate the Herculean efforts taken by the Committee Members in revising this manual. I am confident that this Primary Health Centre manual will provide the necessary information and support to the Medical Officers of Primary Health Centres in imparting their services.

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Acknowledgement

I am delighted to acknowledge the release of the revised edition of the Primary Health Care (PHC) Manual for Medical Officers in Maharashtra. This comprehensive resource incorporates the latest advancements in healthcare delivery of State.

Primary Health Centers have become integral to rural life, often regarded as temples of health in these areas. With the evolving field of public health and the introduction of new programs, revising the PHC manual was long overdue as previous edition was published in 2008. Beyond their role as doctors, Medical Officers are expected to be effective leaders, efficient managers, skilled communicators, and trusted by the communities they serve. This manual outline team responsibilities, modern management principles, leadership essentials and technical guidelines.

Despite best efforts, certain constraints, especially space constraints, have prohibited the pictorial depiction of many relevant contents. Additionally, several technical changes have occurred and are still occurring in ongoing national health programs, which may not have been fully incorporated in the manual. It is requested that unnoticed omissions be taken in the right spirit and not as lapses, which can be rectified as the need arises.

This updated manual is a testament to the tireless efforts of the State Health Resource Centre (SHSRC), State Institute of Health & Family Welfare (SIHFW) and the dedicated committee members .We hope this PHC Manual will be useful to Medical Officers inspiring them to care for the reputation of the services in the public eye. We also hope that every Medical Officer will read the manual thoroughly and work as a successful team leader. I extend my gratitude to the SHSRC, Bureau Chiefs, state and the Committee Members for their efforts in revising this manual. This resource will undoubtedly support Medical Officers in providing exceptional services at the primary level.

I also wish to acknowledge the invaluable guidance and support of Hon. Shri Milind Mhaiskar, Additional Chief Secretary, and Hon. Shri N. Nawin Sona, Principal Secretary-2, Public Health Department, Government of Maharashtra. Their leadership and insights have been instrumental in shaping this manual.

Finally, I express my sincere gratitude to Hon. Shri Amgothu Sri Ranga Naik, Commissioner (Health Services) & Mission Director, National Health Mission, Govt. of Maharashtra, for his invaluable support in ensuring the manual addresses the critical needs of healthcare delivery in Maharashtra.

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Content

Chapter 1: Backgorund 1

Chapter 2: Medical Care 5

Chapter 3: Reproductive & Child Health Programme (Maternal Health) 35

Chapter 4: Reproductive & Child Health (Child Health) 101

Chapter 5: RCH (Child Health) Immunization Programme 181

Chapter 6: Communicable Diseases 297

Chapter 7: Non-Communicable Diseases (NCD) &

Other Important Health Problems 339

PHC Manual Annexure QR Code 381

Abbrevations 393

Section 1
BACKGROUND

The public Health Department continuously strives to improve health care by preventive as well as curative approach. The Public Health Department (PHD) of Government of Maharashtra, plays a vital role in ensuring the well-being of the state's residents. In prevention and early intervention, PHCs has a crucial role by focusing on Primary Care in reducing disease burden and improving overall health outcomes in the state. Primary Health Centre provides, an accessible and comprehensive healthcare package.

Primary Health Centre is key component in health sector reform. It is an integral part of rural life, treated as place of worship across the state.

Medical Officer is the backbone of the Primary Health system in Maharashtra. Their diverse skill set in clinical care, public health, and leadership is crucial for delivering comprehensive and accessible healthcare services to the community. More than a doctor, the Medical Officer in charge of a PHC is expected to be a better leader, an efficient manager, a successful communicator and most importantly acceptable to the people they serve. He/ she supports the entire PHC team in delivering health care outcomes.

Previous edition of PHC Manual was published in 2006. Since then, the field of public health has undergone significant advancements. New medical practices, protocols, and guidelines have emerged, necessitating in updating the existing PHC Manual for Medical Officers. With the ever-changing field of public health and the introduction of numerous new programs, the revision of the existing PHC manual was overdue.
This manual addresses the duties of individuals and PHC team. It also focusses on principles of modern management, essentials of successful leadership, supervision and monitoring mechanisms, essential aspects of communication, and technical details.

Why revision of manual?

Various reforms and change in approach pave the way towards, accessible, affordable and acceptable health services with reduction of out-of-pocket expenditure (OOPE).
Since PHC Manual was published in 2006, to ensure recent advances, holistic approach and involvement of National Health Mission in big way, PHC Manual has to transform from older version.
Continuous changes and evolution in field of public health led to the revision of the existing PHC manual.

Many topics like MJPJAY & PMJAY insurances schemes, Ambulance management, & introduction of new national health programmes guidelines are added in this edition. This book is based on Indian Public Health Standards (IPHS) designed by MoHFW. While writing this Manual, newer initiatives, Departmental guidelines, Government Resolution & various standards from other Government department are also amalgamated.

In 2006, NHM was in nascent stage, which occupied front seat in today's scenario. Norms of Human Resources, Infrastructures, Guidelines changed markedly. This also necessitated need of revision of book.

With lots of new information, guidelines & programmes revised Manual became bulky. Thus, to make it handy in size, present edition is divided into two volumes.

In first volume, Scope and Objectives of PHC, Administrative Aspect, Information Education and Communication (IEC) needs as well as Health Information System (HMIS) topics are elaborated with special emphasis on National Health Mission. Medico Legal cases are integral part of PHC functioning, hence it is discussed in depth. This volume also covers updated information, various Laws, Acts & Directives issued time to time. Many formats regarding MLC, Postmortem cases will be easily available in this volume.

Second volume of manual consist mainly clinical knowledge and technical information regarding Communicable & Non communicable diseases, medical care, Maternal & Child heath, Immunization and National Health programmes at PHC level.

Annexure mentioned in Manual, are presented in QR code. Hyperlink is also provided for same. This system will help Medical Officer to access forms, Formats, tables, Charts as well as Guideline Handbooks.

Keeping essence of Medical Care from last edition, few colourful pictures are inserted for ease of understanding. In depth & updated management of cerebral malaria, Snakebite management by ABCDE approach has been described in medical care & management of emergencies. Subject like Sickle cell crisis as well as Resuscitation of neonates added as a need of hour. While disinfecting, old method of KMnO4 changed to Fogging of operation theatre. Laboratory part divided as Inhouse & Outsourced entities, with list of tests to be conducted, attached in annexures. Jeevandai Arogya Yojna, has been transformed to Unified Insurance approach like Mahatma Jyotirao Phule Jan Arogya Yojna & Pradhan Mantri Jan Arogya Yojna.

Reproductive & Child Health Programme (Maternal Health)

In last 15 years, there is sea change in policies, programmes & use of drugs for improvement of maternal health. Anaemia Mukt Bharat Programme covers various age groups including ANC & PNC to tackle Anaemia. Prophylactic doses and regime for Iron Folic Acid supplementation started under this activity. Use of parental doses & its calculation including newer supplements like Ferric Carboxy Maltose (FCM) in Anaemia has been described in length. In ANC Care subtopic, Ideal schedule of ANC check-up visit. Examination and action to be taken during ANC check up with warning sign are also included. Newer innovations like management of Gestational Diabetes Mellitus, use of Antenatal corticosteroid therapy has been incorporated as per latest guidelines. Organization of Labour Room with Model labour room LDR concept (Labor, Delivery, Recovery) concept Guidelines are also given in this section for improvement in PHC Labor room.

In family welfare programme, breakthrough invention of newer contraceptives like ANTARA (Depot Medroxy Progesterone Acetate DMPA) and medical methods of abortion with drug protocol for medical abortion described afresh. Under NHM programme, maternal health related schemes are in use in last few years like Janani Shishu Suraksha Karyakram (JSSK), Janani Suraksha Yojana (JSY), Matrutva Anudan Yojana and Vatsalya Program has been included. To increase awareness about PCPNDT programme, *'The Pre-Conception and Pre-Natal Diagnostic Techniques (Prohibition of Sex Selection) Act 1994 and Rules 1996'* is given in a nutshell in this section.

Reproductive & Child Health (Child Health)

This section revolutionized completely with addition of newer activities like SAANS (Social Awareness and Action to Neutralize Pneumonia Successfully), Rota virus infection Management & Possible Serious Bacterial Infection PSBI. Rashtriya Bal Swasthya Karyakram (RBSK) replaced older version of school Health programme. As per departmental guidelines, screening of Malnourished children part has been written afresh.

Village Health, Nutrition and Sanitation Day (VHNSD) sessions, HBYC (Home Based Care for Young Child), Deworming with National Deworming Day (NDD) activities are described at a length. Emergency management of sick child is narrated in detail, to help our medical officer in managing various cases.

RCH (Child Health) Immunization Programme

As we are all aware, Immunization is one of the most cost-effective public health interventions to reduce morbidity and mortality in vaccine preventable diseases (VPD). This topic has been carved out of Child Health section of last edition. This will help us to give extra milage for session planning, quality management, cold chain & use of software like e-VIN & U-WIN. Logistics, Session management & roles of health officials are described to nullify ambiguity in work culture. Special importance is given to Adverse effects following Immunization (AEFI), while writing this section.

Communicable Diseases

Though Non communicable diseases are on the rise, Diarrheal diseases, LRTI & Tuberculosis accounts for 12% of disease burden & are in top ten of disease list. Addition of new topics like Natural History of Diseases to understand diseases process, separate classification of Emerging and Re Emerging diseases in view of recent Covid 19 pandemic have been incorporated in communicable diseases section. As per IHIP, list of syndromes are also tabled. In Diseases included for surveillance section, numerous forms and formats of surveillance activities are attached.

Non-Communicable Diseases (NCD) & Other Important Health Problems

Non-Communicable Diseases (NCD's) are now posing major challenges for public health in 21st century. If we consider disease burden change from 1990 to 2016, diabetes rose from 0.7% to 2.2% & ischemic heart disease was at 3.7%, now climbed up to top position with 8.3%. Amongst of all diseases. Non communicable diseases kill approximately 41 million people (71% of all deaths) worldwide every year, including 14 million people in young population. Majority of premature NCD deaths are preventable. As per World Health Organization (WHO) projections, the total annual number NCD's death will increase to 55 million by 2030. Hence this section named as NCD & other health problem.

Under this heading, Palliative care, Geriatric care included in National programme along with 12 non-communicable diseases related programmes. Screening, early diagnosis methods elaborated. Various forms like CBAC are given in Annexure section for ready reference.

Every caution has been taken in to account to includes latest clinical, technical and administrative changes. By going through famous Quote by Benjamin Franklin "*Change is the only constant in life. One's ability to adapt to those changes will determine your success in life*".

Change in modalities in medicine is routine phenomena & may change scenario even tomorrow after publication of this edition.

This Manual will Help Medical Officer of Primary Health Centre in delivering services with quality. It will improve reputation of Public Health Department. As a team leader, Medical Officer will become successful & will inspire as well as build confidence of team members. It also aims to update knowledge & skill of various health staff by providing Charts, SOP's, formats etc. given in Manual.

Hoping expectation of feedback about Manual, in order to improve it further!

Section 2
Medical Care

2.1 Medical Care at PHC-HWC (AAM)

Primary Health Centers have been basically established to provide a strong base of preventive & promotive health care. Hence to make this base strong & acceptable to people, it is necessary to provide for care to sick including disability service & rehabilitation. Medical care extended to sick & disabled should not be an end in itself but must be utilized to emphasize to preventive, promotive Health care with focus on Behaviour Change Communication.

2.1.1 Out Patient care

Outpatient clinic should be conducted every day at PHC- HWC (Health & Wellness Centre), headquarter between 8.30 a.m. to 12 .30 p.m. in morning and 4 to 6 p.m. in evening except Sunday & holidays.

During VHND day MO/CHO will conduct out patient's clinic at Sub-Centre. Number of outpatients is few at Sub-Centre, therefore MO should give more time and attention towards monitoring and supervision of VHND day and guidance to ANMs in MCH work, Supervise work of other health staff such as Health Assistant (M&F), MPW (Male) etc.

2.1.2 In Patient Care

Provision of in-door beds in PHC has been minimized to 2 general beds and 4 maternity beds to enable the attending doctor to devote more time for other important Public Health Services. Medical officer should take a daily round of ward in morning before attending out- patient clinic, examine all indoor patients and give instructions to nursing staff regarding care and treatment of indoor patients. This will ensure satisfactory working of Maternity care and help to gain confidence of community.

2.1.3 Laboratory Service

Almost all the Primary Health Centers (PHC) -Health Wellness Centers (HWC) are provided with microscopes and facilities for carrying out simple diagnostic are having Govt. Authorized laboratory tests to help in proper diagnosis and follow up of cases. Detailed information about Laboratory functioning is given in section 3.6 in this chapter.

2.2. Basic clinical information

Basic clinical information is required while examining the patients at PHC -HWC, is given below. This also includes normal values for important investigations although these may not be conducted at PHC-HWC.

2.2.1 Heart Rate

Table: Age wise average normal heart rate values

Age	Average	Range
New born	140 beats/min	140 to 160/min
1 yr. old	110 beats /min	100 to 130/min
3 yrs. old	100 beats /min	90 to 110/min
8 yrs. old	90 beats /min	90 to 100/min
11yr old	80 beats /min	80 to 90/min
Adult	72 beats /min	70 to 100/min

2.2.2 Temperature

While recording temperature, remember the following points:

- Wash the thermometer in antiseptic solution and see the mercury is well shaken down before using for each patient. After use, wash it before keeping it in case.
- Keep the thermometer for one minute to allow the mercury to reach body temperature. Site of inserting thermometer:
  - In conscious adults: Mouth or axilla
  - In unconscious adults: Axilla
  - In young children: Fold of groin with thigh flexed on abdomen.
  - In infants: Rectum

Temperature of mouth and rectum is generally half degree higher than that of groin or axilla.

Table: Temperature range in centigrade and Fahrenheit

Temperature	Centigrade	Fahrenheit
Normal	36.6-37.2^0	98-99^0
Subnormal	< 36.6^0	< 98^0
Febrile	> 37.2^0	> 99^0
Hyperpyrexia	> 41.6^0	> 107^0
Hypothermia	< 35^0	< 95^0

2.2.3 Blood Pressure

- Blood pressure is measured indirectly by Sphygmomanometer.
- A cuff (of width at least 40% the arm circumference) is attached to mercury or aneroid manometer.
- Cuff is inflated around the extended arm till radial pulse disappears by palpating method and then slowly deflated.
- Auscultation over brachial artery reveals five phases of Korsakoff sounds as the cuff is deflated.
- Take the average of three readings.

Table: Phases of Korsakoff's sounds

Phase 1	First appearance of sounds marking systolic pressure.
Phase 2 & 3	Increasingly loud sounds.
Phase 4	Abrupt muffling of sounds
Phase 5	Disappearance of sounds marking diastolic pressure.

Classification of blood pressure

Classification of hypertension as per API- Textbook of Medicine:

Category	Systolic	Diastolic
Optimal	<120	<80
Normal	120-129	80-84
High Normal	130-139	85 –89
Hypertension (140/90)		
Stage I	140-159	90 -99
Stage II	160-179	100-109
Stage III	180	110

Table: Normal & Hypertension range of Blood Pressure

At PHC-HWC level mercury & aneroid BP apparatus are provided. In these instruments BP can be recorded.

2.2.4 Respiratory rate:

Count the patient's respiration for one minute, starting when patient's attention is directed elsewhere. It is convenient to do this when the patient thinks that you are still counting pulse. The normal rate in adults is about 16 – 20 per minute.

2.2.5 Primary skin lesions:

Macule - Non-palpable area & altered colour of normal skin
Papule - Palpable elevated small area of skin- (< 0.5 cm)
Nodule - Solid palpable lesion within the skin- (> 0. 5 cm)
Vesicle - Small clear fluid filled blister (<0.5 cm)
Pustule - Blister containing pus
Plaque - elevated area of skin (>=2 cm)



2.2.6 Scale for grading muscle function:

Grade-0: Complete paralysis.
Grade-1: A flicker of contraction only.
Grade-2: Power detectable only when gravity is excluded by appropriate postural adjustments.
Grade-3: Limb is held against force of gravity but not against examiners resistance.
Grade-4: Movement possible against moderate resistance.
Grade-5: Normal power is present.

2.2.7 The Glasgow Coma Scale (GCS):

Glasgow Coma Scale enables relatively accurate assessment of improvement or deterioration in patient's conscious state.

Table: Scoring according to Glasgow coma scale

Eye Opening		Verbal response		Motor response	
Open eyes Spontaneously	4	Oriented	5	Obeys commands	6
Open eyes in response to voice	3	Confused	4	Localizes pain	5
Open eyes in response to painful stimuli	2	Inappropriate	3	Normal withdrawal	4
Does not open eyes	1	Incomprehensible	2	Abnormal flexion	3
None		None	1	Abnormal extension	2
				None	1

Brain injury classified as:

Severe with GCS < 9
Moderate with GCS 9-12
Minor with GCS >/= 13

Best score - 15, Worst score - 3. Prognosis is guarded if score is 6 or below.
This scale is important for assessment of unconscious patient, especially for quick assessment of mass causalities but limited applicability to children.

2.2.8 Clinical consequences of thrombocytopenia

This assessment is useful for management of case of Dengue Haemorrhagic Fever.

Table: Clinical features according to platelet count

Platelet count (In thousands)	Clinical features
> 100	Nil
50-100	Possible excessive bleeding after major trauma
20-50	Possible excessive bleeding after minor trauma
< 20	Spontaneous haemorrhage, purpura & petechiae highly likely
< 10	Significant risk of major bleeding, cerebral haemorrhage, internal bleeding.

Normal values for important investigations: (Refer Annexure 2.1 (Vol. II))

2.3. Suturing:

Suturing is the most versatile, least expensive and most widely used technique of securing tissue during an operative procedure.

2.3.1 Sutures:

Sutures are made of a variety of materials with a variety of properties. It may be synthetic or biological, absorbable or non-absorbable and constructed with a single or multiple filaments. Suture is graded according to size. The most popular grading system rates the suture material downward from a very heavy 2 to a very fine ophthalmic suture of 10/0. Tubectomy like

operation can be completed with suture material between size 2/0 and 1. Different materials have different strength characteristics. The strength of all sutures increases with their size.

Absorbable suture:
A suture that degrades and loses its tensile strength within 60 days is generally considered to be absorbable.

Catgut is pliable, is easy to handle and inexpensive. Chromic catgut lasts for 2-3 weeks and is used for ligatures and tissue suture. Do not use it for closing fascia layers of abdominal wounds, or in situations where prolonged support is needed. Plain catgut is absorbed in 5-7 days, and is therefore useful when healing is expected within this period. It is also useful for suturing mucous membranes or when it is not possible for the patient to return for skin suture removal.
Polyglycolic acid is the most popular suture material because it is absorbable and has long lasting tensile strength. It is an appropriate suture for abdominal closure. The absorption time for this suture is considered to be 60-90 days.

Non-absorbable suture:
Braided suture is usually made of natural products (silk, linen or cotton). It is acceptable in many situations, but is contraindicated in a wound that is contaminated.
Synthetic mono-filament suture, such as nylon polyproamide, may be left in the deeper layers, and is not contraindicated in situations of contamination. It is often used as continuous suture.
Use non-absorbable suture material when possible.

2.3.2 Needles:

Surgical needles are classified in three categories:

- Round bodied
- Cutting
- Troche
- Within these categories, there are hundreds of different types.

Important aspects of suturing:

- Suturing within 6 hours after trauma.
- Depth of wound to be assess accordingly decides that suture to be given in layered form.
- Use cutting needles on the skin, and for securing structures like drains.
- Use round-bodied needles in fragile tissue.
- Troche needles have a sharp tip but a round body. They are useful when it is necessary to perforate tough tissue, but when cutting the tissue would be undesirable, as in the linea Alba when closing the abdominal wall.
- The size of the bite, and the interval between bites, should be consistent and will depend on the thickness of the tissue being approximated.
- Use the minimal size and amount of suture material required to close the wound.
- Leave skin sutures in place for average of 7 days. In locations where healing is slow and cosmetic is less important (the back and legs), leave sutures for 10-14 days.
- In locations where cosmetic is important (the face), sutures can be removed after 5 days but the wound should be reinforced with skin tapes.

2.4. Management of Emergency:

2.4.1. Malaria:

Cerebral malaria:

Cerebral malaria is an acute emergency needing urgent treatment. Confirmation of diagnosis by laboratory method is essential for reporting a cerebral malaria case.

Specific treatment:

Quinine hydrochloride is the drug of first choice. The dose is 10 mg/kg body weight eight hourly. In adults, maximum dose is 1950 mg in 24 hrs.

Severe malaria:

Clinical features:

Severe manifestations can develop in P. falciparum infection over a span of time as short as 12 – 24 hours and may lead to death, if not treated promptly and adequately. Severe malaria is characterized by one or more of the following features:

- Impaired consciousness/coma
- Repeated generalized convulsions
- Renal failure (Serum Creatinine>3mg/dl)
- Jaundice (Serum Bilirubin>3mg/dl)
- Severe anaemia (Hb<7g/dl)
- Pulmonary oedema/acute respiratory distress syndrome
- Hypoglycaemia (Plasma Glucose<40mg/dl)
- Metabolic acidosis
- Circulatory collapse /shock (Systolic BP <80mm Hg, <70mmHg in children)
- Abnormal bleeding and DIC
- Haemoglobinuria
- Hyperthermia (Temperature>104oF)
- Hyper-parasitaemia (>5% parasitized RBCs in low endemic and
- >10%in hyper endemic areas)

Foetal and maternal complications are more common in pregnancy with severe malaria; therefore, they need prompt attention.

Microscopic evidence may be negative for asexual parasites in patients with severe infections due to sequestration and partial treatment. Efforts should be made to confirm these cases by RDT or repeat microscopy. However, if the symptoms clearly point to severe malaria and there is no alternative explanation, such a case should be treated accordingly.

2.4.2 Management of complications:

For management of severe malaria, health facilities should be equipped with the following:

- Parenteral antimalarials, antibiotics, anticonvulsants, antipyretics
- Intravenous infusion equipment and fluids
- Special nursing for patients in coma
- Blood transfusion
- Well-equipped laboratory
- Oxygen

If these items are not available, the patient must be referred without delay to a facility, where they are available.

Artesunate: 2.4mg/kg I.V. or I.M. given on admission (time=0), then at 12 hours and 24 hours, then once a day (Care should be taken to dilute artesunate powder in 5% Sodium bi-carbonate provided in the pack).

Quinine: 20 mg quinine salt/kg on admission (I.V. infusion in5% dextrose/dextrose saline over a period of 4 hours) followed by maintenance dose of 10mg/kg 8 hourly; infusion rate should not exceed 5mg/kg per hour. Loading dose of 20mg/kg should not be given, if the patient has already received quinine. **NEVER GIVE BOLUS INJECTION OF QUININE.** If parenteral quinine therapy needs to be continued beyond 48 hours, dose should be reduced to 7mg/kg 8 hourly.

Artemether:3.2mg/kg I.M. Given on admission then 1.6mg/kg per day.

Arte ether: 150 mg daily I.M. for 3 days in adults only (not recommended for children).

Note:

- Once the patient can take oral therapy, the further follow-up treatment should be as below:
  - Patients receiving parenteral quinine should be treated with oral quinine 10 mg/kg three times a day to completed course of 7 days, along with doxycycline 3 mg/kg per day for 7days. (Doxycycline is contra indicated in pregnant women and children under 8 years of age; instead, clindamycin 10 mg/kg body weight 12 hourly for 7 days should be used).
  - Patients receiving artemisinin derivatives should get full course of oral ACT.

However, ACT containing mefloquine should be avoided in cerebral malaria due to neuro psychiatric complications.

- Intravenous preparations should be preferred over intramuscular preparations
- In first trimester of pregnancy, parenteral quinine is the drug of choice. However, if quinine is not available, artemisinin derivatives may be given to save the life of mother. In second and third trimester, parenteral artemisinin derivatives are preferred.

In children dose is calculated as - Age in years / 20 x adult dose:

Quinine is given as IV injection or in IV drip. Dose repeated after every 8 hours.

- IV injection is given in 5% dextrose 500 ml drip over a period of four hours.
- Before starting drip, give 100 ml of 25% dextrose & again infuse 100 ml or 25% dextrose after completion of quinine drip, because there is hypoglycaemia after quinine drip.
- At PHC-HWC never give IV quinine diluted in 20 ml of normal saline, as there is no ECG monitoring at PHC- HWC level.
- Half the dose if patient has oliguria or black coloured urine
- Check pulse and blood pressure two hourly especially if patient has cardiac disease.
- Check for tinnitus or vertigo daily from the day of starting the dose and for ectopic or bradycardia on third day. Stop quinine and refer patient to specialty hospital if any of the toxicity signs are observed.
- Add Tetracycline 250 mg 6 hourly or Doxycycline 100 mg. once a day
- When patient becomes conscious oral quinine in the same dose as 10mg/kg 8 hourly is given.
- Total duration of quinine treatment is over a period of 7 days.

Supportive treatment:

- If high fever, give Paracetamol 15mg/kg body weight in three divided doses.
- For control of convulsions administer IV Diazepam 0.15mg/kg body weight.
- In case of hypoglycaemia give IV 25% dextrose.
- Avoid steroids, heparin, adrenaline.
- Patient should be discharged after giving radical treatment.

2.4.2 Snake bite:

Snakebite is an acute life threatening, time limiting medical emergency. It is one of the most common emergencies in rural areas. When a snake bite patient is brought to PHC-HWC, stop all other activities and start treatment of snakebite.

Poisonous snakes bite:

- **Neurotoxic:** Cobra, King Cobra, Common Krait, Branded Krait, Coral.
- **Vasculotoxic:** Pitless-Russells Viper, saw scaled viper, Pit Bamboo snake rule suggests non-poisonous snake bite.
- **Myotoxic:** Sea Snakes

Signs and symptoms:

As ASV dose is same for all types of poisonous snakes, main aim of examination of patient should to be decide whether snake bite is poisonous or non- poisonous.

- Ptosis (most important & seen early), dysarthria, dysphasia, and respiratory paralysis is common in cobra and krait bite.
- Suspect cobra bite if there is local oedema / Necrosis at the site of bite, giddiness and convulsions.
- Minimal or no local signs, abdominal pain and chest pain are suggestive of krait bite.
- Sever local Pain, Local bleeding, rapid progressive oedema, regional tender lymphadenopathy, bleeding gums, hematemesis, haemoptysis, bleeding of venipuncture site are suggestive of viper bite. If patient is well after 6 hours, bite was non-poisonous.

Investigations:

20 minutes WBCT (Whole blood clotting time) is simple, bed side gold standard test for diagnosis of snake bite. Draw 2 cc blood of patient and place in new test tube. (tube washed with detergent should not be used). Observe time of clotting of blood in test tube. WBCT more than 20 minutes is suggestive of vasculo-toxic envenoming. Perform test at the time of admission and every 6 hourly. Adjust dose of ASV as per test results.

Management:

ABCDE approach:

- **A**irway
- **B**reathing (respiratory movements)
- **C**irculation (arterial pulse)
- **D**rugs
- **E**xposure and environmental control

Reassurance:

Psychological upset, severe fright may cause shock, for which patient needs assurance.

Measures to retard absorption of poison:

- Immobilize the bitten limb with a splint. If crepe bandage is available whole limb should be bandaged firmly to a splint.
- If patient comes within 30 minutes of bite, infiltrate 20 ml. ASV locally at the site of bite. This will neutralize 50% of snake venom.
- Avoid any interference with the wound (incisions, rubbing, vigorous cleaning, massage, application of herbs or chemicals)
- Infection, increase absorption of the venom and local bleeding.
- AVOID Tight tied tourniquets.

Anti Snake Venom (ASV):

- It is most effective if given within 1-4 hrs. after the bite.
- Freeze dried ASV powder is reconstituted by adding 10ml distilled water.
- Sensitivity test is performed by injecting 0.02 – 0.1 ml of 1:10 dilution of ASV intradermal. If no reactions occur within 30minutes then give IV.
- 60 ml. of ASV (6 vials) is added to 500 ml. Normal Saline & given IV over 1-2 hrs.
- Dose can be repeated if neurotoxicity or shock persists or recurs after few hrs.
- If patient is sensitive, desensitization is carried out using small dose SC & increasing doses IM.
- Reactions can be prevented by pre-treatment with adrenaline (0.5 ml. IM 15 minutes prior), anti-histamine and hydrocortisone.
- Dose for children is same as adults.

Supportive treatment

Supportive treatment should be given which consists of treatment of hypovolemia, care of wound by washing it with antiseptic solution, prophylactic antibiotic like penicillin, erythromycin and TT immunization. (Avoid NSAIDs)

- Check for bleeding tendency and urine output.
- Neuroparalytic snake bite: Immediately give Atropine 1 ampoule followed by Neostigmine 1 ampoule. This is lifesaving treatment. Repeat the dose every 15 minutes for 6 times. Then taper i.e. give after 1 hr, 3 hr and 6 hours. Omit if there is response. If patient gives response to Atropine + Neostigmine then it is cobra bite, if not then Krait bite.
- In Krait bite, there is delayed neuroparalysis, therefore patient should be observed for 12 hours for ptosis, difficulty in deglutition, diplopia, respiratory difficulty etc. If these signs develop, treat patient with atropine, neostigmine as per treatment of cobra bite.
- Respiratory paralysis: If you are confident then intubate (Endotracheal intubation) the patient and keep patient on Ambu bag. If no confidence, start Atropine + Neostigmine, arrange for the transfer of patient to hospital with ventilator facility, continue to give this medication as per given schedule above.

Health Education:

- Use proper clothing, wear shoes during farm work.
- Use stick and torch while working in night hours.
- Do not run in case of snake bite, instead call for help, immobilize bitten part and keep part at lower level than heart.

- Immediately rush patient to hospital, never go to quacks as poison can be neutralized by giving injections only.
- Handel dead snake carefully.

2.4.3 Poisoning:

Large numbers of insecticides are available in rural areas for agricultural purpose. The poisoning case may come with accidental or deliberate consumption of insecticide or exposure to insecticide while spraying on the crops. Important aspect in management of poisoning is to assess degree of severity of poisoning, use antidote if available and provide life support if necessary to keep the patient alive till the effect of poison is over.

Immediate Management:

ABCDE approach

- **A**irway
- **B**reathing (respiratory movements)
- **C**irculation (arterial pulse)
- **D**rugs
- **E**xposure and environmental control

Respiration:

First try to clear the respiratory route of patient. Food, Vomit, secretions & dentures should be removed from patient's mouth.

- Head low in left lateral position to minimize the risk of aspirating gastric contents into the lungs.
- Assess the pulse, BP, temperature & pupil size.
- Diagnosis should be made on history given by patient & relatives. Clues may be obtained from circumstantial evidence like empty bottles or tablets, capsules found nearby.
- Gastric lavage – Efficacy of stomach wash decreases with time. Therefore, gastric lavage should be considered only if a patient has ingested life threatening amounts of poison and brought to PHC (HWC) within one hour. It is dangerous to perform gastric lavage on unconscious patient and in patients with suspected kerosene or acid poisoning or corrosive poisoning.
- After passing tube, aspirate the stomach contents & introduce 250 ml lukewarm water. Aspirate after 2-3 minutes. Repeat the procedure until 2 Liters have been used or until lavage fluid is clear. Gastric lavage is contraindicated in corrosive poisoning.
- Emesis – Making patient drink a glass of salt water or stimulating the pharynx with the fingers are home remedies & have low efficacy.
- Fluid & electrolyte balance: For the patients who are vomiting, give IV fluids – Normal saline, Ringer lactate
- Give Mag. sulph. powder 30 gm to all patients after gastric lavage.

Treatment of specific poisons:

Patient usually brings empty pack of ingested poison. Observe contents of pack carefully. Go through treatment. Measures suggested on pack and then start management of patient.

Chlorinated hydrocarbons (Dicofol, Endosulfan, Lindane):

- Control convulsions by administrating diazepam 5-10mg IV
- Start calcium Gluconate 10 % iv
- Give fat free diet

- Do not give alternative directives, morphine, theophylline, ephedrine and atropine

Organophosphorus compounds: (chlorpyriphos, Diaxinon, Dichlorovas, Fenthion, Malathion, Monocrotophos, Thiometon etc.)

Inject atropine sulphate intravenously in a dose of 2-4 mg (0.04-0.08mg/kg body weight) every 10 minutes till sign of atropinisation (dry mouth, tachycardia and dilation of pupil) Occurs. Maintain this level for 24 hours. Give atropine afterwards if symptoms reappear. While keeping patient duly atropinized, administer 2 – PAM 1000-2000 mg (5 mg/kg body weight) Repeat after 2 hours if necessary.

Synthetic pyrethroids (Allethrin, cyfluthrin, Deltamethrin, Permethrin)
- Treatment is symptomatic
- Perform gastric lavage and administer activated charcoal
- Control seizure with injection diazepam
- Refer patient to centre with facility of MICU.

Carbamate (Carbaryl, carbendazim, Fenabucarb, Propoxur):
Inject massive dose of atropine sulphate iv 1-3 mg. Repeat every 10 minutes until signs of atropinisation occurs. A Total of 25-30 mg atropine may be required on first day. If patient is cyanosed, incubate patients and then start Atropine.
In case of severe poisoning inject 1 gm Protopam IV or IM Treat convulsions with diazepam 10-20mg IV.

2.4.4. Anaphylactic shock:

It is one of the acute & life threatening emergency, for which prompt & proper treatment should be given to the patient.

Common stimuli for anaphylaxis:

Antibiotics	Penicillin, streptomycin
Anaesthetic agent	Lignocaine
Others	Foods, parenteral iron dextrose
Antisera	ASV

Onset may be instantaneous or within few minutes after IV injection or sometimes after half hour of exposure. Anaphylactic reaction begins with itching, flushing of skin, severe dyspnea, and fall of BP.

Management:
- Ensure free airway.
- Start IV fluids (Normal saline) as fast as possible, one point every 30 minutes till the hypotension is corrected.
- Start Oxygen and give in high concentration
- Inj. Adrenaline 0.5 - 1 ml. of 1:1000 strength. Dilute in 10 ml of Normal saline, give over 10 minutes. Repeat every 30 minutes if necessary. If no response or bronchospasm or cardiovascular collapse, give 5-10 ml. of 1: 10,000 solution IV.
- Inj. Hydrocortisone 200 mg. IV followed by 100 mg. 6 hrly. to prevent late manifestations of anaphylaxis for first 24 hours. Shift to oral after 24 hours and taper in 5 days.
- Aminophylline 250 mg. IV in 20 ml dextrose to relieve bronchospasm.

- Diphenhydramine 50 mg IV (1 mg/kg) slowly only after hypotension is corrected and repeated if necessary. Injection Phenargan 25 mg.

2.4.5. Drug reaction:

It is common observation to get patients of drug reaction in OPD. Such patients should be carefully examined and given treatment as follows:

Systemic Management:

- Stop all the drugs that the patient may be taking.
- Corticosteroids should be given in high doses. If patient is very toxic, give Hydrocortisone 200 mg IV stat, then 100 mg. 6 hourly, Dexamethasone 4 mg. IM 8 hourly or Prednisolone 1mg/kg/day depending on severity.
- Antibiotics – Antibiotic of choice is Erythromycin, Roxithromycin, Azithromycin. The suspected antibiotic should be avoided. Start with one tablet 250-500 mg. on the first day, 2 tablets on the second day & if well tolerated i.e. there should be no exacerbation of disease, then increase tablets 3-4 times a day.
- Avoid analgesics as far as possible. For fever use ice bag, sponging & fan. Only if fever is very high Paracetamol may be tried, starting with very small doses. Any analgesic, which is suspect, should be avoided.
- If patient is in shock, first treat shock as described in Anaphylactic shock management.
- Start Antihistaminic in low dose first and give up to five days.

Local (Topical) Management:

- Use only bland, soothing applications such as calamine lotion.
- Take proper hygienic measures i.e. sponging with mild antiseptic.

2.4.6. Scorpion sting

Red scorpion is very poisonous than black scorpion. Management of scorpion bite consists of following actions

- Use of ice bags to reduce pain and to slow the absorption of venom via vasoconstriction.
- Local infiltration of 1% lignocaine if severe pain.
- Systemic analgesics.
- Start Prazocin - 0.5 mg in children and 1 mg in adults orally.
- Administer Tetanus Toxoid.
- Antivenin if available – 10ml. IV over 10-30 minutes.
- For pulmonary oedema frusamide, 02 inhalation, aminophylline. Prazocin is the drug of choice.
- In patient with pulmonary oedema, Inj. Pethidine gives dramatic effect along with other measures like frusamide, 02 inhalation, aminophylline & Prazocin. Dose of Pethidine is 50 mg IM, which can be repeated after 12 hours.
- In patient with tachycardia, Hypertension and priapism, start Prazocin as prophylaxis.

2.4.7 Sickle cell crisis:

Sickle cell crisis is an acute life-threatening medical emergency. it is more common in some of rural areas. When patient of sickle cell crisis brought to PHC HWC, give quick attention to the patient.

Sign & symptoms: Abdominal Pain, joint pain, cough, fever, dyspnoea, anaemia, weakness, swelling of joints

Hepatic sequestration crisis & Priapism

Management:

- Treat the pain with Inj. Pentazocine or Morphine or Other NSAID.
- Oxygenation
- IV hydration
- Antibiotics
- Bronchodilators
- Blood transfusion (if possible)
- Sickle cell (Electrophoresis)
- Refer the patient to district hospital.

2.4.8 Heat stress:

Human beings are homoeothermic (warm blooded) and need to maintain a relatively constant deep body temperature. Substantial deviation from normal body temperature can result in adverse effects that range in severity from annoyance to life threatening illness.
Acute physiological response to heat stress includes perspiration and peripheral vasodilatation. Perspiration increases cutaneous moisture. allowing grater evaporative cooling. Peripheral vasodilatation tends to reroute blood flow. Enhancing transmission of heat from body's core to peripheral body parts. From where it is rapidly lost.
In Maharashtra State, Vidarbha & Marathwada region experience heat waves during summer season causing lot of heat stress related illnesses in community.

Important Disorders resulting from exposure to heat are as below:
Heat syncope:

- Person standing in sun becomes pale and collapses suddenly.
- This results from pooling of blood in lower limbs due to dilatation of blood vessels resulting in reduced blood returning to heart & lack of blood supply to brain. There is no practically rise in body temperature.
- Treatment consists of bringing patients in shade, giving head low position and rest.

Heat exhaustion:

- Heat exhaustion is milder illness than heat stroke. It is effect of exposure to high temperature for several days and is caused by imbalance or inadequate replacement of water & salts which are lost in perspiration due to thermal stress.
- Body temperature may be normal or slightly elevated, but does not exceed 102-degree F
- Symptoms are dizziness, weakness & fatigue.
- Treatment consists of plenty of fluids and electrolytes bringing patients in shade and fanning.

Heat hyperpyrexia:

- There is impaired functioning of heat regulating mechanism.
- It is defined as a temperature above 106-degree F & this may proceed to heat stroke.
- Treatment consists of plenty of fluids and electrolytes, bringing patients in shade and fanning.

Heat stroke:

- It is characterized by very high body temperature, which may rise to 110-degree F (43.3 degree C)
- Skin is dry and hot, there is failure of heat regulating mechanism.
- Patient may have delirium, convulsions & partial or complete loss of consciousness.
- Classically sweating is absent or diminished but many patients perspire profusely.

- Chances of death are significantly more.
- Treatment: Rapidly cooling body in ice water bath till rectal temperature falls below 102-degree F (38.9 degree C)
- Further treatment is supportive, concentrating on complications like hypovolemia, hyperkalaemia, hypercalcemia, bleeding diathesis, for which if needed patient may be referred to higher centre.

Role Of MO in Heat stress:

- Orient all health workers about effects of heat stress, preventive measures & control measures during monthly meeting April onwards.
- Keep adequate stock of medicine like ORS, IV fluids
- Ensure that fans are working in PHC-HWC & also deep-freezer, refrigerators, coolers in working condition
- Keep ready ice & ice packs every day.
- Appropriate management of heat stroke patients
- Visit to Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) works in PHC-HWC area & inform concerned about effects of heat stress, Management required, preventive measures etc.
- IEC about heat stress in PHC-HWC area.

Heat Stroke Reporting:

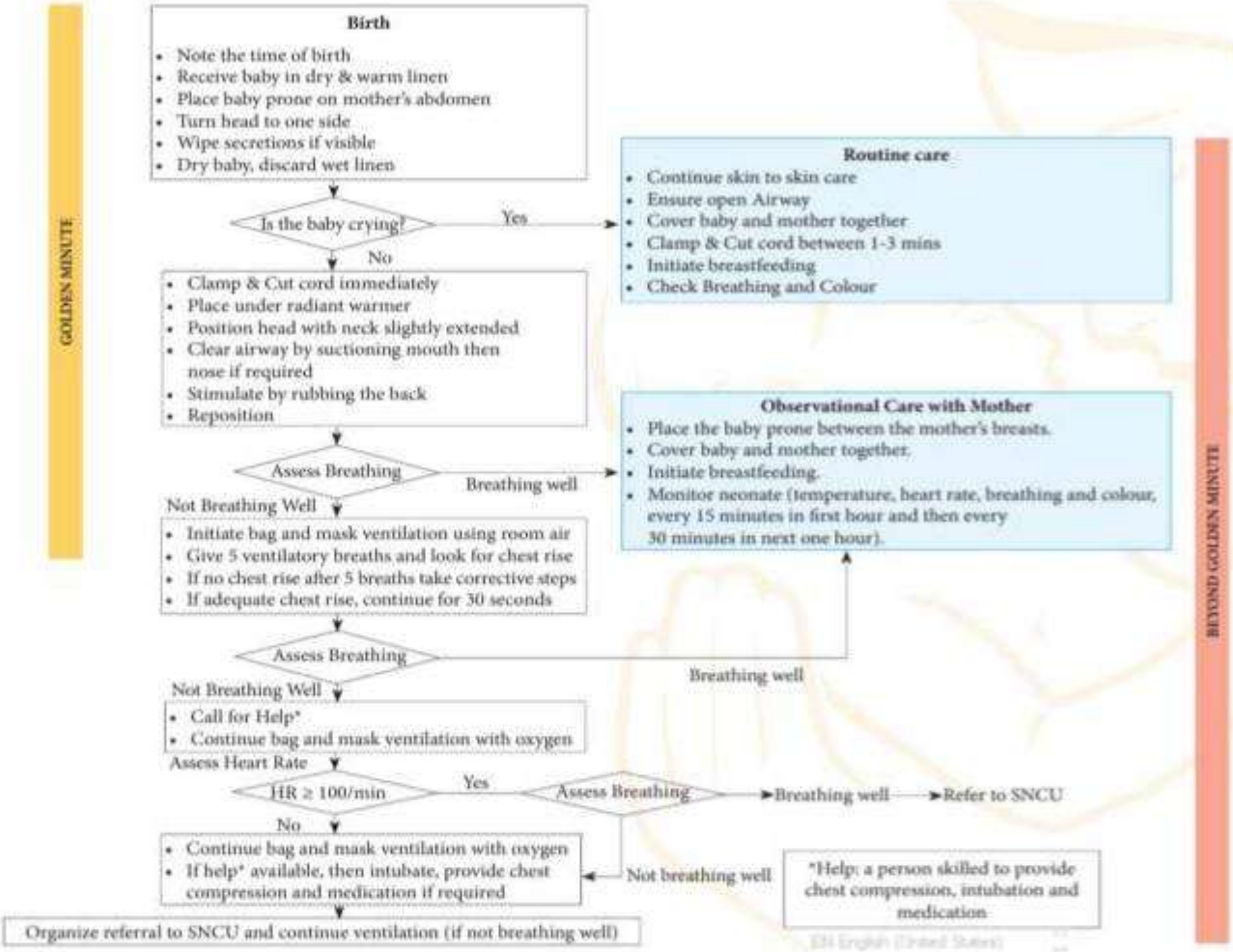
Submit heat stroke report daily, weekly to DHO. Reporting Weeks and dates are fixed for submitting weekly heat stroke report. Every year heat stroke reports starts from 1st April till June end. MO should submit daily report to DHO.

2.4.9 Perinatal/ Birth Asphyxia (Asphyxia neonatorum)

Foetal distress which occurs in intra-natal period leads to Asphyxia neonatorum. If foetal distress is identified during intra natal period support the mother with:

- Left lateral position
- Oxygen through mask
- I. V. Fluids
- Stop oxytocin

Resuscitation of newborn:



(To be displayed at Labor room)

2.4.10 Resuscitation of patient

Resuscitation of patients is required in emergency situations, e.g. severe trauma, drowning and other accident emergencies.

Priorities for resuscitation are:

- Ventilate.
- Perform cardiac massage.
- Restore circulating volume loss.
- Remove any cause, hazard or noxious agent.
- Make a diagnosis, if possible.

There are no drugs that will make someone breathe. The only treatment for the non-breathing patient is to inflate the lungs mechanically, preferably with a resuscitation bag and mask or a tracheal tube.

Table: Drugs in resuscitation (adult doses)

Drug	Indication/Action	Dose
Epinephrine (Adrenaline	Cardiac Arrest, Acute anaphylaxis	0.5 to 1 mg IV
Atropine	Bradycardia, Vagal asystole	0.5-1.0 mg IV
Mephentine	Hypotension after spinal anaesthesia	10-30 mg IV
Calcium chloride (Not in patients on Digoxin)	Inotropic support in cardiac arrest	10 mg in 10 ml IV
Sodium bicarbonate	Proven acute acidosis	30-100 mmol (50 ml IV stat if hypotension)
Lidocaine	Ventricular arrhythmias	1-2 mg/kg IV
Beta blockers	Hypertensive crisis	Various beta blockers

Key points about drugs

- Always give drugs intravenously during resuscitation.
- Most drugs are only helpful once the cause of cardiac arrest has been diagnosed, but epinephrine is an exception and should always be given to patients with circulatory arrest.

Resuscitation skills

Some practical skills are essential for initial resuscitation of injured patients. Only way to learn them is by gaining practical experience under supervision of a person who is skilled in their use. Skills you need include:

- Making a rapid examination to diagnose and treat life threatening injuries, including possible need for cardiopulmonary resuscitation.
- Airway skill: simple manoeuvres artificial airway use, Tracheal intubation and tracheotomy, if needed.
- Use of an intravenous cannula in any available vein
- Management of shock
- Patient handling

Once patient is stable, shift patient to specialty hospital with full details of treatment given at PHC HWC with referral slip.

2.4.11 Acute severe asthma (Status Asthmatics)

Acute severe Asthma also known as Status Asthmatics. It is acute exacerbations of asthma and not responding to Bronchodilators and Corticosteroids routinely.

Symptoms are breathless, dry cough extreme wheezing, its life threatening episode of airway obstruction.

Drugs:

- Aerolised Medication – Salbutamol, (2.5mg in 2.5cc Saline Nebulise,
- Ipratropium bromide
- I.V. Corticosteroid, Aminophylline
- I.V Ketamine.
- Oxygen therapy
  (1% of patient, may require Mechanical Ventilator)

Expectorants and mucokinetic drugs do not have any significant role.

Management of acute severe asthma

Hour 1: 4 doses of inhaled salbutamol ± ipratropium, 100 mg hydrocortisone (IV) or oral prednisolone 60 mg, oxygen, adequate hydration

Hour 2: 4 more doses of inhaled salbutamol with ipratropium, IV aminophylline, subcutaneous terbutaline/adrenaline 0.3-0.5 mg (0.01 mg/kg for children) for 3 doses, Oxygen Therapy

Acute severe asthma not responding within 2 hours of treatment, or deteriorating: **Refer Immediately**

2.4.12 Status epilepticus:

The seizure that lasts longer than 5 minutes, or having more than 1 seizure within a 5 minutes period, without returning to a normal level of consciousness between episodes is called status epilepticus.

This is a medical emergency that may lead to permanent brain damage

There may be multiple causes for status epilepticus

Common causes are:

- Breakthrough seizure in known case of epilepsy
- Intracranial infection/ SOL
- Electrolyte imbalance
- Drug induced seizures.

Treatment

It is a Medical Emergency patient need urgent management for status epilepticus.

Patient should be in lie down, at mid prone position with slight lifting chin to avoid tongue bite and asphyxia.

ABCDE approach

- **A**irway
- **B**reathing (respiratory movements)
- **C**irculation (arterial pulse)
- **D**isability of the nervous system (level of consciousness)
- **E**xposure and environmental control (protect from cold, risk of drowning etc.)

Intravenous Medications:

Benzodiazepines:

- Phenytoin are the first line drugs recommended for termination of seizures.
- Diazepam 10.mg iv slowly or lorazepam 2 to 4 mg are main line of treatment.
- Diazepam (or midazolam), thiopental and propofol infusion are useful for control of Refractory SE (RSE).
- Other drugs are in use like sodium valproate and Valproic acid.

After cessation of seizure cause of seizure to be identified and treated accordingly.

2.5 Operation Theatre (OT):

In PHC -HWC, Operation Theatre is mainly used for Family planning operation and MTP. MO PHC-HWC should personally give attention for cleanliness and fumigation. Important aspects of OT (cleaning, fumigation & maintenance) are described in this chapter.

2.5.1 General aspects related to Operation Theatre

- Adequate space, good lighting and ventilation is required for OT.
- All the equipment, instrument and emergency medicines kept in OT should exclusively be used for OT purpose only. Never take them out for general patients.

- Keep all doors of the operating room closed, except as needed for the passage of equipment, personnel and the patient.
- Store some sutures and extra instruments in OT to decrease the movement of health staff during procedure.
- Allow minimum number of health staff to enter OT
- Between the uses, clean and disinfect table. Clean OT at the end of each day, clean all surgical instruments immediately after use and keep ready for autoclaving.

2.5.2 Culture sensitivity swabs

- OT swabs should be sent for culture sensitivity before first use of OT after renovation or if OT is closed for one month or more and thereafter every six months.
- If swab report is positive after culture, washing & refumigation should be done. Again, swabs should be sent for culture. Never Use OT till swab report comes negative.

2.5.3 Sponge and instrument counts:

It is essential to keep track of the materials being used in the OT in order to avoid potentially disastrous loss of sponges and instruments in the abdomen.

- It is a standard practice to count supplies (instruments, needles and sponges):
  - Before Starting Surgery
  - On completing the procedure.
  - Before final closure
- The aim is to ensure that materials are not left behind in abdomen or lost. Pay special attention to small items and sponges.
- Create and make copies of a standard list of instrument/sponges for use as a checklist for each procedure and keep exact number as stated in checklist on table. This will be useful to check equipment at the beginning of operation and then for counts during closure of abdomen and after completion of case.

2.5.4 Scrubbing:

Before surgery, all members of the surgical team i.e. those who will touch the sterile surgical field; surgical instruments or the wound should scrub their hands, arms to the elbows. Scrubbing cannot completely sterilize the skin, but will decrease the bacterial load and risk of wound contamination from the hands.

Scrubbing Instructions:

- Remove all jewellery and trim the nails.
- Use soap, a brush (on the nails and finger tips) and running water to clean thoroughly around and underneath the nails.
- Scrub your hands and arms up to the elbows.
- After scrubbing, hold up your arms to allow water to drip off your elbow.
- Turn off the tap with your elbow.
- Dry them with a sterile towel and make sure the towel is not taken near sterile surgical field or used during operative procedures.
- Hold your hands and forearms away from your body and higher than your elbows until you put on a sterile gown and sterile gloves.
- Surgical gloves prevent transmission of HIV through contact with blood, but there is always the possibility of accidental injury and of a glove being punctured. Promptly change a glove punctured during an operation and rinse your hand with antiseptic or re-scrubs if the glove has leaked during the puncture. Patient safety is of primary concern; do not compromise it. Change your gloves.

2.5.5 Cleaning of OT:

- After each use clean the floor with a mop soaked in 0.5% chlorine solution.
- Operating table, table tops, light handles should be wiped with 0.5% chlorine solution.
- For 0.5% chlorine solution use either bleaching powder or hypochlorite solution. 15gm of bleaching powder is added in 1 litre of water or if 5% hypochlorite solution is available at PHC-HWC, make dilution with water as 1:10 to give 0.5% chlorine solution.
- Weekly cleaning of OT by washing & using disinfectant is must.

2.5.6 Fumigation:

Operation Theatre Fogging:

- Calculate the room size (OT) in cubic feet by multiplying Length X Breadth X Height.
- Hydrogen peroxide10-11% w/v with 0.01% w/v, diluted silver nitrate solution is recommended to use for the purpose of fumigation instead of formalin + KMNO4.
- Hydrogen peroxide 10- 11% w/v with 0.01% w/v, diluted silver nitrate solution used for fumigation, as well as surface disinfectant recommended by Expert Committee of DHS.
- Close the windows and ventilators tightly. If any openings found, seal it with cellophane tape or other material.
- Switch off all lights, AC and other electrical and electronic items.

2.5.7 Emergency Tray

Following are important aspects to be observed by MO regarding emergency drugs:

- Emergency medicine tray should be kept at injection room, OT, labour room, ward.
- Fix the responsibility of checking these trays regularly with either headquarter ANM or HA (F)
- She should regularly check & replenish the drugs that are used.
- She should see expiry date of these medicines & when expired it should be replaced immediately.

List of emergency drugs to be kept in emergency tray : (Injectable preparations):

- Adrenaline
- Atropine Sulphate
- Corticosteroids (Hydrocortisone and Dexamethasone)
- Aminophylline
- Diazepam/Phenobarbitone
- Pentazocine
- Sodium Bicarbonate (7.5%)
- Calcium Chloride
- Furosemide
- Dopamine
- ASV
- Ergometrine
- Oxytocin
- Misoprostol
- Dextrose 5% in water
- Dextrose 5%in normal saline
- Glucose 25%
- Ringer Lactate Solution

In addition to this, needles, syringes, IV set, scalp vein set should be kept in the tray. Venesection tray, oxygen cylinder must be kept ready.

2.6 Laboratory (in house)

It is important to develop facilities for carrying out some basic laboratory tests which need to be performed at PHC- HWC. This facility is for diagnosis and follow up of patients. Laboratory Technician attached to PHC-HWC (from Malaria, Tuberculosis, and any other department) should perform Basic laboratory tests. Basic laboratory tests performed at PHC-HWC are:

- Haemoglobin estimation by Sahli's method. (all PHCs- HWCs)
- Urine examination for: Albumin, Sugar (all PHCs -HWCs)
- Peripheral Blood Smear for Malaria parasite (all PHCs-HWCs)
- Sputum smear preparation & staining (all DOTs Microscopy centres)

2.6.1 Haemoglobin estimation by Sahli's method:

Haemoglobin estimation is performed for all antenatal mothers & tubectomy cases.

Procedure:

- Take 0.1 N HCL up to mark 20 in a glass tube from Sahli's apparatus
- Clean the ring finger of left hand with spirit & prick with the sterile disposable lancet.
- Wipe out first drop of blood. Take the blood in Sahli's pipette up to the mark 02 ml.
- Put this blood in glass tube of Sahli's apparatus. Mix HCL & blood well with pipette.
- Wait for 8 minutes.
- Add distilled water or HCL, drop by drop in a glass tube & match the colour in glass tube with colour indicator plates on the haemoglobin meter.
- Take the reading on glass tube when colour from test tube matches with the colour on haemoglobin meter.
- This reading indicates Hb as gm %.
- While taking reading, Sahli's apparatus should be at eye level, so that reading will be correct.

Diagnosis of anaemia:

World Health Organization has given the cut off points to diagnose anaemia as below:

Male	-	13gm - 17 gm
Females:	-	12 gm - 15 gm %
Pregnant women:	-	11 gm %- 12gm %
Children:	-	12gm - 16 gm %

(RCH Maternal Health Programme)

2.6.2 Urine examination

Urine examination for albumin & sugar is indicated for all ANC, tubectomy cases. The test can be performed by using Uristix or by using laboratory reagents.

Table - Interpretation of urine examination results

Observation	Interpretation	Albumin concentration
No turbidity.	Negative	No albumin
Cloudiness or ring can just be seen on black background.	Very slight trace (+ or –)	Albumin 0.01% or less.
Cloud distinct but not granular. No definite flocculation or the ring is sufficiently definite to be seen without a black background.	Slight trace (+)	Albumin 0.01 to 0.05%
Cloud is distinct & granular without definite flocculation. Ring is dense but not fully opaque when viewed from above.	Moderate trace (++)	Albumin 0.05 to 0.2%.
Cloud is dense with mark flocculation or the ring is heavy, opaque & sometimes curdy.	Heavy cloud (+++)	Albumin 0.2 to 0.5%.
Heavy precipitant on boiling. Solid or very dense ring.	Very heavy cloud (+ +++)	Albumin 0.5 to 3%.
Solid formation after boiling	Albumin boils solid.	Albumin 3% or more

Actions to be taken by MO

- If albumin is present in urine of ANC, she is a high-risk case. Check, whether she has preeclampsia. Regular follow up is essential.
- If tubectomy case has albumin, she will have to be investigated for cause of proteinuria. Do not perform tubectomy. Refer her to higher centre.

Urine Pregnancy Test (UPT):

Early diagnosis of pregnancy is necessary to ensure adequate care to pregnant mother, foetal growth and development and safe delivery. It should be undertaken as early as possible after the first missed period. To facilitate early identification of pregnancy UPT should be done using UPT kit.

Interpretation of UPT: Positive – 2 lines visible
Negative- only control line is visible
Invalid - no line visible or only test line is visible.

Actions to be taken by MO:

In case of invalid result repeat test with new kit.

Urine examination for sugar (Benedict test)

Urine sugar estimation is done at PHC-HWC for routine check-up of antenatal mothers, and as a pre operative investigation of tubectomy cases.

Procedure and interpretation of results

- Take 5 ml. of Benedict's solution in a test tube.
- Add 8-10 drops of urine.
- Boil on spirit lamp.
- Allow it to cool to room temperature and interpret results as follows according to change in colour

Interpretation of the results

Colour change	Sugar
Blue -	No sugar
Greenish blue +/-	Traces
Green +	0.5%
Greenish brown + +	1%
Yellow + + +	1.5%
Brick red + + + +	2%

Actions to be taken by MO:

- If sugar is present in urine of ANC, she is a high-risk case. Refer her to a higher centre. Regular follow up is essential.
- If it is puerperal Tubal ligation (within 6 weeks after delivery), sugar in urine may be due to physiological lactosuria. Call mother after one month and repeat the test. If urine is negative for sugar Tubectomy can be performed provided that there is no other contraindication. If urine is still positive for sugar, refer case to specialist as this could be Diabetes.
- If it is interval Tubal ligation (after six weeks of delivery) and urine is positive for sugar, refer case to specialist as this could be Diabetes.

2.6.3 Blood smear for Malaria Parasite

- Blood smear is collected from every patient of fever to confirm or exclude diagnosis of malaria.
- For taking blood smear sterilized pricking needle or disposable lancet should be used.

PBS Procedure:

- Blood Smear is taken from the tip of the ring finger of the left hand. In case of new born babies or small children sample should be collected from heel or the tip of big toe.
- Hold the finger. Apply gentle pressure & sterilize by using spirit swab. Allow spirit to dry.
- Prick the tip of finger. Blood will come out, wipe out first drop of blood. Next drop is placed in the middle of slide to prepare thin smear.
- Take another slide. Use it as a spreader. Keep the edge of that slide on the drop of blood & allow blood to run along its edge.
- Push the spreader along with the slide away from the drop, keeping the spreader at an angle of 45^{0}. Spreader should be in even contact with the surface of side till the blood is being spread. Thin smear prepared should be tongue shaped.
- To prepare thick smear – After collecting the drop to prepare thin smear, apply further pressure to express more blood & collect 2 to 3 large drops on the slide about 1 cm. from the previous drop.
- Using the corner of spreader join these 2-3 drops & make a round of diameter 1 cm. by circular movements of the corner of spreader. Allow the BS to dry.
- Slide number is written by using pencil on thick smear.
- Staining – Method is known as JSB (Jaswant Singh Bhattacharji Stain) staining.
- Night blood smear for filariasis.

2.6.4 Sputum smear preparation & staining

Sputum smear is collected from patients having cough for more than 2 weeks.

Preparation of sputum smear

- Sputum cups have been provided for collection of samples.
- Ask the patient to stand facing wall & keeping hands on waist.
- Ask the patient to take deep breath.
- Stand behind the patient & hold sputum cup in front of him, so that he can spit in cup. Cup should be immediately capped.
- Take a glass slide. Yellowish, thick sticky part of sputum should be spread on glass slide with the help of stick.
- Make it round of small coin size with the help of stick.
- Allow it to dry & then fix on spirit lamp by gentle warming.

Staining

Staining method is Ziehl Nelson (ZN) staining.

- Cover sputum smear with carbol fuschin by pouring it on slide.
- Warm the slide with the help of spirit lamp until steam rises from staining solution. Do not boil.
- Keep this for 5 minutes.
- Repeat the procedure again.
- Wash with water.
- Decolorize with 20% HCL acid and 70% alcohol till colourless.
- Wash with water.
- Counter stain with methylene blue and wait for two minutes.
- Wash with water and allow it to air dry.
- Examine the slide on microscope under oil emulsion.

	Result	Grading	No. of field
More than 10 AFB per oil immersion field	Positive	3+	20
1-10 AFB per oil immersion field	Positive	2+	50
10-99 AFB per 100 oil immersion fields	Positive	1+	100
1-9 AFB in 100 oil immersion field	Positive	Scanty	100
No AFB in 100 oil immersion field	Negative	0	100

(Ref: NTEP MO Module)

Apart from above mention lab tests other essential laboratory investigations are now out source at PHC-HWC.

2.7 Laboratory (Outsource Service)

Govt. of Maharashtra has outsourced laboratory Services for tests which are not carried out at PHC -HWC (AAM -Ayushman Arogya Mandir) level.

This aims to:

- Reduce the burden at Government Institute labs, which require specialized instruments and equipments.
- Zero out of pocket expenditure and easy accessibility to beneficiaries.

The MOU to establish with outsource agency in 34 districts of Maharashtra was signed on 3rd February 2017 for providing laboratory testing services to the person attending government hospital centres under DHS, at all level.

The outsource agency collection centres are functioning at 2500 government hospital centres in 34 districts of Maharashtra and the sample are transported to the connected 136 labs for testing and reporting.

The laboratory investigations are made available to the person in the remotest villages of the state, which is the mission of Govt of Maharashtra.

Outsource Laboratory Services:

- Phlebotomist at each Health Institute.
- Sample collection from 8 am to 1pm.
- Sample transport by using Cold Chain method.
- Sample Processing TAT (Turn Around Time) ranging from 2 hours to 2 days as given in test table.
-

Tests Conducted at PHC (Outsource agency)- Refer Annexure 2.2(Vol. II)

Report Delivery:

Patient's reports will be dispatch by 4 methods:

1. To patient on registered mobile number.
2. To facility by mail (on same day evening hours).
3. To the facility through hard copy-Next day.
4. MO PHC- reports link (PHC specific).

2.8 Pradhan Mantri Jan Arogya Yojana (PMJAY) and Integrated Mahatma Jyotirao Phule Jan Arogya Yojana (MJPJAY)

Preface:

State Government's Mahatma Jyotirao Phule Jan Arogya Yojana is being implemented in the state from July 2, 2012 and Ayushman Bharat - Pradhan Mantri Jan Arogya Yojana, is a health insurance scheme of the central government. PMJAY scheme is admissible to each member of family (83.63 lakh families) whose name is included in the list of SECC data. It was implemented in the state from September 23, 2018.Ayushman Cards and photo IDs are given to family members of these families through UTIITSL, COLOURPLAT, ZEYFER and Common Service Centers in Maharashtra.

As per the government decision dated February 26, 2019, it has been decided to combine the Ayushman Bharat-Prime Minister Jan Arogya Yojana with the Mahatma Jyotirao Phule Jan Arogya Yojana and implement both the schemes together in the state. Accordingly, the revised plan is being implemented in the state from 01.04.2020. The existing Mahatma Jyotirao Phule Jan Arogya Yojana and Ayushman Bharat-Pradhan Mantri Jan Arogya Yojana combined scheme and the matter of making some changes and expanding the scheme was under the consideration of the government. As per this scheme, Ayushman Bharat-Pradhan Mantri Jan Arogya Yojana (PMJAY) health protection per family per year is Rs. 5 lakhs while of Mahatma Jyotirao Phule Jan Arogya Yojana (MJPJAY) providing health protection per family per year upto1.5 lakhs.

In year 2023, Government has integrated both the schemes with changes in protection amount and included procedures.

2.8.1 Salient Features:

Previously, 991 treatments were covered under Mahatma Jyotirao Phule Jan Arogya Yojana and 1209 under Pradhan Mantri Jan Arogya Yojana. Out of these, 181 undemanded treatments are now scrapped. While 328 in-demand new treatments are included afresh. In the Pradhan Mantri Jan Arogya Yojana, the total number of treatments has increased by 147 to 1356 and same number of procedures are now included in the Mahatma Jyotirao Phule Jan Arogya Yojana. Out of the said 1356 treatments, 119 treatments will be reserved for Government Hospitals only, (refer Annexures 2.3(Vol. II))

2.8.2 Specialty and Procedures (Refer Annexure 2.4 (Vol. II))

- Now under the Mahatma Jyotirao Phule Jan Arogya Yojana, health protection per family per year will be Rs.5 lakhs.
- Treatment cost limit per patient in Mahatma Jyotirao Phule Jan Arogya Yojana for kidney surgery enhanced from Rs. 2.5 lakhs to Rs. 4.50 lakhs.
- Total 1350 Hospitals are empanelled under this scheme across State including Maharashtra - Karnataka Border Hospitals (10 hospitals from 4 districts of Karnataka). Apart from this, all government hospitals will be adopted in this scheme.
- All the newly opened hospitals in the backward areas if such hospitals so desire, will be adopted in this consolidated scheme, apart from the hospitals mentioned in (4).
- All ration card and domicile certificate holder families in the state are entitled under this scheme.
- In 2020, Late Balasaheb Thackeray Road Accident Insurance Scheme started for 74 road accident procedures with cost limit of Rs. 30,000/-. It is now included in this revised scheme with 184 road accident procedures with cost limit of Rs. 1,00,000/- (Refer Annexure 2.1(Vol. II))
- In future, funds received from this scheme will be kept at hospital level and permission will be given for utilization.

  At present as per GR dated 11 January, 2019, following distribution is permitted to utilize funds received through insurance company.
  - 25% will be given back to Government finance department.
  - 20% will be utilize by hospital for incentive measures to treating doctors and other staff.
  - Up to 3% will be given to outsource agencies for claims and necessary documentation.
  - 52% will be permitted to utilize in hospital for the items mentioned in Appendix-A of same GR, subject to approval of committee headed by Civil Surgeon/ Medical Superintendent of respective institute.

2.8.3 Beneficiaries:

Beneficiary Components: Beneficiaries identified under MJPJAY and PMJAY are enlisted in Annexure 2.3(Vol. II)

Beneficiary Identification: E-card, ration card, Domicile certificate, photo ID proof, Aadhar Card, voter card, PAN card, etc., as given in Annexure 2.3(Vol. II)

Mahatma Jyotirao Phule Jan Arogya Yojana and Ayushman Bharat-Pradhan Mantri Jan Arogya Yojana have different beneficiaries. The State Health Assurance Society will verify the beneficiary list twice a year to avoid duplication of beneficiaries (same family will not be included in both schemes).

Insurer: From 02-07-2012 to 31-03-2020 scheme was implemented by insurer National Insurance Company (Public Sector undertaking). 01-04-2020 onwards Integrated scheme (MJPJAY and PMJAY) is implemented by United India Insurance Company (Public Sector undertaking).

2.8.4 Committees:

For effective implementation of both the schemes State and District level committees are formed as given in Annexure 2.3(Vol. II)

State Monitoring and Executive Committee- (headed by Additional Chief Secretary/Principal Secretary/Secretary, Public Health and Family Welfare Department)

State Level Co-ordination, Adoption and Disciplinary Committee - (headed by CEO of State Health Assurance Society)

Central Claim Committee - (headed by CEO of State Health Assurance Society)

State Grievances Redressal Committee - (headed by CEO of State Health Assurance Society)

District Monitoring and Grievance Redressal Committee -(headed by Collector of respective district)

State Monitoring and Executive Committee will meet quarterly or as per requirement. At least two meetings of one i.e. Regulatory Council shall be held once in a month or as required.

Financial Burden: - Under the Pradhan Mantri Jan Arogya Yojana (PMJAY), the share of the Central Government will be 60% and the share of the State Government will be 40%. State government will be responsible for Financial Burden of PMJAY (40%) and MJPJAY (100%). Being State owned scheme, MJPJAY is fully funded by Government of Maharashtra.

Human Resources (HR): - The Chief Executive Officer, State Health Assurance Societies have the authority to appoint the officers and staff required for the schemes on contractual basis.

Financial Powers: - The State Health Society will have the rights of pay/allowance expenditure of employees, Office expenditure, insurance company expenses and claim expenses.

Claim Status and Action to be taken is mentioned in Annexure 2.3(Vol. II)

2.8.5 Role of PHC MO:

- IEC of the scheme, awareness to all healthcare provider
- To screen all OPD patient and scrutiny them in specialized category and refer them to the nearby empanelled hospital.
- Arrangement of health camp in collaboration with empanelled hospitals
- Arrangement of camp for generation of PMJAY card and ABHA card with help of ASHA workers, ASSK (Aple Sarkar Seva Kendra), Common Service Center (CSC) center and Arogy Mitra of empanelled hospitals.
- Monitoring and follow up of the patient.
- 6.Recording the success story for MJPJAY and PMJAY beneficiary story.

2.9 Infection Control Measures:

Problem of infections acquired in the health care setting is becoming serious day by day due to spread of HIV, Hepatitis-B and antibiotic resistant microorganisms.

2.9.1 Infection spread in PHC (HWC) settings is possible in following ways:

- From one patient to another patient during stay in hospital (most common)
- From Patient to health care worker (Doctors, nurses, lab technicians, assistants)
- From health care worker to patient (Rare)

Patients to Patient spread infection mainly due to improper sterilization of instrument/equipment/dressing material, ignoring aseptic precautions during procedures on patients and overall lack of cleanliness in the PHC (HWC).
Risk of transmission of blood borne viruses to health care workers is 0.05 – 0.4% for percutaneous exposure of HIV, 9 - 30 % for hepatitis B & 3 -10% for hepatitis C.

Infection prevention Measures:

- Standard precautions
- Use of personal protective equipments. (PPE)
- Decontamination.
- Hand washing.
- Waste disposal.

Additional precautions

- Respiratory hygiene/cough etiquettes
- Environmental cleaning
- Proper handling of patient care equipment, injections safety.

2.9.2 Principles of infection control

- **Rationalization of Patient admission:** Do not admit patient in PHC unless it is absolutely necessary. Patient should be discharged as early as possible.
  Patients with communicable diseases such as cholera should be isolated.
- **Proper disinfection procedure:** Cleaning and sterilisation of equipment, instrument and linen helps to reduce risk of infection.
- **Disposal of hazardous Hospital waste:** Proper waste disposal reduces risk of infection among patients, health care providers and community.
- **Training of health care provider:** Health care providers need to be trained regarding infection control measures to beadopted in health facility.

2.9.3 Standard bio-safety guidelines

- Wash hands with soap and water before and after all patient or specimen contacts and after work is finished. If gloves are worn, wash hands with soap and water before use and after removing gloves.
- Wear protective material (e.g. gloves, masks, goggles, gown, etc.) during procedures, when handling infectious materials or in case of potential contact with blood and other body fluids.
- Discard gloves whenever they are contaminated or perforated. Wash your hands, and put on new gloves. Do not leave workplace or walk around while wearing gloves.
- Disinfect or sterilize all instrument, equipment and materialused for patients as per standard guidelines.
- Handle instruments and equipments carefully. Avoid unnecessary contact with sharp instrument. Place used syringes immediately in nearby impermeable container; DO NOT recap or manipulate needle in any way.
- Wear protective devices. Handle all linen soiled with blood and/or body secretions as potentially infectious.
- Hospital waste management is equally important. Carefully follow procedure of hospital waste management in your PHC.

2.9.4 Important infection control measures

Following important measures should be carried out forinfection control in PHC.

- Hand washing
- Use of protective material
- Disinfection
- Sterilization
- Safe injection and blood safety practices
- Decontamination of laundry and spills
- Safe laboratory practices
- Hospital waste management

All these important measures are described in detail belowexcept hospital waste management, which is described in separate chapter.

Hand washing and decontamination

Pathogenic organisms from infected patients are carried on hands of staff and represent an important mode of spread of infection in hospital. Hand washing is the most effective and simple method for preventing transfer of infection.

Following are methods of hand washing:

Social hand washing:

In social hand washing, vigorous and mechanical friction is applied to all surfaces of hands using plain soap and water for at least 10 seconds using a defined technique. Hands are rinsed under a stream of water and dried with paper towel. In absence of running water, a clean bowl of water should be used for hand- washing purposes.

Social hand washing is indicated:

- Before handling food, eating and feeding patient.
- After visiting toilet.
- Before and after nursing patient (e.g. bathing, bed making)

Hygienic hand washing

Antiseptic detergent preparation is used in hygienic hand washing. Wet hands with clean (running) water, apply cleanser (3-5ml) or soap and wash hands for 10-15 seconds and then apply antiseptic solution over all hand surfaces, rinse and dry.

Hygienic hand washing is indicated

- Before performing non-invasive procedures.
- Before caring for susceptible patients (Immunocompromised.)
- Before and after use of gloves.
- After contact with blood secretions or following situations in which microbial contamination is likely to occur. Agents used are, 4% chlorhexidine gluconate, Povidone- iodine, 0.5% glycerol etc.

Surgical hand washing

Aim of surgical hand washing is to remove and kill transient flora and to decrease resident organisms to prevent risk of wound contamination when gloves are damaged. Agents are same as for hygienic hand washing. Adefined technique for decontamination of hands is of greaterimportance than detergent used.

Surgical hand washing is done before surgical procedures or interventions. In surgical hand-washing, scrubbing of hands and fingernails is very crucial. Hands should be

scrubbed at least twice with warm water. Hands should be washed up to elbow. After washing, water should not drip down from unwashed area of arm to washed hands. To assure this, hands are kept in upright position folded at elbow. After drying, surgeon must put ongown and gloves.

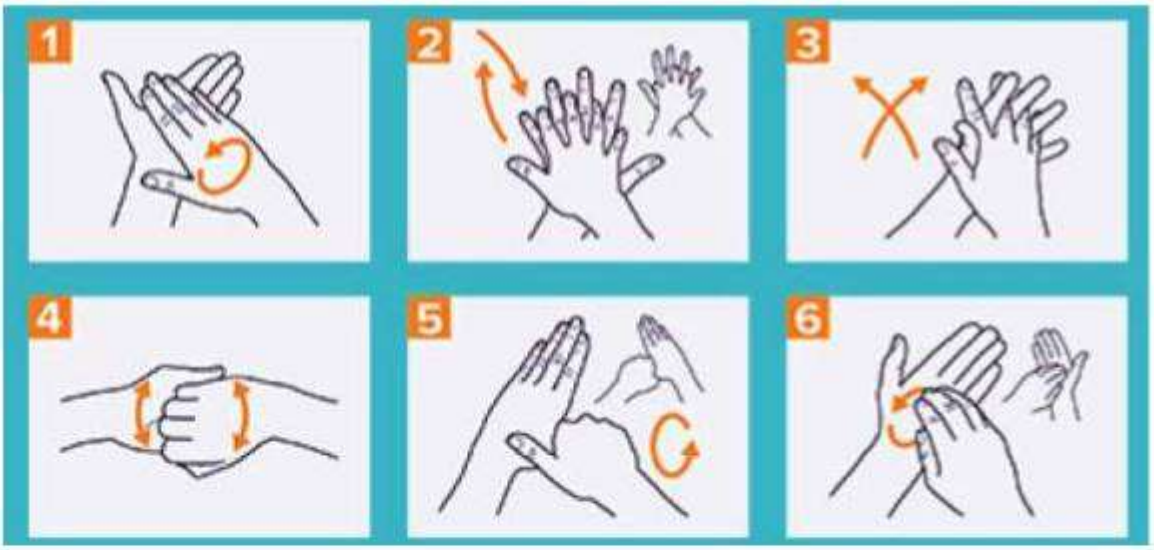


Fig. Steps of hand washing

Use of protective material:

Gloves:

- Ideally gloves must be disposable. Routinely single gloves are sufficient, however double gloves must be used in high- risk patients.
- Wash hands thoroughly with soap before wearing gloves and after degloving.
- Check gloves for gross defects every time you wear them. Cover cuts or wounds in hand with waterproof band-aid before gloving.
- Discard gloves at least suspicion of puncture. Change gloves between two procedures.
- Do not touch areas not directly involved in procedure.

Masks:

- Masks are mandatory to prevent airborne infection from to patients
- Masks should be used by health staff

Plastic aprons

Wear plastic aprons outside clothing to protect against splashes, can also be worn beneath gowns when heavy contamination is suspected e.g. while conducting delivery.

Type of exposure & protective barrier:

Table: Exposure and protective barriers

Type of exposure	Protective barriers	Examples
Low risk: Intact skin, no visible blood	Gloves helpful but not essential	Injections, minor wound dressing
Medium risk: Probable contact with blood. Splashing unlikely	Gloves, gowns and apron	Vaginal examination, insertion or removal of intravenous cannula, handling of laboratory specimens, large open wound dressing, venipuncture, spill of blood
High risk: Probable contact with blood, splashing, uncontrolled bleeding	Gloves, waterproof gown or apron, eye wear, mask	Vaginal delivery, major surgical procedures particularly in orthopaedic surgery and oral surgery

Personal Protective Equipment (PPE kit)

Personal protective equipment (PPE) refers to protective clothing, helmets, gloves, face shields, goggles, facemasks and/or respirators or other equipment designed to protect the wearer from injury or the spread of infection or illness. PPE is commonly used in health care settings such as hospitals, doctor's offices and clinical labs. When used properly, PPE acts as a barrier between infectious materials such as viral and bacterial contaminants and your skin, mouth, nose, or eyes (mucous membranes). The barrier has the potential to block transmission of contaminants from blood, body fluids, or respiratory secretions. PPE may also protect patients who are at high risk for contracting infections through a surgical procedure or who have a medical condition, such as, an immunodeficiency, from being exposed to substances or potentially infectious material brought in by visitors and healthcare workers. When used properly and with other infection control practices such as hand-washing, using alcohol-based hand sanitizers, and covering coughs and sneezes, it minimizes the spread of infection from one person to another. Effective use of PPE includes properly removing and disposing of contaminated PPE to prevent exposing both the wearer and other people to infection.



PPE Kit

Disinfection

Disinfection and sterilization are necessary to prevent cross- infection from skin, equipment and surfaces used in all hospitals.Disinfection is used to reduce number of microorganisms on an object or surface, although disinfectant used rarely destroys allmicroorganisms or spores that come into contact with. Decontamination renders an article safe for handling.

Rules for use of disinfectants

- Carefully read and follow manufacturer 's instruction before using any new disinfectant.
- Check expiry date of solution.
- Ensure that optimum dilution is used.
- Always wash and clean articles before disinfection.
- Do not refill disinfectant containers without sterilizing container between each use. Topping up is not allowed.
- Do not use empty containers to store any other solutions. This is dangerous and must be discouraged. Chemicals can be harmful when used in wrong situation.
- Disinfectant should not be used to sterilize instruments orequipment (unless specified in disinfection policy, e.g. endoscopes).
- Open containers of disinfectant should not be used, as there is a serious risk of contamination with multiple antibiotic-resistant bacteria such as Pseudomonas species and spores.
- When disinfectants are indicated for use on surfaces, they should be used for wiping.

Approved disinfectants

Povidone iodine: An intermediate level disinfectant can be usedas a (1% available iodine) surface disinfectant for instrument tray, headrest, hand piece etc.

Sodium hypochlorite 1% is a low-level disinfectant and 5% actsas strong disinfectant even in presence of debris. However, users aecautioned that it can cause rusting of many instruments and has an offensive residual odour.

Glutaraldehyde: When used for sharp instruments, 2% glutaraldehyde provides high-level disinfection, which approximates sterilization. Its strong odour precludes its use asa surface disinfectant. Gluteraldehyde can be reused.

Right choice of disinfectant can be made depending on need. Objects must be soaked/wetted/immersed (as is possible) in disinfectant.

Table: Disinfection of contaminated articles to prevent spread of disease

Sr.	Articles	Method of disinfection
1	Sputum	All sputum cups after examination should be submerged in a bucket containing 5% hypochlorite solution or 5% phenol solution overnight & then burnt in a pit/incinerator.
2	Stools, urine, vomit us, bedpans, urine bottles.	Add five percent phenol or concentrated chlorine solution and keep for 30 minutes. Dispose of by burial. Wash bedpans with boiling water.
3	Clothes, bed	Dip for 30 minutes in five percent phenol linen and then wash
4	Utensils, glasses and cutlery	Dip in five percent hypochlorite solution for five minutes and then clean with detergent and water as usual.
5	Belongings of patients	In expensive items should be burned, clothes bed linen, etc. should be disinfected as described above. Costly items of patient can be swabbed with 1:1000cetrimide solution and allowed to dry.
6	Mattresses/Pillows	Cover with water-impermeable sheets. Wash covers with detergent solution and dry. Disinfect with phenol when necessary
7	Trolley tops	Wipe with warm water + detergent to remove dust and keep dry.

Chlorine releasing compounds as disinfectants:

Chlorine releasing compounds (TCL and liquid chlorine)are effective against majority of the bacteria and viruses including HIV virus. However, these compounds have to be diluted for making appropriate concentration. Household bleach (TCL) contains 30% of available chlorine and Sodium Hypochlorite (Liquid chlorine) contains 5% available chlorine. When using chlorine releasing compounds, minimum contact time of 10 - 30 minutes (depending on concentration) is recommended.

Other chemical disinfectants effective in inactivating HIV

Ethanol 70% - 3-5 minute

2-propanol 70 % (isopropyl alcohol) - 3-5 minute

Povidone iodine 2% - 15 minute.

Formalin 4% - 30 minute.

Gluteraldehyde 2% (CIDEX) - 30 minute.

Hydrogen Peroxide 6% - 30 minute.

Sterilization

Sterilization (absolute term) is used to remove all living microorganisms, including spores, from an object by highly effective chemicals or heat sterilization.

Heat sterilization is the cheapest, safest and most effective method of sterilization. It could be dry heat such as flame or wet heat such as autoclaving. Proper sterilization ensures protection against all viruses and bacteria including spores. Instruments should be soaked in disinfectant for 30 minutes, cleaned and then sterilized by autoclaving.

2.9.5 Important aspects of sterilization at PHC

Following are guidelines for sterilization by autoclaving-

- Needles, syringes especially for immunization, instruments for tubectomy, dressing material, linen, and equipments for delivery should be autoclaved.
- Give responsibility of autoclaving to Health Assistant (Female). Responsibility of autoclaving should not be given to a class IV servant.
- There should be a clock in room where autoclaving is done, so that time required for autoclaving can be monitored.
- Signoloc register has to be maintained at PHC. HA (F) should enter sterilization details daily and MO should check register during morning round.
- Signoloc register includes following information:

Table: Signoloc register format

Date	Material	Time of		Signoloc strips		Person attended		Signature of MO
		Starting	Completion	Outer	Inner	Name	Signature	

Packing the drum for autoclaving

- Wrap material to be autoclaved in loose flat bundles to allow easy penetration of steam.
- For autoclaving of needles & syringes, wrap each set of piston & barrel in gauze after confirming that, barrel & piston are in pair.
- Do not pack drum tightly; leave free spaces between objects.
- One signoloc strip should be kept inside drum & other outside of drum.

Procedure of autoclaving

Fill up water up to mark and place autoclave on stove.

Load drum with material to be autoclaved. Open side holes of drum and put loaded drum in autoclave.

Put lid of autoclave on body and tighten diagonally opposite screws simultaneously till the lid is airtight.

Start gas or stove. Pressure starts rising. Keep valve open till air inside autoclave is released out and steam starts coming out from autoclave at least for 2 – 3 minutes. This is important as if air remains inside, penetrating power of steam decreases and optimum effect is not achieved.

Close valve. Pressure starts rising as is shown in pressure meter. When temperature reaches to 121 degree centigrade & pressure reaches 15 lb, note time and let pressure remain for 20-30 minutes depending upon type of articles to be autoclaved (e.g. 20 minutes for gloves, needles, syringes and 30 minutes for linen, cotton and gauze).

After stipulated time, put off gas and let off the steam.

Remove lid by losing screws of lid. Remove dressing drum. Check outer signoloc strips for colour change indicating successful sterilization. If there is no colour change, repeat procedure carefully.

Close side holes of drum & lock it. Complete signoloc register.

Confirmation of completion of autoclaving

Signoloc strips, which are green before autoclaving become gray, or black, which indicates that, autoclaving is successfully completed. Both inner & outer strips should become gray or black.

Safe injection and blood safety practices

Avoiding unnecessary injections, suturing and blood transfusions for reducing infections through blood-borne route. Injections should be used when absolutely indicated. As a part of national policy, injection of antibiotic should be avoided if an equally effective oral preparation is available or if one injection can be given instead of multiple doses. Adequate number of sterile syringes or needles must be arranged. There is no need to wear gloves when giving injections.

Good practice for safe handling of sharps:

- Never pass used sharp instruments from one person to another by hand, always use tray.
- During exposure-prone procedure, risk of injury should be minimized by ensuring that surgeon has best possible visibility, e.g. by positioning patient, adjusting good light source and controlling bleeding.
- Protect fingers from injury by using forceps instead of fingers for guiding suturing.
- Never recap, bend or break disposable needles.
- Place used needles and syringes in a rigid container until ready for disposal.
- Locate sharps disposal containers close to point of use,
- e.g. in injection room, on medicine trolley and in treatment room etc.
- Never place used sharps in other waste containers, use puncture-resistant container.
- Keep all sharps and sharps disposal containers out of reach of children.
- Prevent overflow by sending sharps disposal containers for decontamination or incineration when three - quarters full.

2.9.6 Decontamination of laundry, mattresses and spills Laundry

Laundry

Contaminated linen must be disinfected before giving to dhobi for washing. Disinfection can be done by chemical disinfectant or by boiling or autoclaving at low pressure of steam. Both 'clean

(less contaminated)' and 'contaminated' linen shouldbe transported to laundry separately in thick polythene bags of different colours.

Decontamination and washing of mattresses

It is advisable to cover all mattresses with waterproof synthetic material like Rexene or Plastic. This makes disinfectionof mattresses easier. Washing can be done manually.

Management of spills

- Spills on floor, of infected or potentially infected material should be covered with paper towel/blotting paper/ newspaper.
- Pour 1% Sodium-hypochlorite solution on and around spill area and keep as it is for 10 minutes.
- After 10 minutes, paper should be removed with gloved hands and area wiped out.

2.9.7 Bio Medical Waste Management

Cat	Type of Container	Type of waste	Treatment/ Disposal options
	Non-chlorinated plastic bags	(a) Human Anatomical Waste (b) Animal Anatomical Waste (c) Soiled Waste (d) Expired or Discarded Medicines (e) Chemical Waste (f) Micro, Biotechnological and other clinical lab waste (g) Chemical Liquid Waste	Incineration or Plasma pyrolysis or deep burial
	Non-chlorinated plastic bags or containers	Contaminated Waste (Recyclable) tubing, bottles, intravenous tubes and sets, catheters, urine bags, syringes (without needles) and gloves	Autoclaving/ microwaving /hydroclaving and then sent for recyling
	(Translucent) Puncture, Leak, tamper proof containers	Waste sharps including Metals	Auto or Dry Heat Sterilization followed by shredding or mutilation or encapsulation
	Puncture and leak proof blue colour containers	Glassware	Disinfection or autoclaving, microwaving, hydroclaving and then sent for recycling

Table: Type of container and colour coding for hospital waste disposal

Bio-medical wastes categories and their treatment and disposal options (Refer Annexure 2.5(Vol. II))

Occupational Hazards and Post-Exposure Prophylaxis (PEP):

Hospital Hazard is defined as any substance or activity that directly or indirectly causes

hazards to those working in a healthcare setting.

Occupational Hazards

1. Biological Hazards:

- Healthcare workers (HCWs) are frequently exposed to infectious agents. Pathogens such as bacteria, viruses, and fungi can be transmitted through blood, bodily fluids, or airborne particles. Notable risks include: Bloodborne Pathogens: HIV, Hepatitis B (HBV), and Hepatitis C (HCV) are major concerns. Needlestick injuries or cuts from contaminated sharps are common sources of exposure.
- Airborne Pathogens: Tuberculosis (TB), influenza, and COVID-19 pose risks through respiratory droplets or aerosols.
- Other Infectious Agents: Contact with contaminated surfaces or patients can lead to infections such as MRSA (Methicillin-resistant Staphylococcus aureus) or Clostridium difficile.

2. Chemical Hazards:

HCWs may encounter hazardous chemicals, including disinfectants, sterilants, and medications (e.g., chemotherapy drugs). Exposure can cause skin irritation, respiratory issues, or long-term health effects like cancer.

3. Physical Hazards:

- Radiation: Exposure to ionizing radiation during diagnostic or therapeutic procedures can increase cancer risk.
- Ergonomic Risks: Repetitive tasks, heavy lifting, and prolonged standing can lead to musculoskeletal injuries.

4. Psychological Hazards:

Stress, burnout, and mental health issues are prevalent due to high workloads, long hours, and emotional demands of patient care.

5. Workplace Violence:

HCWs face risks of physical assaults or verbal abuse from patients or visitors.

Post-Exposure Prophylaxis (PEP)

Definition:

PEP involves taking antiretroviral medicines immediately after exposure to HIV to prevent infection. It is also used for other exposures, like HBV, where prophylactic treatments are available.

When to Use PEP:

PEP is recommended after potential exposure to HIV through:

- Needlestick injuries or sharps exposures.
- Contact of mucous membranes or broken skin with contaminated blood or bodily fluids.
- Sexual assault or high-risk sexual exposure.

PEP Protocol:

- Immediate Action: Wash the affected area with soap and water. If eyes or mucous membranes are exposed, flush with water or saline.
- Report the Incident: Notify the appropriate occupational health department or supervisor.
- Risk Assessment: Evaluate the exposure risk based on the type of fluid and the nature of the exposure.

- Initiation of PEP: Start PEP as soon as possible, ideally within 1-2 hours, but not later than 72 hours after exposure.
- Medication Regimen: A typical PEP regimen involves a 28-day course of antiretroviral drugs.
- Follow-Up: Regular follow-up visits for testing and monitoring for potential side effects or seroconversion (developing antibodies against HIV).

Counselling and Support:
Provide psychological support and counselling to the exposed HCW. Ensure they understand the importance of adherence to the PEP regimen and the follow-up schedule.

Prevention:
Implementing and adhering to standard precautions (e.g., use of personal protective equipment, safe handling and disposal of sharps) and vaccination programs (e.g., HBV vaccine) are crucial for minimizing occupational hazards.
Understanding and mitigating occupational hazards, coupled with prompt and effective use of PEP, can significantly reduce health risks to healthcare workers, ensuring a safer and healthier workplace.

Needle-stick injury
Needle-stick injury and inadvertent exposure to blood products is perhaps the most common professional hazards in the field of medicine and health care. Health care workers (HCWs) are at risk of contracting transmissible blood-borne viruses, like human immunodeficiency virus (HIV), hepatitis B virus (HBV), hepatitis C virus (HCV) and others while performing routine hospital activities. The frequency of such incidents depends on the work load, use of universal precautions, safety devices and medical discipline.
Needle-stick Injury (NSI): The accidental puncture of the skin by a needle or sharps contaminated with blood and/or blood contaminated body fluids, during a diagnostic or therapeutic procedure.
This term includes all paid and unpaid staff (e.g., physicians, nurses, medical and nursing students, sanitation staff, dieticians, physiotherapist and other allied staff) working in health care facility who are at risk of exposure to infectious materials (e.g., blood, tissue, and specific body fluids), contaminated medical paraphernalia. All categories of HCWs should undergo training for prevention of such injuries, and should be eligible for similar postexposure prophylactic treatment program.

Prevention is the Best Strategy
Prevention of occupational exposures should be the primary strategy. All HCWs should practice Universal precautions, which include:
- Washing hands before and after care of each patient.
- Appropriate use of protective equipment and devices—gloves, masks, gowns, boots, shoe covers, eyewear, etc.
- Any arterial or venous cannulation should not be performed without wearing protective gloves.
- Needles and sharps should be used with caution:
- Sharp disposal container must be on the procedure trolley itself.
- Sharps should be disposed in puncture proof containers immediately after use.

Reference:

1) *Regional guidelines for the management of severe falciparum malaria in small hospitals*
2) World Health Organization, Regional Office for South-East Asia (2006). New Delhi, WHO/SEARO
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6) http://www.searo.who.int/LinkFiles/Tools_&_Guidelines_Smallhospitals.pdf
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8) Tools_&_Guidelines_LargelHospitals.pdf
9) Bio Medical Waste Management Act 2016 & amendment 2018
10) महात्मा ज्योतीराव फुले जन आरोग्य योजनेअंतर्गत सार्वजनिक विभागाच्या नियंत्रणाखालील आरोग्य सेवा संचालनालयाच्या अधिनस्त संस्थाच्या माध्यमातून जमा होणाऱ्या निधीचा विनियोग करण्याबाबत, महाराष्ट्र शासन सार्वजनिक आरोग्य विभाग,शासन निर्णय क्र: मफुयो-२०१८/ प्र.क्र.२५७/आरोग्य-६/दिनांक: ११जानेवारी,२०१९.
11) विद्यमान एकत्रित महात्मा ज्योतीराव फुले जन आरोग्य योजना व प्रधानमंत्री जन आरोग्य योजनेसाठी निवड करण्यात आलेल्या विमा कंपनीशी झालेल्या सामंजस्य करारनाम्यास मुदतवाढ देण्याबाबत, महाराष्ट्र शासन सार्वजनिक आरोग्य विभाग , शासन निर्णय क्र.निविदा-२०२३/प्र.क्र.२३/आरोग्य-६/दिनांक:२१ जून,२०२३
12) महात्मा ज्योतीराव फुले जन आरोग्य योजना व आयुष्मान भारत - प्रधानमंत्री जन आरोग्य योजना या एकत्रित योजनेचे विस्तारीकरण करण्याबाबत महाराष्ट्र शासन सार्वजनिक आरोग्य विभाग ,शासन निर्णय क्र: मफुयो-२०२३/प्र.क्र.१६०/आरोग्य ६/दिनांक :२८जुले,२०२३ .
13) **Annexure 2.6(Vol. II) MJPJAY index of GR Web Site Link:**
https://www.jeevandayee.gov.in/MJPJAY/FrontServlet?requestType=CommonRH&actionVal=RightFrame&page=undefined%3E%3E%3Cb%3ERGJAY%20Government%20Resolution%3C/b%3E&pageName=RGJAY_Government_Resolution&mainMenu=About&subMenu=RGJAY_Government_Resolution.

Section 3

Reproductive & Child Health Programme (Maternal Health)

3.1 Introduction:

Delay the first, postpone the second & prevent the third

In 1952, India became the first country in the world to launch Family Planning Programme to check population growth. Since then, the population control programme in India has undergone many changes.

In 1970s maternal and child health services began to receive greater attention as poor health status of women and children in terms of high mortality and morbidity was also perceived as important problem. Health facilities and hospitals started providing antenatal, intranatal and postnatal services. Number of special programmes like immunization against vaccine preventable diseases, nutritional interventions, diarrhoeal diseases control Programme, Acute Respiratory Infection Control Programme were implemented independently. In order to provide maternal and child services in integrated manner the Child Survival and Safe Motherhood Programme was introduced in 1992.

During 1990s the International Conference on Population and Development (ICPD), Cairo recommended initiation of National Reproductive & Child Health Programme with the advocacy of a need based, client-cantered, quality-oriented, demand driven reproductive health approach.
The Government of India accepted the ICPD Programme and agreed to orient the National Family Welfare Programme towards the Reproductive and Child Health approach. The first phase of the Reproductive and Child Health Programme was launched in 1997, in which National Family Welfare (FW) Programme and the National Child Survival and Safe Motherhood (CSSM) Programme merged into the Reproductive and Child Health (RCH) Programme. In addition to the family welfare and MCH services, the RCH Programme includes strategies for prevention and management of reproductive tract and the sexually transmitted infections (RTIs/ STIs). Phase II of RCH Programme started from April 2005.

3.1.1 Definition of Reproductive Health: -

- People have the ability to reproduce and regulate their fertility.
- Women are able to go through pregnancy and childbirth safely.
- The outcome of pregnancy is maternal safety, infant survival and well-being.
- Couples are able to have sexual relation free of fear of pregnancy and contracting disease.

3.1.2 Major emphasis in RCH:

- Gender sensitivity
- Informed choice and safety
- Community mobilization

- Quality of care
- Client cantered services as per the demand
- Male participation
- A comprehensive view of sexuality
- Multi-sectoral efforts

3.1.3 Maharashtra Health- Vision 2030 elements

- Universal coverage to quality healthcare with special attention to vulnerable groups such as women, children, the disabled and the aged, scheduled caste and scheduled tribes.
- Enhance average Life expectancy to 69 years
- Reduce by 2030
  - Maternal Mortality Ratio (MMR) to less than 19 per lakh live births
  - Neonatal mortality rate to less than 10, Still Birth Rate to less than 4
  - Under 5 Mortality rate to less than 15
- Maintain Total Fertility Rate at 1.8
- Reduction in TB incidence rate by 80% as compared to 2015
- ANCDR less than 10/lac in all districts & PR less than 1/10000 in all districts
- Proportion of GR 2 disability less than 1.20% among NCD by 2020 & less 1% by 2030

3.1.4 **Important Reproductive and Child Health Services:**

- Adolescent health
- Prevention and management of unwanted pregnancy.
- Preconception Care
- Antenatal services
- Intra-natal services
- Postnatal services
- Child survival interventions
- Management of RTI/STIs
- Forty plus care

3.2 Safe Motherhood:

While entering the 21st century India has made significant progress in many fields. Maternal Mortality Ratio and Infant Mortality Rate shown satisfactory decline after commencement of NRHM. Safe motherhood program is an important component of the national Reproductive and Child Health program, which aims at reducing the maternal morbidity and mortality substantially in near future, by giving skilled health care to all ANCs throughout their pregnancy, childbirth, and Puerperium.

Rates	India	Maharashtra
Birth Rate*	**19.7**	**15.3**
Death Rate*	**6.0**	**5.4**
IMR*	**30.00**	**17.00**
MMR*	**97**	**33**
TFR	**2.10**	**1.8**
Sex Ratio (At Birth)	**906**	**896**
Sex Ratio (0-6)	**914**	**883**
Sex Ratio	**940**	**922**
Source –*SRS (2020) Spl. Bulletin Nov. 2022, SCD®, Census 2011*		

3.2.1 Maternal Mortality:

Maternal mortality is one of the important indicators, which helps to assess the effectiveness of maternal services received by pregnant women. As per SRS 2022 MMR for Maharashtra is 33 per 100,000 live births.

Maternal death is a death of a woman while pregnant or within 42 days of termination of her pregnancy by conditions related to or aggravated by pregnancy.

Maternal Mortality Ratio is number of maternal deaths per 1,00,000 live births per year. Each ASHA should report all women deaths in age group 15 to 49 years in *Form 1 of MDSR Format* (Refer Annexure 3.1(Vol. II)) to MO PHC and THO within 24 hours. All such women deaths must be investigated by team of ANM, LHV, Mukhya Sevika by using formats for Community Based Maternal Death Review. (Marathi Formats *Parishishta 2, Prapatras 1,2,3,4*) (Refer Annexure 3.2(Vol. II)) PHC staff must record each and every maternal death and MO should investigate its cause. MO must know the number of maternal deaths that occurred in a year in PHC area.

Causes of maternal mortality:

Table: Direct and indirect causes of maternal mortality

Direct causes	Indirect causes
Haemorrhage (APH and PPH), Abortion	Severe anaemia
Sepsis (puerperal and post abortion)	Hepatitis
Pregnancy induced hypertension or Eclampsia	Malaria
Obstructed labour	Heart disease
Post-partum complications	Diabetes
	Tuberculosis

It is evident from the above table that; most of the causes of maternal deaths are avoidable (preventable). These conditions can be avoided by providing quality care to all pregnant

women (total coverage/Fully Protected Mother concept need to be introduced which include Registration <11 weeks, % ANC check-up at least 4 checkups including at registration, screening of each pregnant women with 5 mandatory tests [Hb, RPR for syphilis, GDM, HIV and TSH], 100/200 IFA, Td-2/B, & institutional delivery or Delivery by SAB), which is the key to success of Safe Motherhood Programme.

Maternal Death Review:

Each and every maternal death happened at home or on road are investigated by using the formats mentioned above and all maternal deaths in any Govt. or Private institutions is reviewed first by FBMDR committee and all maternal deaths are reviewed by District Quality Assurance committee (DQAC), to take corrective measures vide *GR dated 28/05/2010*.All Govt. Hospitals should have FBMDR committee & all Private Hospitals having more than 250 deliveries should have FBMDR committee at their level. One of the officers from hospital should be designated as Nodal Officer who will be member secretary of the committee.

All Maternal death should be informed to District/ Corporation nodal officer. Monthly Review should be conducted of all maternal deaths. Community Verbal Autopsy to be conducted of all home/transit maternal deaths. Rs 450/- is given to the investigation team (Rs 150/each for max 3 members i-e. THO/MO, ANM and ASHA) for conducting verbal Autopsy and Rs 200/- is given for transport support to the team. First Respondent ASHA is rewarded Rs 200/- if she informs about community maternal death to ANM or Medical Officer within 24 hours. Refer to MDSR Guidelines for details.

General Instructions for Verbal Autopsy

- **Confidentiality:** After the formal introduction to the respondents, the investigating official should give assurance that the information will be kept **confidential**.
- Throughout the interview, the interviewer should be very polite and sensitive questions should be avoided.
- Make all the respondents seated comfortably and explain to them that the information that they are going to provide will help to prevent such deaths of mothers in future.
- Allow the respondents to narrate the events leading to the death of the mother in their own words. Keep prompting until the respondent says there was nothing more to say.
- Do not ask questions which are not in the interview schedule.
- Wherever needed, the investigating official should encourage the respondents to bring out all information related to the event.
- Please also write information in a **narrative form**
- **Neutrality and Impartiality:** The interviewer should not be influenced by the information provided by the field health functionaries, doctors or by the information available in the mother care register, case sheets etc.
- **Facility Based Review Committee:**
  - OBGY specialist — Chairman
  - Physician- — Member
  - Anaesthesia specialist- — Member
  - Incharge Nurse of Labour Ward- — Member
  - Blood Bank Medical Officer- — Member

- Nodal Officer- Member Secretary

Community Based Maternal Death Review:
All women deaths of age group 15 to 49 years occurring at home or on way to hospital are investigated by team of ANM /LHV & Mukhya Sevika under supervision of THO by using Marathi formats as and THO to submit his report to DQAC *(GR Dated 28/5/2010).*
District Level Committee

(District Quality Assurance Committee Except Greater Mumbai and Pune)

1	District Civil Surgeon, General Hospital	Chairman
2	Medical Officer Health, Corporation	Member
3	Senior OBGY specialist, General Hospital	Member
4	Senior General Surgeon, General Hospital	Member
5	Senior Anaesthesia specialist, General Hospital	Member
6	Representative of FOGSI	Member
7	Pathologist	Member
8	Matron	Member
9	Medical Officer, Blood Bank, General Hospital	Member
10	District Reproductive & Child Health Officer	Member
11	Residential Medical Officer (Outreach)	Member Secretary

3.2.2 Components of maternal Health Services:

To achieve the objective of reducing maternal mortality and morbidity, it is essential to strengthen the maternity health services, which include:

- Adolescent care
- Antenatal care including referral for obstetric complications and emergencies
- Care during childbirth
- Postnatal care
- Provision of contraception including emergency contraception
- Safe abortion services
- RTI management

3.2.3 IEC Activities:

In addition to above services, IEC activities are important as they help to improve the knowledge of the community, improve utilization of health services ultimately lead to healthy behavior. Group meetings of newly wedded couples, pregnant and lactating mothers should be planned at sub centre level. About 10 marriages occur for every 1,000

population. Many women Marry at young age. It is therefore extremely necessary to impart knowledge about the parenthood to newly wedded couples as early as possible. Similarly, group meetings of pregnant and lactating mothers should be arranged to provide them information about maternal and child health care and contraception. After the MCP session, ANMs with the help of HA (F) should organize group meetings of newlyweds, pregnant and lactating mothers. ANMs will impart knowledge about prenatal, natal and postnatal care of women, new-born care, child immunization, virtues of small family size, interval between births, methods of contraception and abortion, STI/RTI including HIV/AIDS. Use of appropriate AV aids will improve the effectiveness.

3.3 Adolescent Health

3.3.1 Introduction:

Adolescents (age 10-19 year) contribute over 23% of the population in India. Adolescence is a phase of rapid physical growth, psycho-social development and sexual transformation. Information regarding such changes may not be available in schools & colleges. Because of wrong information there may be misunderstanding about preventive aspects. Adolescent girls have limited choices and are caught in the cycle of early marriage, repeated pregnancies and childbearing.

Adolescent pregnancy, excess risk of maternal and infant mortality, reproductive tract infections, sexually transmitted infections, and HIV / AIDS in this age group are some of the public health challenges.

Some highlights from NFHS 5 Maharashtra state fact-sheet for adolescents:

- Women aged 20-24 yrs. married before age 18 yrs. is 21.9% (Rural- 27.6%, Urban-15.7%)
- Median age at first birth for women aged 25-29 yrs. -19.6%
- The contraceptive prevalence rate (CPR) among currently married women aged 15-49 is 66 percent
- Adolescent fertility rate for women aged 15-19 years 47%
- Total fertility rate in the state was recorded at 1.7 children per woman,
- Population below age 15 years 22.8 %
- Women aged 15-19 years who were already mothers or pregnant at the time of the survey 7.6 %

Some highlights from DLHS-4 Maharashtra state fact-sheet for adolescents:

- Currently married women married below 18 yrs- 11%
- Currently married men married below 21 yrs- 9.3%
- Births to women aged 15-19 yrs out of total births – 4.8%
- Women aged 20-24 yrs. reporting birth order 2 and above – 37.5%
- Children 10-19 yrs. having anaemia (males) - 56.8%
- Children 10-19 yrs. having anaemia(females)- 66.5%
- Children 10-19 yrs. having severe anaemia (males) - 7.6%
- Children 10-19 yrs. having severe anaemia (females)- 10%
- Adolescents (15-19 yrs.) having anaemia - 58.3%

- Adolescents (15-19 yrs.) having severe anaemia – 8.2%

3.3.2 Aims & Objectives of Adolescent Health Program:

- To improve reproductive Health status of adolescent girls & boys
- To reduce IMR, MMR and TFR.
- To prevent and manage of obstetric complications during pregnancy
- To provide counselling & awareness to adolescent boys & girls about their health
- To provide access to early & safe abortion services
- To create sensitization & awareness about reproductive sexual health in adolescents.
- To improve knowledge / awareness about the adolescent's health problems

3.3.3 Adolescent Health Program in the districts

- Community Based Intervention - Promotion of Menstrual Hygiene Scheme, Peer Education Program, Adolescent Health Day under AFHS.
- Facility Based Intervention- Weekly Iron & Folic Acid Supplementation Scheme (WIFS) & Adolescent Friendly Health Clinics under AFHS.

Community Based Intervention -Promotion of Menstrual Hygiene Scheme (PMHS)

In adolescent girls physical, mental, emotional & social changes happen. In this particular period menstrual cycle begins. This crucial stage starts from age group 10 to 16. Because of lack of knowledge about taking precautions in menstrual cycle most of the adolescent girls face difficulties. According to guidelines of Govt. of India Promotion of Menstrual Hygiene Scheme is implemented in the state. This programme is for adolescents' girls age group of 10 to 19 years.

Objectives:

- The programme will be focused in rural areas with the following objectives:
- To increase awareness among adolescent girls on Menstrual Hygiene, build self-esteem, and empower girls for greater socialization.
- To increase access and use of high quality sanitary napkins to adolescent girls in rural areas through ASHA.
- To ensure safe disposal of Sanitary Napkin packs.

Implementation:

Under this program Sanitary Napkin Packs are sold through ASHA to adolescent girls. After sale of Napkin Pack (One pack contains 6 Sanitary Napkins cost is Rs. 6, ASHA gets Rs.1/- as incentive for the sales of Napkin Packs, remaining amount Rs. 5/- is deposited in District Health Society fund. To make awareness by making sales to adolescents ASHAs are given Rs. 50/- allowance to arrange meeting at village level.

Role of various stakeholders in implementation of PMHS

Sr. No	Activity	Responsible person	Timeline
1	Availability of stock at PHC	DHO/ THO/ MO	Quarterly
2	Sanitary Napkin distribution to ASHAs	ANM of sub-centre	Quarterly
3	Sale of Sanitary Napkins	ASHAs	Daily
4	Depositing Rs.5 per pack at PHC	ASHAs/ BF	Monthly
5	Depositing the collected money in District Integrated Health & Family Welfare Society (DIHFW)	MO PHC	Monthly
6	Depositing the amount to State Integrated Health & Family Welfare Society (SIHFW).	DHO	Monthly

Facility Based Intervention:

Weekly Iron Folic Supplementation Scheme:

In Adolescents most common cause of anaemia is nutritional anaemia i.e. Iron Deficiency Anaemia (IDA).

Implications of iron deficiency Anaemia

Iron deficiency Anaemia adversely affects transport of oxygen to tissues and results in diminished work capacity and physical performance. During adolescence, iron deficiency anaemia can result in impaired physical growth, poor cognitive development, reduced physical fitness and work performance and lower concentration on daily tasks and school performance, loss of appetite resulting in reduced food intake in adolescents. Iron deficiency in adolescent girls influences the entire life cycle. Anaemic girls have lower pre-pregnancy stores of iron and pregnancy is too short a period to build iron stores to meet the requirements of the growing fetus. Anaemic adolescent girls have a higher risk of preterm delivery and having babies with low birth weight. Regular consumption of iron-folic acid supplements along with a diet rich in micro-nutrients is essential for prevention of iron deficiency anaemia in adolescent girls and boys.

Maharashtra state is implementing Weekly Iron Folic Supplementation Scheme (WIFS) in rural area. Under this Scheme the students from the 6th to 11th Standard & Non-School going girls (age group 10-19 Years) will be covered. Tab IFA will be given to each above-mentioned Boy and Girl every week for 52 Weeks in a year. Three departments Health department, Women and child development department, and Education department will function in convergence for effective implementation of this scheme. Under this

programme De-worming of all targeted beneficiaries will be done twice in a year. Tab Albendazole will be distributed to school going boys, girls, non-school going girls, and married non pregnant adolescents.

Objective of Weekly Iron Folic Acid Supplementation (WIFS)

- Ensure all adolescent boys and girls in 6th to 11th standards of government/government aided/ municipal schools are given a tablet of IFA once a week and Albendazole twice a year for de-worming.
- To inform adolescent boys and girls of the correct dietary practices for increasing iron intake.
- To inform adolescents of the significance of preventing worm infestation and encourage adoption of correct hygiene practices, including use of footwear to prevent worm infestation. Now WIFS being implemented under AMB (Anaemia Mukt Bharat) programme.

Target groups

- Adolescent girls and boys who are school going and are in government/government aided/municipal schools and Ashram Schools from 6th -11th classes.
- Adolescent Girls who are not in school or out of school.
- Non-Pregnant married Adolescents

Strategy for Prevention of Anaemia in Adolescents

Under the WIFS programme for adolescents, IFA supplements are to be distributed free of cost on a weekly basis to the target groups in categories A, B and C. In addition to IFA supplements, Albendazole tablets for de-worming are to be administered twice a year to the same target groups.

Administration of Weekly Iron and Folic Acid Supplementation (WIFS). Each IFA tablet containing 100mg elemental iron and 500µg folic acid for 52 weeks in a year. Findings across the studies reveal that weekly supplementation of 100mg Iron and 500µg Folic acid is effective in decreasing prevalence of anaemia. As adolescent anaemia is a critical public health problem in the country, the Ministry of Health and Family Welfare, Government of India, based on the empirical evidence generated by these scientific studies, has developed Operational Framework for Weekly Iron and Folic Acid Supplementation scheme (WIFS) of adolescent since 2011-13. In Maharashtra WIFS started in all districts since 2011-13. Screening of target groups for moderate/severe anaemia and referring these cases to an appropriate health facility.

The WIFS strategy involves a "fixed day'' approach for IFA distribution. It is recommended that Monday be the day on which all schools and Anganwadi Centers distribute weekly IFA tablets, with one additional designated day for missed out beneficiaries.

In order to screen adolescents for moderate/severe anaemia, AWW and teachers will be trained to identify adolescents with moderate/severe anaemia. The suspected anaemic adolescents should be refereed to AAM/ SC/ Primary Health Center where blood Haemoglobin levels should be tested and those found anaemic will be given treatment for management of anaemia.

Side effects after IFA consumption:

After consumption of IFA tablet 5 -28% of beneficiary population can experience common expected side effects (WHO). These side effects may be metallic taste in the mouth, gastrointestinal discomfort - nausea, vomiting, giddiness, heartburn, constipation and black stools. The black stools are due to colour of iron. These complications may subside with increasing use of tablets. If there is any such side effects after IFA tablet it can be treated locally by health workers or Medical Officer and can be relieved in 20 to 30 minutes. So, the next dose of IFA tablet can be given to same beneficiary next time as usual. Standard IFA Tablets with enteric coated should be used so that it can minimize the side effects.

Roles and Responsibilities in WIFS programme- (Refer Annexure 3.3(Vol. II))

Estimation of IFA

- IFA tablets for the year = (52 x Total number of children in 6 to 11th standards) + (52 tablets /per teacher / year). An additional 20 % stock as buffer will be added.
- Albendazole tablets Requirement per year = (2 x number of children in 6th to 11th standards) + 10 % stock as buffer.
- After estimating IFA and Albendazole tablets requirements for students and teachers, the schools will forward the requirement to the Block Education Officer in the form prescribed format.

Estimation of IFA and Albendazole:

- Estimating IFA tablet Supply = (Number of adolescent girls registered with ICDS x 52 tablets) + (52 tablets/ year for each AWW + 52 tablets/ year for ASHA).
- An additional 20% is to be added for ensuring adequate stock supply.
- Estimating De-worming tablet supply = (Number of adolescent girls registered with ICDS x 2 tablets of Albendazole) + 10% as buffer stock.

Name and address of Anganwadi Centre: .....

Total Number of Adolescent Girls: .....

Distribution of IFA through the platform of School: role of field level functionaries

School children from 6th to 11th standard, in rural and urban regions will be reached through this program.

- Each school will designate two teachers as the WIFS nodal teachers.
- Nodal teachers will ensure supervised ingestion of IFA tablets by adolescents enrolled in classes 6th to 11th on a fixed day preferably Monday at a fixed time after Mid-Day Meal (where applicable)/lunch. Teachers will also be encouraged to consume IFA. The first dose of de-worming tablet i.e., 400 mg of Albendazole should ideally be administered in month of August and the second dose should be given by February (six months after the first dose).

- If the child is absent on a Monday or misses out on the consumption of the IFA tablet, subsequent follow-up during the week needs to be done to ensure that the tablet is consumed.
- Teachers will screen adolescents for presence of moderate/severe anaemia by assessing nail bed and tongue pallor and refer anaemic adolescents to appropriate health facility for management of anaemia.
- Separate time should also be allotted during the school year to provide Nutrition and Health Education (NHE) to the adolescents. The nodal teacher should conduct monthly NHE session(s). Parents should also be oriented on WIFS and NHE during Parent Teacher Association Meetings.
- Before the school closes for vacations, the children can be given the requisite number of IFA tablets for consumption during the holidays under parental supervision at home.
- Annual supplies of IFA and Albendazole tablets should be stored in a clean, dry and dust free area away from the direct sunlight.
- The schools will receive annual supply of IFA and Albendazole tablets from Medical Officer of PHCs.

Block Level:

- Block Education Officer will consolidate requirements from schools under his jurisdiction for aggregated block requirements/supply and share with district level.
- Block Education Officer will set up distribution system for schools and ensure
- uninterrupted supply of IFA and Albendazole tablets to schools by March annually.
- Block Education Officer will ensure proper storage of IFA and Albendazole tablets in schools.

Individual:

Individual Compliance Card (ICC) or a self-monitoring card with simple design will be used (Annexure 3.4(Vol. II)).

The nodal teacher will be responsible for overseeing that the compliance card is filled correctly.

Class- The class teacher will use monitoring register at school/class level as per (Annexure - 3.4 (Vol. II)).

School - The nodal teachers would consolidate all the information from the class reporting formats on the monthly school-reporting format (Annexure- 3.4 (Vol. II)) and submit it to the school principal. The school principal will review the information in the monthly school reporting format, counter sign it and submit it to the block level officials on a monthly basis. A copy of this monthly school report will also be sent to the ANM.

In every school, a school WIFS committee is to be formed headed by the Principal /Head Master with participation of the Nodal teachers, student representatives and ANM for regular monitoring and management of the programme.

Reporting system.

The Block Education Officer will review the monthly report from each school and consolidate the reports for all schools in the block and submit it to District Health Officer and District Health Officer will submit one copy to District Education officer.
Out of school going girls report will be consolidated by MO PHC. Anganwadi worker will submit report to Anganwadi Supervisor and AWS will submit report to MO PHC and CDPO. MO will submit report to THO. THO will submit report to DHO. District Health Officer will give one copy to Deputy CEO, WCD.

WIFS program for Out of School girls:

Distribution of IFA through ICDS platforms: Role of field level functionaries

- The platform of Kishori Samooh will be utilized for mobilizing adolescent girls in the districts implementing SABLA scheme. In other districts, AWW with the help of ASHA will mobilize adolescent girls at the AWC on a fixed day (preferably a Monday) at a fixed time preferably after the noon meal.
- One IFA tablet will be provided to each girl by AWW and she will ensure direct consumption of IFA tablet by adolescent girls. AWW will advise the girls that IFA tablets are not taken on an empty stomach and to the extent possible ensure that the girls have eaten a meal prior to taking the IFA tablet.
- AWW will screen adolescent girls for presence of moderate/severe anaemia by examining the nail bed and tongue pallor.
- Adolescent girls with moderate/severe anaemia will be referred to a nearby health facility.
- In case a girl complains of uneasiness /any side effects, the AWW will refer her to the ANM.
- Each girl will be guided to maintain individual compliance cards by the AWW. The AWW will be trained on maintenance of the Individual Compliance Card.
- ANM will undertake quarterly Nutrition and Health Education session on "Anaemia in adolescent and benefits of IFA supplements" in convergence with SABLA /ICDS and will record date and attendance in monthly format.
- AWW, ICDS helper and ASHA will also be supplied IFA tablets for weekly consumption; these frontline workers will be encouraged to consume the supplement in the presence of the girls.
- AWW will encourage all adolescent girls to be tested for anaemia at appropriate health facility. Line listing of out of school girls should be with AWW.

Compliance in consumption of the tablets

- R Regular IEC and Nutrition and Health Education session
- R Record keeping at AWC level
- T Transfer of correct information from recording registers to the reporting format
- T Timeliness of the submission of monthly reports Ensuring timely IFA and Albendazole
- D Distribution, proper storage of IFA and Albendazole tablets.

For all reporting formats (Refer Annexure 3.4 (Vol. II))

Adolescent Friendly health services, (AFHS)

Ministry of Health & family Welfare, Government of India has launched this new Adolescent health Programme which envisages strengthening of the health system for effective communication, capacity building and monitoring and evaluation.

The main objectives of the Programme are:

- To Reduce the prevalence of malnutrition among adolescent girls and boys.
- To Reduce the prevalence of iron – deficiency anaemia (IDA) among adolescent girls and boys.
- To Improve knowledge, attitudes and behaviour, in relation to SRH.
- To Reduce teenage pregnancies.
- To improve birth preparedness, compilation and provide early parenting support for adolescent Parents.
- Address mental health concerns of adolescents.
- To promote favourable attitudes for preventing injuries and violence (including GBV) among adolescents.
- To increase adolescent awareness of the adverse effects and consequences of substance misuse.
- To promote behaviour, change in adolescents to prevent NCDs such as Hypertension Stroke, Cardio- vascular diseases and Diabetes.

The proposed activities under RCH PIP are as follows:

- Community level activities by peer educators.
- Organization of Adolescent Health Day and Adolescent Friendly Club at Sub centre level.
- BCC and IEC activities.

Adolescent Friendly Health Clinic

Location of Clinics

The clients attending the clinic should have access to:

- Separate room should be made available for clinic.
- Waiting area with appropriate seating arrangements
- Provision of drinking water, Clean functional toilets
- Timing should not clash with OPD timings
- Should be organized once a week

Staff availability:

- The staff placed at the clinic facility to be trained in AFHS eg.MO/ANM/LHV/MPW

Privacy:

Arrangements of visual and audio privacy

- Clinic rooms must have window curtains and bed screen surrounding examination table
- Clear instruction for staff traffic to avoid disruption in counselling and to ensure audio privacy.

Clinic timings

- The clinic timings must be convenient to adolescents.

- Attention is to be given to school timings and work timings of adolescents who are engaged in employment.
- Availability of staff and rooms, if the clinic is scheduled after routine OPD hours
- The timings for clinics at PHC: On scheduled day in a week (i.e. Wednesday) -2:00 to 4:00 p.m. and IEC regarding the same may be done by the PHC.

AFHC Services Package

- IEC and IPC upon issues related to Sexual and Reproductive Health (SRH), mental health, substance misuse, NCD prevention, Gender Based Violence (GBV) and Nutrition.
- Provision of Tab. IFA, Tab Albendazole, Contraceptives, Sanitary Napkins, Pregnancy testing kits Antispasmodics, first aid, other medicines etc.
- Services like RTI/STI management, Lab tests such as Hb, Sugar, BMI screening, HIV testing and counselling, management of menstrual problems, management of iron deficiency anaemia, screening for HT & DM.
- Counselling on nutrition SRH, puberty related concerns, premarital counselling, sexual problems, contraceptive advice, abortion, RTI/STI, substance abuse, learning problems, suicidal tendencies, violence, sexual abuse, mental health issues, healthy life style, risky behaviour etc.

Role of Medical Officer.

- Treatment for major and minor illness to adolescents.
- Effective counselling by health staff trained in AFHS.
- Referral to higher referral centres.
- Follow up of adolescents.
- Linkage with other sections for referral.
- Creating awareness in adolescents through outreach activities as lecture, quiz, melava, essay competition etc.
- Maintaining privacy and confidentiality while treating adolescents.
- Keeping all registers and records updated.
- Citizen charter about adolescent services should be displayed on health facility.
- Maintaining AFHCs as per standards given by GOI.
- Availability of IEC material
- Ensure Training of health providers.

Adolescent Health Day and Adolescent Friendly Club

Adolescent Health Day (AHD)

Guidelines for AHD:

- Adolescent Health Day is to be organized once quarterly in every village on a date convenient following VHND and may coincide with existing Kishori Diwas.
- Venue for the AHD could be AWC and other common community places.
- Attempts to be made to include all adolescent target groups, males, females, 10-15 yrs,15-19 yrs, school going and out of school, married and unmarried etc.
- Efforts to be made to include other stakeholder parents, teachers, Counsellors, Field NGO, ASHAs, PRI members & VHNSC members etc. to sensitize them on adolescent health issues.
- MOs and trained health staff to attend the AHDs to sensitize various stakeholders and adolescents.

- Commodities like weighing machine, haemoglobinometer, stethoscope, BP apparatus, Tab.
- IFA, Tab Albendazole, Antispasmodic tablets and IPC materials Date, time and venue with services given at AHD may be given wide publicity to ensure maximal coverage.
- Services like IEC and IPC on nutrition, SRH, mental health, substance misuse, NCD prevention etc, Provision of above commodities, General health check-ups including BMI, Hb estimation, Blood and urine sugar etc and referrals to AFHCs are to be given at AHDs

Adolescent Friendly Club

- Adolescent Friendly Club meetings to be organized once every month at sub-centre level by ANM.
- 10-20 Peer Educators including male and female groups would attend the club meeting.
- Issues like adolescent health concerns, planning for AHD would be discussed and other activities like drawing competition, quizzes etc for adolescents may be planned.
- ANM to support and facilitate skill development of PEs.

Anaemia Mukt Bharat Programme:

Table: Prophylactic dose and regime for Iron Folic Acid supplementation

Age Group	Dose and Regime
Children 6–59 months of age	Biweekly, 1 ml Iron and Folic Acid syrup Each ml of Iron and Folic Acid syrup containing 20 mg elemental Iron + 100 mcg of Folic Acid Bottle (50ml) to have an 'auto-dispenser' and information leaflet as per MoHFW guidelines in the mono-carton (See Note 1)
Children 5–9 years of age	Weekly, 1 Iron and Folic Acid tablet Each tablet containing 45 mg elemental Iron + 400 mcg Folic Acid, sugar-coated, pink colour
School-going adolescent girls and boys, 10–19 years of age Out-of-school adolescent girls, 10–19 years of age	Weekly, 1 Iron and Folic Acid tablet Each tablet containing 60 mg elemental iron + 500 mcg Folic Acid, sugar-coated, blue colour (See Note 2)
Women of reproductive age (non-pregnant, nonlactating) 20–49 Years	Weekly, 1 Iron and Folic Acid tablet Each tablet containing 60 mg elemental Iron + 500 mcg Folic Acid, sugar-coated, red colour (See Note 2)
Pregnant women and lactating mothers (of 0–6 months child)	Daily, 1 Iron and Folic Acid tablet starting from the fourth month of pregnancy (that is from the second trimester), continued throughout pregnancy (minimum 180 days during pregnancy) and to be continued for 180 days, post-partum Each tablet containing 60 mg elemental Iron + 500 mcg Folic Acid, sugar-coated, red colour

Note 1: Prophylaxis with iron should be withheld in case of acute illness (fever, diarrhoea, pneumonia, etc.), and in a known case of thalassemia major/history of repeated blood transfusion. In case of SAM children, IFA supplementation should be continued as per SAM management protocol.

Note 2: All women in the reproductive age group in the pre-conception period and up to the first trimester of the pregnancy are advised to have 400 mcg of Folic Acid tablets, daily, to reduce the incidence of neural tube defects in the foetus.

3.4 Antenatal Care:

Antenatal period is the most crucial period as the services provided during this period affect both health of the mother and her child. This is the key area, which needs to be monitored by MOS.

3.4.1 Activities to be performed by MO regarding antenatal care:

Estimate expected ANCs:

For planning and delivering maternal services in PHC area, first step is to know number of antenatal mothers in PHC area. Expected level of ANC registration is communicated by DHO to all PHCs during the month of April every year. However, M.O. should be able to calculate number of expected ANCs in each sub-centre area within the PHC based on population & birth rate of the district as per SCD plus 10% pregnancy wastage.

Expected antenatal registration:

- Expected number of ANCs in one year = {(Birth rate X Population)} /1000 + 10% (pregnancy wastage)

Example: Estimate number of ANCs for 5000 population assuming BR of 16.5per 1000 = (16.5X5000) /1000 = 83, 83+8 = 91.

At any given point of time, ANM should have 50%of annual expected numbers of pregnancies in her area, as pregnancy is a 9-month event & most women acknowledge their pregnancy only around third month.

- High risk ANCs (Norm) = 15% of total ANCs = (91X15) ÷100 = 14, i.e. total high risk ANC in sub centre will be 14 during the year.
- Anaemic ANCs (Norm) = 50%to 70% of total ANCs = (91X50)÷100 = 45, 91X70/100= 63 i.e. total anaemic ANC in sub centre will be 45 to 63 during the year.
- Severely anaemic mothers are about 11% of total anaemic mothers i.e. 4 to 5/6.

Expected Percentage of -High Risk Pregnancy Detection

Reason for high-risk pregnancy	Avg. Percentage
PIH	**8%**
GDM	**5%**
Severe Anaemia	**2%**
Previous LSCS	**5%**

Pregnancy with heart disease	**1%**
Premature labour	**7%**
Breech presentation, Transverse Lie	**3 to 4%**
APH	**1 to 2 %**
Multiple Pregnancy	**2 %**
Adolescent Pregnancy	**3 to 5 %**
Exp. Percentage of High-Risk Pregnancy	**37**

Ensure 100% registration of pregnant women:

Registration of pregnant women is entry point for service delivery. All registered ANCs should be monitored for service delivery & also should be registered in RCH portal software. All women must be informed about importance of Pre-pregnancy use of Folic acid 0.5mg tablet to avoid Neural tube defects. For this ASHAs/ ANMs should register all newly married couples and provided them information on neural tube defects and its prevention by daily consumption of Tab. Folic acid 0.5 mg for at least 3 months period to conceiving pregnancy. As many / majority of couples do not plan for pregnancy and conceive pregnancy within 3-4 months of marriage, it is advisable that all newly married women are started with Folic Acid 0.5 a day. During subsequent pregnancy the couples are enough matured to decide for next issue and can be advised to start with Tab. Folic Acid 0.5 mg 3 months period to pregnancy and follow contraception till such period.

Registration of all pregnant women before 11 weeks is the most important activity of ANM. Ensure 100% registration of ANCs by all sub-centres in PHC area. Keeping touch with recently married women and couples not using contraceptives will help in early registration. Monitoring Menstrual cycle for all women from eligible couple list who are not protected by permanent methods of contraception. All such unprotected eligible women should be followed up every month for history of menstrual cycle. Those women who give history of missed menstrual cycle/ period should be tested for urine pregnancy test by use of UPT kit by ASHA. The women should be asked to give urine sample preferably 7-10 days of post missed period to be tested by UPT kits for confirmation of pregnancy. The urine examination done immediately after missed period may be negative and hence to rule out false negative results it is advisable to do UPT during 7 to 10 days after missed period.

Register name of ANC in RCH register serially& also in RCH software. Give MCP card to mother with UID of RCH. Yearly number starts from 1st April of year and monthly number from 1st of every month.

Inform each pregnant woman about her registration number, place and date of next ANC clinic and importance of regular check up at the time of registration.

If any ANC from outside sub-centre area attends ANC clinic, she should be encouraged and provided with all the checkups. However, while registering, such ANC should be given '0'

number in RCH register. She should be asked for MCP card if issued to her and if it has UID number then service provided must be entered on RCH software

ASHAs should help ANM in early registration, & HA(F) should help in ANC check-up and management of difficult cases referred by ANM.
Use of UPT Kit by ASHA to early pregnancy.
MO should take sub-centre wise and village wise review Of ANC registration against expected ANCs and week of registration of each ANC in the monthly meeting. Find out reasons for less registration / late registration and try to rectify them also see whether registered ANCS entered in RCH software

3.4.2 Examination of all pregnant women at antenatal clinic:

Table: Examinations during pregnancy

Height and weight	Systemic Examination
Pallor, Icterus,	Fundal height
Oedema over feet, hands, face	Foetal presentation and position
Blood pressure	Foetal heart rate

Schedule of ANC check-up:

- Most important aim of antenatal examination is recognition and management of any complication of pregnancy at early stage so that there will be safe delivery for mother and birth of healthy child.
- Frequency of examination and test to be carried out are such that all the common complications are detected early and corrected in time.
- Ideally all ANCs should be examined monthly after registration in Arogya Seva Satra or PHC. Therefore, insist all ANCs to attend clinic monthly for check-up, Asha must mobilize them. Pradhan Mantri Surakshit Matrutv Abhiyan (PMSMA) activity should carried out by MO regularly on 9th of every month.
- If it is not possible to attend ANC clinic monthly, then ANC should get checked at least four times during pregnancy as per schedule given below –Including Registration

Table: Ideal schedule suggested below is of four visits ANC check up

1st check up 8-11 weeks	2nd check-up 24-26 weeks	3rd check-up 32 weeks	4th check up 36-38weeks
• **Confirmation of Pregnancy** • **Calculate EDD Height in Cm's, Weight in Kg and calculate BMI.** • **Screening for high-risk mother** • **Inj.Td**	• Check for mother and Foetal status • Confirm hypertension and anaemia • Tab. IFA, inj. Td,	• Check for mother and Foetal status • Confirm hypertension and • Anaemia Tab. IFA • Review the planning of delivery and do	• Check for mother and Foetal status • Confirm hypertension • and anaemia • Review the planning of delivery and do changes if needed

• **Prepare plan for delivery and emergency** • **Health education and Counselling**	• Review the planning of delivery and do changes if needed • Health education and Counselling	changes if needed • Health education and Counselling	• Health education and Counselling

- Most important part of schedule of ANC examination is that, all ANCs should be checked at 32 and 36 weeks irrespective of number of previous examinations. Because most of the complications of pregnancy are detected during last trimester. If the ANC is going to her parent's house for delivery, ANM should inform to concerned sub-centre ANM and advise ANC to attend clinic there along with ANC card.
- For 'high risk' mothers more frequent examinations will be required as per clinical situation.
- Medical Officer ensure list of all expectant mothers in next 3 months are displayed as per expected date of delivery and expected place of delivery and monitor.

Examinations during ANC check-up:

Height of ANC should be recorded at the time of registration or during first check-up if registration is done at home. Other examinations should be carried out every month at the time of monthly check up. List of examinations and actions to be taken on common findings are given in table 4 below,

Table: Examination and action to be taken during ANC check up

No.	Examination	Action
1	Edema	• Examine whether edema is on one leg or both legs. If edema is on one leg, refer ANC to specialist. • Ask mother if she **has urinary complaints such as burning micturition, pain in lower abdomen,** *history of kidney disease*, if yes refer to specialist. • If mother has oedema + albuminuria +high blood pressure, refer to specialist as she is/may be in pre-eclampsia. • If bilateral oedema without albuminuria and high BP (most common): Reassure mother, give FS if mother is anaemic, advise for salt restriction and elevation legs during afternoon rest and at night
2	Weight gain	• Record monthly weight gain on ANC card of mother • Weight gain more than 3 kg. in a month: Suspect pre-eclampsia

		• Weight gain less than 1 kg. in a month: Suspect foetal growth restriction
3	Blood Pressure	• If more than > 140 / 90 mm of Hg, advise mother to rest for half hour and then repeat the BP recording • If systolic more than 160: refer to specialist • If systolic between 140-160 and or diastolic 90 or above: advise salt restriction and refer mother to MO PHC for further advice.
4	Fundal Height	• Examine fundal height in weeks and compare with LMP • If the difference is more than 4 weeks (more or less) refer to specialist
5	Foetal Presentation	• Non-cephalic (Significant after 34 weeks)
6	Foetal Heart Rate	• FHR < 110 or > 160 /minute: Refer to specialist
7	Haemoglobin %	• For Hb less than 7 gm % (severe anaemia): Start therapeutic IFA, & deworming by Tab Albendazole 400 mg single dose during 14-16 weeks of pregnancy. • For Hb between 7-11 gram%: Start IFA in therapeutic doses and re-examine after one month - If improvement of Hb by more than 1gm%, continue IFA. • If improvement less than 1gm%, give Albendazole Tablet 400 mg single dose and observe for another 3 weeks, if no improvement then refers to specialist • If Hb persist < 7 gm % at 24 weeks give IV Iron Sucrose based on calculation
8	Proteinuria	• If proteinuria present suspect pre-eclampsia and refer to specialist
9	Risk factors	• ANM should look for any risk factor associated with pregnancy during every check-up. List of risk factors to be looked for is given on next page. • All high-risk pregnancies should first be checked by MO and then referred to specialist if necessary for further check-up or during delivery depending upon the risk factor.

Essential investigations e.g. Haemoglobin estimation and urine examination for albumin and sugar should be done for all ANCs during check-up.
Other investigations (shown in table below) may be performed wherever facilities are available.

Rapid malaria test in endemic areas	**RPR for syphilis.**
Test for sickling in selected tribal area	Voluntary HIV testing
Blood grouping, Rh typing	Blood sugar testing (GDM)
Hepatitis B surface antigen (HBsAg)	Ultrasonography (16 to 18 weeks) for congenital anomalies

Warning signs:
Following warning signs require immediate visit to the doctor/ health facility:

- Fever >38.5ºC/for more than 24 hours.
- Headache, blurring of vision.
- Generalized swelling of the body and puffiness of face.
- Palpitations, easy fatigability and breathlessness at rest.
- Pain in abdomen.
- Vaginal bleeding / watery discharge.
- Reduced foetal movements.

3.4.3 Advice about care during pregnancy:

ANMs should give at least one home visit to all ANCs from her area every trimester. This will help in giving important messages to mother regarding care during pregnancy. Following topics should be covered during the home visit

First and second trimester:

- Diet: One more meal a day and evening snacks (most important), inclusion of sprouted legumes, pulses, green leafy and other vegetables, seasonal fruits.
- Rest: 2 hours in afternoon and 8 hours at night preferably in lateral position
- Exercise: Walking
- Habits: Avoid tobacco in any form, avoid alcohol
- Self-reporting of danger signals, e.g. Hyperemesis, severe headache, giddiness, severe oedema, bleeding, loss/sluggish of foetal movements etc.
- Consumption of Iron and Folic Acid 180 tablets for prophylaxis of anaemia and 360 for therapeutic dose.
- 2 doses / booster of Td.
- Calcium through diet and tablets.
- Registration for JSY, if eligible.

Third trimester:

All above plus,

- Avoid heavy work and jerky travel on bad roads. This may lead to pre-term labour, foetal growth restriction and premature rupture of membranes.
- Plan for place of delivery, inform TOLL free No.102 and 108 for free ambulance service. Prepare mother for delivery, importance of exclusive breast-feeding, child immunization and contraception.

3.4.4 Identification of high-risk mothers:

From registration, at each antenatal visit, ANM should screen all pregnant women for presence of any risk factor.

MO should enlist all high-risk mothers and monitor their follow up, the list of all high-risk mothers must be displayed in MO room for follow up and monitoring.

Actions to be taken for high-risk pregnancy:

For high-risk pregnancies which can be managed at PHC:

Table: Suggested actions for high risk factors

High risk factor	Actions suggested
Primigravida age < 20 years or > 35 years	Regular ANC check-up at PHC, refer to specialist if abnormal findings during check-up, can be delivered at PHC.
Primigravida of Height less than 140 cms	Regular ANC check-up at PHC. Assessment of place of delivery by specialist. Keep transport facility ready if decided for delivery at PHC
Primigravida having vertebral /limb deformity	Regular check-up at PHC, Assessment by specialist for place of delivery. Can be delivered at PHC if suggested by specialist
Gravida 4 and above	More frequent checkups at PHC, evaluation by specialist once during pregnancy. Can be delivered at PHC.
Prior history of mid trimester abortion	Refer to specialist immediately after registration. Regular check up by specialist necessary. Give supportive care. Can be delivered at PHC
Anaemia at the time of delivery	Mild anaemia (Hb: 10-11 gm%) - Can be delivered at PHC. Moderate anaemia (Hb: 7- 9gm%) - Delivery at PHC in presence of MO, refer case to centre with blood transfusion facility if PPH is suspected Severe anaemia (Hb :< 7 gm%) - Delivery at specialty hospital with blood transfusion facility.

Hypertension	Hypertension without proteinuria - Prescribe anti-hypertensive and if under control delivery at PHC

For high-risk pregnancies that should be delivered under specialist care

High risk factor	Actions suggested
Post caesarean pregnancy	Refer to specialist during third trimester for evaluation. Should be delivered under specialist care. Advise institutional delivery under specialist care.
Hypertension with proteinuria	Refer to specialist for delivery
Prior history of medical diseases- heart disease, diabetes mellitus etc.	Refer to specialist immediately after registration. Regular check up by specialist necessary. Give follow up care.
Previous history of pre-term labour, stillbirth, early neonatal death, congenitally malformed child	Refer to specialist immediately after registration. Regular check up by specialist if necessary. Give supportive care.
Malpresentation persisting at 36 weeks	Refer to specialty hospital with facility of caesarean section and blood transfusion is available.
Pregnancy beyond 41 weeks	Confirm the LMP first. If LMP correct and pregnancy is exceeding 41 weeks, refer to specialist.

Common problems in high-risk women and required actions

Common problems in high-risk pregnant women & actions that can be taken by health workers & MO are enumerated below. MO should follow these instructions during management of high-risk pregnancies

RISKS	ACTION
Elderly Primigravida	
• **Pregnancy induced hypertension** • **Gestational diabetes** • **Difficult labour- Chances of Caesarean delivery are higher** • **Foetal abnormalities.**	• Regular antenatal check up • B.P. and urine analysis every month • Refer to SDH for USG around 18-20 week to exclude foetal anomalies • Pelvic assessment at or after 36 weeks. • Institutional delivery under care of specialist.
2. Teenage Primigravida	
• **Pregnancy induced hypertension** • **Anaemia** • **Pre-term labour** • **Foetal growth restriction** • **Difficult labour**	• Regular antenatal care • Hb%, BP, urine analysis more frequently • Adequate rest • IFA tablets, nutrition guidance • Pelvic assessment at 36 weeks • Hospital delivery.
3. Grand multipara (para 4 and more)	
• **Anaemia** • **Malpresentation** • **Atonic PPH** • **Uterine rupture**	• Antenatal care • Supplement IFA, nutrition guidance • Examine P/A at 34 and 36 weeks to look for foetal malpresentation • Hospital delivery - Avoid injudicious use of Oxytocin, • Active management of 3rd stage of labour – Keep IV line ready, Give Inj. Oxytocin 10 units IM Clamp the umbilical cord soon after the birth of baby, deliver the placenta by controlled cord traction: If placenta not delivered even after half hour and bleeding PV increased give IV Oxytocin 20 units in RL drip at 40-60 drops per minute. Tablet Misoprostol 800 mcg. per rectally If placenta is not delivered in half an hour refer to **FRU. Do not give cord traction to deliver placenta**

4. Breech presentation after 34 weeks	
• **Pre-term labour** • **Premature rupture of membranes (PROM)** • **Cord prolapse leading to foetal asphyxia** • **Foetal abnormalities**	• Refer to SDH for USG to confirm presentation, gestational age, type of breech, placental location and to exclude twins and congenital malformations. • Refer to specialist
5. Transverse lie beyond 34 Weeks	
• **Preterm labour** • **PROM with cord prolapse, hand prolapse - Foetal asphyxia, foetal death** • **Obstructed labour, uterine rupture.**	• USG at SDH to exclude placenta previa and other abnormalities • Referral for Caesarean Section.
6. Post Caesarean pregnancy	
• **Requirement of Caesarean section again** • **Scar dehiscence during labour.**	• Regular antenatal care, Refer to specialist at 36 weeks
7. Prolonged pregnancy beyond 42 weeks	
• **Foetal distress, difficult labour**	• USG at SDH • Vaginal examination to assess condition of cervix (Ripe/unripe) and pelvic assessment • Referral at 41 weeks to specialist
8A. Uterine over distension: May be due to twins **Fundal height greater than period of amenorrhea, abdomen over distended**	
• **Anaemia, PIH, APH, malpresentation causing dystocia, pre-term labour** • **Foetal malformation** • **Atonic PPH**	• Extra diet • Extra nutrition and IFA tablets • Look for anaemia and PIH periodically
8B. Uterine over distension: May be due to polyhydramnios	
• **Can be associated with twins,** **foetal malformation, maternal** **DM**	• USG to exclude twins, foetal malformation • Referral to specialist

Gestational Diabetes Mellitus

Gestational Diabetes Mellitus (GDM) is defined as Impaired Glucose Tolerance (IGT) with onset or first recognition during pregnancy. Worldwide, one in 10 pregnancies is associated with diabetes, 90% of which are GDM. Undiagnosed or inadequately treated GDM can lead to significant maternal & fetal complications. Moreover, women with GDM and their offsprings are at increased risk of developing type 2 diabetes later in life.

Consequences of GDM: Maternal risks of GDM include polyhydramnios, pre-eclampsia, prolonged labour, obstructed labour, caesarean section, uterine atony, postpartum haemorrhage, infection and progression of retinopathy which are the leading global causes of maternal morbidity and mortality. Foetal risks include spontaneous abortion, intra-uterine death, stillbirth, congenital malformation, shoulder dystocia, birth injuries, neonatal hypoglycaemia and infant respiratory distress syndrome. Long term clinical effects of GDM are important contributors to the burden of non-communicable diseases in many countries.

Operational Definition of GDM Gestational Diabetes Mellitus (GDM) is defined as Impaired Glucose Tolerance (IGT) with onset or first recognition during pregnancy2. National guideline for diagnosis and management of Gestational Diabetes endorses the single step test recommended by WHO for diagnosis of GDM using a 75gm glucose, through Oral Glucose Tolerance Test (OGTT) irrespective of the last meal with a threshold value of 2-hour BS >140 mg/dL.

Guidelines advocate for universal screening of all pregnant women at first antenatal contact. If the first test is negative, second test should be done at 24-28 weeks of gestation. GDM Pregnant women should be managed by Medical Nutrition Therapy (MNT), and insulin therapy/ metformin as required. In the postpartum period, OGTT should be repeated at 6 weeks after delivery, if blood sugar <140 mg/dL, then women should be referred to NCD clinic for Post Prandial Blood Sugar (PPBS) testing annually.

Protocol for investigation Testing for GDM is recommended twice during ANC.

The first testing should be done during first antenatal contact as early as possible in pregnancy.

The second testing should be done during 24-28 weeks of pregnancy if the first test is negative. It is important to ensure second test as many pregnant women develop blood sugar intolerance during this period (24-28 weeks).

Moreover, only one third of GDM positive women are detected during first trimester. If it could not be done during this time, then it can be done any time after 24 weeks of pregnancy. There should be at least 4 weeks gap between the two tests. The test is to be conducted for all pregnant women even if she comes late in pregnancy for ANC at the time of first contact. If she presents beyond 28 weeks of pregnancy, only one test is to be done at the first point of contact.

OGTT of all pregnant women should be done at Pradhan Mantri Surakshit Matritva Abhiyan (PMSMA) sites as per protocol. If the test is positive at any point, protocol of management should be followed as given in this guideline. At MC/DH/other CEmOC Centres, availability

of glucometer, metformin and insulin must be ensured at all ANC clinics and labour rooms with facility for collection of sample and interpretation of result there itself (by training of personnel). At all other facilities up to PHC level, there should be an in-house arrangement of glucometer and 75 gm glucose pouches for conducting the test & giving report immediately so that necessary advice can be given on the same day by the treating doctor.

Management of GDM Guiding Principles

- All Pregnant women who test positive for GDM for the first time should be started on Medical Nutrition Therapy (MNT) and physical exercise for 2 weeks.
- The woman should walk/exercise for 30 mins a day. After 2 weeks on MNT and physical exercise, 2 hrs PPBS (post meal) should be done.
- **Thus, GDM is managed initially with MNT and physical exercise and if it is not controlled with MNT (lifestyle changes), Metformin or Insulin therapy is added to the MNT.**
- If 2hr PPBS is <110 mg/dL, repeat test as per high-risk pregnancy protocol i.e. to undertake 8 tests (4 regular tests and 4 additional). It is recommended to conduct at least one test every month during 2nd and 3rd trimester. More follow-up tests can be done as recommended by the treating physician.
- If 2hr PPBS is ≥110 mg/dL, medical management (metformin or insulin therapy) to be started as per guidelines.

Medical Nutrition Therapy (MNT)

Principles of MNT

Healthy eating during pregnancy All pregnant women with GDM should get Medical Nutrition Therapy (MNT) as soon as diagnosis is made. MNT for GDM primarily involves a carbohydrate controlled balanced meal plan which promotes

- Optimal nutrition for maternal and foetal health
- Adequate energy for appropriate gestational weight gain
- Achievement and maintenance of normoglycemia.

For Detail Please referrer to State or GOI Guidelines

3.4.5 Assessment of risk during third trimester of Pregnancy:

Look for:

- Uterine over distention
- Foetal mal-presentation persisting beyond 34-36 weeks
- Pregnancy continuing beyond 41 weeks

3.4.6 Common complications during pregnancy and their Management:

Medical officer can manage some of the pregnancy related complications at PHC level. Management of such complications will minimize unnecessary referral and will increase the credibility of PHC and medical officer in the community.

However, for correct management, it is important to recognize the complications and to have correct knowledge of management.

Important complications and their PHC level management are given below,

Anaemia:

Detection: Clinically pallor, oedema, dyspnoea, Hb<11gm% (Severe anaemia Hb < 7 gm%)

Risks:

- Cardiac failure
- Inability to withstand blood loss during third stage of labour, puerperal sepsis.
- Foetal growth restriction, prematurity.

Causes:

- Nutritional deficiency (Iron and folic acid)
- Worm infestation.
- Sickle cell disease
- Hemoglobinopathies
- Malaria
- Chronic blood loss etc.

Action to be taken at PHC:

- Give oral Iron Folic Acid tablets in therapeutic doses, ensure compliance
- Deworming with tablet Albendazole 400 mg. (not in first trimester)
- Nutritional advice for iron rich food.
- Repeat Hb estimation after 1 month
- Refer if, Hb< 7 gm% at any time
- Anaemia is defined as Hb level < 11gm% in pregnancy or immediate postpartum period.
- Anaemia is grouped as mild (10-11gm %), moderate (7-9 gm %) and severe anemia (<7gm %),
- Suspect anemia in pregnancy:
  - Breathlessness, easy fatigability.
  - Last delivery within a year.
  - H/o hookworm infestation or malaria.
- Assess for pallor.
- For prophylaxis give IFA tablet (with 100 mg elemental iron and 0.5 mg folic acid) once daily for 100 days (6 months) starting after the first trimester.
- Mild to moderate anemia is treated by iron and folic acid tablets (100 mg elemental iron + 0.5 mg folic acid) twice daily and to be continued during postpartum period. Administer parenteral iron preparation if there is no compliance / intolerance to oral iron.
- All pregnant mothers should receive anti-helminthic drugs (Tab. Albendazole 400 mg single dose) during 2nd trimesters of pregnancy.
- Cases of severe anemia after ruled out that it is not due to chronic malaria, sickle cell disease or any hemoglobinopathies must be treated by de-worming with tablet Albendazole 400 mg single dose during 14-16 weeks and therapeutic Tab. IFA for period of 3 months. Every month estimate hemoglobin. If hemoglobin has not shown improvement or remain below 7gm% at 24 weeks of gestation/ pregnancy then give injectable iron sucrose/ Inj.Ferrous Carboxymaltose (FCM) as per protocol

The woman having following might need a blood transfusion: -

- Women with Hb< 7 gm% at term should deliver at FRU.
- Blood loss during delivery must be minimized by practicing AMTSL in all cases.

Indications and dose for parenteral iron sucrose therapy:

- Intolerance to oral iron.
- Persistent non-compliance.
- If Hb is less than 7gm% till 24 weeks of gestation even after mother taking IFA tablets regularly

Technical guidelines to give parenteral iron*:*

Every pregnant woman needs 500 mg of iron for foetus and placenta, 500 mg for development of RBCs and Bleeding during & after delivery and during breast feeding for 6 months mother loses 360 mg of iron. As such a pregnant mother needs a total of 1360 mg of iron. As menstrual loss is not there during pregnancy and sometimes during lactation an iron loss of 350 mg saved by mother due to pregnancy. Taking into account above every pregnant mother need 1000 mg of iron (1360-350=1010). The needed 1000 mg of iron she can't get from her regular day to day diet hence prophylactic and therapeutic iron must be received by every pregnant mother. If the cause of anaemia is nutritional then must seek advice of doctor regarding parenteral iron sucrose.

Calculation of dose of parentral iron:

Formula: -

Required iron = [2.4 X weight of pregnant woman X Deficiency of Hb%#]
+ [Body store of iron*]

#Deficiency of Hb% = (Hb 11gm% - current Hb% of pregnant woman)

*Body store of iron= 15mg per kg body weight of pregnant woman (upto35kg). if weight is more than 35 kg then take 500mg.

e.g. If a pregnant woman of 40kg weight has 7gm% of Haemoglobin then her iron requirement will be as follows,

Iron Req.= [2.4 X 40 X (11-7)] + [500] = [9.6 X 4] +500=38.4+500=538.40mg.

Calculate iron requirement as above and then give parenteral iron in normal saline.

Precautions to be taken while giving iron sucrose to pregnant mother:

- It must be given in the presence of Medical Officer.
- Anaphylactic shock may occur while giving iron sucrose hence keep emergency tray ready.
- IV Iron sucrose should be administered as a slow infusion of 200mg/ dose in 100ml of 0.9% saline delivered over 20-30 mins. During initial 5 mins., the infusion should be administered at the rate of 20-30 drops per minute, gradually increasing to 80-90 drops/min. Subsequent doses can be given over a period of 20-25 mins. The maximum dose of Iron sucrose should not exceed 600mg (3 doses of 200 mg each) in a week.
- Total dose of iron requirement should be given as above on every 3rd or 7th day.

Ferric Carboxy Maltose (FCM) in Anaemia

Use of FCM during pregnancy, second trimester onwards. Following advantages over Iron Sucrose were: - FCM brings about greater and faster Haemoglobin increase in treatment of anaemia as compared to iron sucrose FCM exhibits higher stability than iron sucrose Antigenicity was much lower with FCM in comparison to iron sucrose. FCM usually requires a shorter administration time, approximately 15 minutes, compared to iron sucrose, which may take around 30 minutes. Maximum dose and total replacement dose in a single

infusion is higher for FCM, allowing for the efficient delivery of a substantial amount of iron in one administration.

Ferric Carboxy Maltose (FCM) administration:

- FCM is available in 10 ml and 20 ml vials. Each 10 ml vial contains 500 mg of FCM equivalent to elemental iron. Similarly, each 20 ml vial contains 1000 mg of FCM equivalent to elemental iron
- FCM will be administered as an intravenous infusion based on the calculated dose requirement with 100 ml of 0.9% Normal Saline Solution over 15 minutes
- The maximum dose per session will be 1000 mg
- If subsequent doses are needed, 7th and 14th days can be planned for administration
- FCM should be administered at PHC or higher level under the supervision of the medical officer.
- Vital signs such as blood pressure, heart rate, respiratory rate, temperature, and fetal heart rate should be monitored before, during, and at the end of the infusion
- To avoid permanent discoloration of the skin due to extravasation of FCM, the patency of the cannula must be checked by flushing normal saline before the initiation of treatment
- Pregnant women should be observed for 30 minutes for any adverse events following the infusion of FCM
- A test dose is not required for FCM.

Note:

- Do not administer more than 1000 mg of FCM per week
- Do not cross 1500 mg total dose in one pregnancy
- IV FCM does not require admission, can be a day procedure
- Do not give by subcutaneous or intramuscular route Sodium chloride 0.9% is the only diluent to be used.

Precautions

- All life-saving equipment should be available to deal any unexpected severe adverse reaction
- Hand hygiene shall be performed before and after the contact with pregnant women
- Use sterile and disposable intravenous infusion set, i.v. cannula and syringe
- Patency of i.v. cannula has to be ensured, otherwise extravasation of iron could lead to permanent staining of skin.
- Discard the remaining unused drug in the vial after withdrawing the required dose. Do not store the remaining Iron sucrose or FCM for later use
- In case of any reaction, stop the intravenous iron administration and give one ampoule of inj. Avil (Pheniramine), one vial of inj. Hydrocortisone intravenously immediately and contact the medical officer on duty.

Follow up of after Intravenous iron administration

The haemoglobin level of the pregnant women should be checked four weeks after administration of intravenous iron. If there is no improvement in Hb level (<1 g/dl increase after four weeks), other causes of anaemia should be investigated.

Note: IFA tablets need not be given for 3 months post infusion to pregnant women who have received full dose of IV iron as the iron deficit and body's iron stores have been replenished. After 3 months, re-evaluate and decide treatment based on Hb levels.

Assess response to Iron and Folic Acid: -

- Subjective well-being within few days
- Haemoglobin starts increasing after 2-3 weeks.
- Rate of increase in Hb concentration is 1 gm% every week.

Points to Remember: -

- Very severe anaemia (Hb 5 gm% or less) carries a very high risk of maternal mortality for which blood transfusion and institutional care is required.
- Anaemia, pyrexia and icterus should raise suspicion regarding malaria.
- Delivery of anaemic woman should be done under supervision of MO and it requires,
  - Strict aseptic precautions
  - Prophylactic antibiotics.
  - Active management of 3rd stage of labour to reduce blood loss

Pregnancy Induced Hypertension (PIH):

Diagnose PIH and severe pre-eclampsia

- PIH: Sustained rise of BP at 140/90 mm of Hg or more after 20 weeks of pregnancy without history of high BP before pregnancy is called as PIH.
- Severe pre-eclampsia: When ANC has following signs and symptoms along with high BP (B.P. > 160/110mm of Hg) patient is in severe pre-eclampsia
- Proteinuria + + or more
- Reduced urinary output, bilateral oedema over feet or swelling over body
- Symptoms and signs suggestive of impending eclampsia like severe headache, blurring of vision, vomiting, epigastric pain, oliguria, hyper reflexia (brisk knee jerk)
- PIH and Pre-eclampsia has adverse effect on mother and foetus. Important effects are given in table below,

Table: Adverse effects of PIH and pre eclampsia

Mother	Foetus / Neonatal
Eclampsia	IUGR
Cerebral haemorrhage	Intrauterine foetal death
Acute Renal failure	LBW
Haemorrhage due to coagulation failure	Prematurity
Liver failure	Asphyxia
Pulmonary oedema	
Cardiac failure	
APH due to abruptio placentae	

- Maternal, foetal and neonatal complications are mostly seen in severe and protein uric hypertension, early onset hypertension, women with multi-organ dysfunction and women developing eclampsia.

Difficulties in management:

- In PIH, symptoms appear very late in the course of disease. Hence, diagnosis can be made only on clinical examination and urine analysis carried out fortnightly during ANC check-up.
- The disease continues to remain in the same state or worsens and the condition improves only after termination of pregnancy.
- Some patients may need critical care in Intensive Care Units with sophisticated equipment.

Therefore, PIH cases should be evaluated by specialist before taking decision about place of delivery.

Principles of care:

- Pregnancy induced hypertension (PIH) without proteinuria and oedema should be managed at PHC with appropriate anti-hypertensive as described below. Call such ANCs every 15 days, record BP and examine urine for protein and oedema over legs. Continue PHC level management till urine examination is normal and there is no detectable oedema.
- PIH with proteinuria and oedema requires investigations and specialist care that are not available at PHC. Do not wait till symptoms of pre-eclampsia occur. Start first dose of anti-hypertensive and refer to specialist for further management.
- Follow up check-up, BP monitoring and dose adjustment of PIH cases referred to specialist can be managed by MO under supervision of specialist. This will save time and money of poor rural patient and will also increase confidence of MO and PHC staff in management of PIH.

Anti-hypertensive treatment:

Drug treatment:

- Give anti-hypertensive drugs if diastolic BP remains100mm of Hg. or more. Goal of therapy is to keep the diastolic BP between 90 to 100 mm of Hg.
- Nifedipine and Methyl dopa are safe drugs for PIH.
- Do not give diuretics except in cases of pulmonary oedema.
- Do not give sedatives, as they do not offer any benefit in PIH.

Nifedipine:

- Nifedipine is a Calcium channel blocker. It directly acts on the blood vessels and relaxes the arterial smooth muscles.
- Dose is 10 - 20mg orally or sub-lingually every 6 - 8 hours. Peak action is achieved in 1-3 hours.
- Side effects include headache, dizziness
- Advantages: Does not affect the perfusion of vital organs and cardiac preload.

Alpha Methyldopa:

- It acts centrally, reduction in BP is seen in four to six hours
- Dose is 250 mg thrice a day, which can be increased up to 500 mg 6 hourly depending upon response of the patient
- Advantage: Does not affect circulation to vital organs.
- Side Effects include sedation, vertigo and depression in mothers and reduction in birth weight of the foetus.

Obstetric Management:

- Record blood pressure and urine for proteins of all the mothers attending PHC for delivery.
- In mothers with PIH, carefully record diastolic BP. If Diastolic BP is less than 100mm of Hg, delivery can be conducted at PHC as like any other deliveries.
- Mothers with PIH and proteinuria should be referred to specialist for delivery. However, if such patient is directly brought to PHC in labour, follow the guidelines given below for delivery
- Monitor foetal Heart Rate (FHR) and colour of liquor for detection of foetal distress
- If progress of labour is slow, hasten by artificial rupture of membrane (ARM) followed by oxytocin infusion if required.
- Give Episiotomy to cut short second stage of labour when required.
- Oxytocin is safe when required in mothers with severe PIH (diastolic BP more than 100mm of Hg) refer the mother irrespective of urine analysis to specialist for delivery.

Eclampsia:

Eclampsia is an important cause of maternal death. MO and nursing staff must have ability to recognize the eclampsia and give primary treatment before referral to specialist. This is important, as most common reason for death in eclampsia is improper or late management.

Management of eclampsia:

- First assess the seriousness of eclampsia by following examination
- Severe hypertension (>110diastolic)
- Proteinuria (+ + more)
- Number of fits (1 or more)
- Diminished urine output (< 30 ml/hour)
- Altered consciousness (coma)
- Icterus
- Patient with eclampsia is presented with severe hypertension, blurring of vision, convulsions, diminished urine output and altered consciousness. On urine examination, patient has proteinuria. Onset of convulsions can be ante-partum, intra-partum or post-partum
- Do not try to manage the case of eclampsia at PHC. Refer the case to nearest FRU/DH/WH specialty hospital where 24 hours specialist services are available, as early management is lifesaving.

When condition indicates serious maternal deterioration, refer urgently to a tertiary care centre/Medical College Hospital. Give primary treatment till the arrangement of transport is made.

Primary treatment includes following important points:

- Prevent Injury
- Clear airway: Clear airway by cleaning mouth and throat by suction of secretions, turning head of patient to side and by inserting airway. Oxygenate the patient if required.
- Control of fits: Control fits by giving Magnesium sulphate (doses given below) or Injection Diazepam 10 mg IM. Giving anticonvulsant prior to referral is very important, as it will help in preventing further deterioration of the patient. Magnesium sulphate is drug of choice as it effectively controls convulsions, patient remains conscious and alert and there is no adverse effect on foetus.
- Control of high BP: If diastolic BP is more than 110 mm of Hg, give Nifedipine 5 mg sublingually and record BP every five minutes. Maintain diastolic BP around 90-100 mm of Hg. Note down timing of Nifedipine administration & BP on referral chit.
- Monitor urine output: Insert Foley's catheter and connect it to urine bag. Note the timing on the urine bag and referral chit; this will facilitate monitoring the urine output and assessing the general condition at referral centre.
- Maintain hydration: Start IV line. If diastolic BP drops to below 90 mm give 500 ml of IV Fluids. This will help in maintaining perfusion of vital organs and will prevent patient going in renal failure.
- If patient of eclampsia has arrived in labour and it is not possible to refer, augment labour by artificial rupture of membrane and oxytocin drip. Do not give Inj. Methergine after delivery.

Dose and administration of Magnesium Sulphate:

Inj. Magnesium sulphate Loading Dose- 14 gm. 4 gm. I.V. - 20 ml of 20% solution over 5 minutes followed by10 gm. I.M. – 10 ml of 50% (i.e. 5gm) solution (i.e. 5gm) in each buttock + 1 ml of 2% lignocaine

Status of Labour:

- Not in labour or early labour: Refer to FRU (with referral slip).
- Advance stage of labour:
  - Deliver
  - Refer to the higher facility after delivery
  - Accompany the woman
  - Maintain semi-prone position/left lateral position with mouth gag in-situ
  - Maintain I.V. line with RL
  - If BP >160/110 mm Hg - administer Nifedipine, 5 mg, sub-lingual
  - Give oxygen with mask

Recurrence of convulsion:

2 gm magnesium sulphate (2 ampoule of 50% solution diluted in 16 ml NS) I.V. over 5 minutes.

Maintenance Dose: -

- 5 gm IM alternate gluteal region (buttocks) 4 hourly till 24 hours after last convulsion or delivery (whichever is later).

Before repeating the dose of Magsulph ensure:

- Patient must be conscious
- Knee jerk - Must be present
- Respiratory rate - > 16/min.
- Urine output > 100 ml in previous 4 hours

MgSO*4* antidote:

- Calcium Gluconate 10 %, 10 ml slow I.V.

Prevention of hyper magnesia:

To avoid hyper-magnesia, ensure the following -

- Knee jerk must be present.
- Urine output should be 100 ml in previous 4 hours
- Respiratory rate should be about 16/minute. If there are signs of respiratory depression, the next dose is withheld and respiratory depression is treated by10 ml intravenous injection of 100% Calcium gluconate.

Eclampsia Management: (Refer Annexure 3.5(Vol. II))

Bleeding in early pregnancy:

A woman may present with history of a short period of amenorrhea followed by vaginal Bleeding. Abortion, vesicular mole and ectopic pregnancy are the common conditions underlying, while an occasional woman may simply have a delayed menstruation. Medical Officer must be able to differentiate between early pregnancy bleeding and delayed menstruation.

Differentiate between menstruation & early pregnancy bleeding:

- Ask patient following:
  - Period of amenorrhea, LMP, previous menstrual cycles or any symptoms suggestive of pregnancy
  - Amount and duration of bleeding, it may be scanty in delayed menstruation and profuse in abortion.
  - Whether there is any significant history of abortions, surgery for ectopic pregnancy
- If possible, arrange for pregnancy test of patient
- Arrive at the diagnosis with the help of following chart If the signs and symptoms indicate that it is early pregnancy bleeding, refer ANC to specialist.

Table: Causes of early pregnancy bleeding

Particular	Threatened abortion	Incomplete abortion	Missed abortion	Vesicular /H.Mole	Ectopic pregnancy	Delayed menstruation
Uterine Size	Equal to Period of Amenorrhoea	Smaller	Smaller	Bigger	Smaller	-
Vaginal bleeding	Slight	Profuse	Absent or brownish discharge	Recurrent small	Slight	Moderate
Pain	Absent	Cramping pain significant	Absent	Absent	Severe, continuous	Absent
G.C. pallor /tachycardia	Fair	Proportional to blood loss	Fair	Fair	Out of proportion to visible blood loss.	Fair
Tenderness Abd/vag	Absent	Absent (Unless infected)	Absent	Absent	Marked	Absent
USG	Intrauterine viable pregnancy	Some products in uterine cavity	Nonviable pregnancy	Snowstorm appearance	Empty uterus, pelvic / adnexal mass	No pregnancy, normal findings
Management	Expectant	Surgical evacuation	Termination of pregnancy	Suction evacuation with blood transfusion if required	Laparoscopy or Laporotomy, blood transfusion	Medical

Ante-Partum Haemorrhage (APH):

Vaginal bleeding during pregnancy generally from20weeks onwards but before birth of baby is called as ante-partum haemorrhage.

Causes:

- Placenta Previa
- Abruptio placentae
- Heavy show
- Local cervical pathology like carcinoma, polyp etc
- During labour can be due to uterine rupture (Vasa previa is a rare condition when bleeding is fetal in origin)

Most common causes of APH are placenta previa and abruptio placentae. When patient of ante-partum haemorrhage attends PHC, assess patient first, examine, search for cause of APH and advise accordingly.

Steps in management of APH are described in detail below:

Assess the patient on following aspects:

- Time of onset of bleeding, amount
- Abdominal pain present or absent, its time of onset
- Prior H/O warning haemorrhage
- Perception of foetal movements
- Period of amenorrhea
- When did she pass urine
- Reports of prior USG if available

Examine the patient for:

- Pallor, tachycardia, general condition, blood pressure
- Uterus relaxed/hard/tender
- Presentation normal/abnormal/uncertain
- FHS heard/not heard
- Uterus contracting and relaxing or tonically contracted. Do not conduct vaginal examination until placenta previa is ruled out. Table below will help in differentiating placenta previa from abruption placentae.

Differentiate between Placenta Previa and Abruptio placentae as follows

Particular	Placenta previa	Concealed or mixed abruptio placentae
Pain	Painless recurrent vaginal bleeding	Painful bleeding
General condition	Pallor, tachycardia, restlessness proportional to visible amount of blood lost	Pallor, tachycardia disproportionately more than the visible amount of vaginal bleeding
Uterus	Relaxed, non-tender, foetal parts felt well	Tense, tender, woody hard, foetal parts cannot be felt
Presentation	May be abnormal or head may be high floating	Presentation cannot be made out

Foetus	foetal condition usually well if mother not in shock	Foetus often distressed or dead. FHS may not be heard
Maternal Dangers	Hypovolemic shock	Shock, acute renal failure, DIC
Action	No P/V examination. IV fluids, referral	IV fluids, referral, monitor clotting time and urine output

Take the action as per the guidelines given below:

- Refer the patient of APH to a specialist or a centre where facilities for USG, blood transfusion and operative delivery are available.
- Until referral is executed give at least one litre of I.V. R.L. fluids.
- Convince the relatives for urgent referral after explaining the seriousness of the condition, if there is significant pallor (Hb< 7 gm%), PR > 100/min, restlessness, systolic BP < 90 mm. of Hg, fetus distressed/dead (indicating massive haemorrhage requiring blood transfusion.)
- Keep transport facility ready (102 and 108 ambulance) for speedy transfer of patient to higher centre if you suspect CPD.

Start emergency care of a patient of concealed abruptio placentae that cannot be referred immediately.

- Give head low position, IV fluids and plasma volume expanders (colloids such as hemaccael, dextran, hysteril) if required and available.
- Monitor urine output and clotting time every 2 hours.
- Hasten delivery by Artificial Rupture of Membrane (ARM) and oxytocin infusion through other vein.
- Weigh the retro-placental clot after delivery.
- Repeat haemoglobin estimation.

Management of Antepartum Haemorrhage: (Refer Annexure 3.6(Vol. II))

Cephalo-Pelvic Disproportion:

Suspect CPD in following conditions:

- Teenage and elderly Primigravida
- Short Statured Primigravida
- Floating head at term in a Primigravida
- Baby appears big clinically
- Vertebral/limb deformity.

Diagnosis:

- Clinical assessment of pelvis
- Clinical test for CPD
- Unsatisfactory progress of labour

Actions:

- Refer all teenage and elderly Primigravida with height less than 140 cm, and other cases you suspect as of CPD clinically to specialist at 36 weeks to decide the place of delivery.
- Advise Primigravida with less than 140 cm height for delivery at centre where caesarean facility is available.
- When you detect floating head in term Primigravida or suspect big baby clinically, refer the mother to FRU/DH/WH/Medical College Hospital with caesarean facility.
- Keep transport facility ready (102 and 108 ambulance) for speedy transfer of patient to higher centre if you suspect CPD.

Leaking/Premature Rupture of Membranes (PROM):

- Spontaneous rupture of membranes (bag of water) any time beyond 28 weeks of pregnancy but before onset of labour is called pre-labour / premature rupture of membranes (PROM).
- Diagnosed by passage of watery discharge from vagina either in the form of sudden gush or slow leakage.
- Diagnosis is confirmed by per speculum exam. with aseptic precautions.
- Avoid per vaginal examination.
- **Investigations:** (1) Full Blood Count; (2) Urine Routine, Culture and Sensitivity; and (3) High Vaginal swab for Culture and Sensitivity.

Complications:

- Increased incidence of pre-term labour and pre-maturity.
- Cord prolapses
- Dry labour.
- foetal pulmonary hypoplasia leading to Respiratory Distress Syndrome (RDS).

Management during early Delivery:

- **If < 34 wks:**

Give steroid to improve lung maturity, i.e.,

  - Inj. Betamethasone 11 mg/day for 2 days OR dexamethasone 6mg I.M 11 hourly 4 doses.
  - Amoxycillin or Erythromycin to prevent infection.
  - Referral to higher health facility for Tocolysis and specialized neonatal care.

- **>34 wks:**
  - Administer antibiotics
  - Assess cervix, if favourable then deliver under Antibiotic cover and if unfavourable refer to FRU.

Antenatal corticosteroid therapy:

- **Who can receive the therapy?**

- Inj. Dexamethasone (Glucocorticoid) administered between 24- 34 weeks of pregnancy in cases of threatened preterm labour is effective in lowering the risk of respiratory distress syndrome (RDS) & neonatal mortality if birth was delayed by at least 24 hrs after initiation of therapy. The effect persists for 7 days after completion of course of steroid therapy. Administration of single course of dexamethasone during pregnancy in properly selected women is safe. Maternal complications are not observed with a single course.
- Single course of Injection Dexamethasone 6 mg IM 11 hourly for 48 hours, total one course of 4 doses should be administered.
- Repeated courses should not be given as there is increased risk of neonatal complications and there are no added benefits
- Majority of women have spontaneous onset of preterm labour. Some have complicated pregnancies who are likely to deliver preterm or may require preterm induction of labour (Severe preeclampsia, antepartum haemorrhage, etc). In all these cases Inj. Dexamethasone can be given safely.
- When a woman is in preterm labour, look for any cause for preterm delivery. Ask history of vaginal bleeding, vaginal leaking (watery discharge suggesting rupture of membranes).
- If a woman having pregnancy< 34 weeks, has ruptured the membranes before the onset of labour pains (PROM), then perform a sterile speculum examination to see the pool of liquor in the vagina. Do not perform vaginal examination as there is danger of carrying the infection in the uterine cavity. In this case Inj. dexamethasone can be administered. Consider giving prophylactic broad spectrum antibiotic such as erythromycin, amoxicillin, cefotaxim in case the duration has been over 4 hours or where in utero transfer is being planned.
- Record blood pressure. Check urine for proteins and sugar.
- While referring, record BP, urine test result, time of giving Inj. dexamethasone on referral note.

- **Which women should not receive corticosteroid therapy?**
  - This treatment is not to be given if there is chorioamnionitis, (infection of foetal membranes, uterine tenderness, fever, polimorphonucelocytosis).
  - First check whether there are any signs of chorioamnionitis
- Ask history of fever, lower abdominal pain
- Record temperature, look for fever
- Look for tenderness over the uterus
- Note if there is foetal tachycardia (foetal heart rate > 160/minute)
- Note the smell of liquor: Foul smelling liquor indicates infection.

In these cases, delivery is not to be postponed. Early delivery is safer for both mother and her baby.

Dangers: -

- Infection - chorioamnioitis
- foetal infection
- Prolonged labour
- Dry labour
- foetal asphyxia

Causes: -

- Contracted pelvis and CPD
- Mal-presentations
- Occipito-posterior position
- Infection of foetal membranes

Actions by MO: -

When a patient with h/o involuntary leakage of clear fluid per vaginum, soaking her clothes comes to a PHC do the following:

- Perform per abdominal examination. If uterus is smaller than period of amenorrhea and on per speculum examination, fluid is coming through cervix, more on coughing or pressure on abdomen diagnose a case of PROM.
- Perform a simple test (Fern test): Prepare a smear of drop of fluid from cervical canal on a clean glass slide, dry and examine under microscope. If there is ferning, it indicates rupture of membranes and helps in confirmation.
- Refer the patient to specialist if –
  - PROM> 11 hours and no labour pains
  - Pre-term gestation
  - Malpresentation
  - Signs of infection
  - foetal tachycardia > 160 per minute
- Observe the patient if she is now in labour with no signs of infection and pregnancy is full term pregnancy.
- If progress of labour is satisfactory, monitor and conduct delivery. If unsatisfactory progress refer the patient.

Guidelines for Organization of Labour Room

Model labour room-Labor, Delivery, Recovery (LDR) concept -

- The LDR should have minimum 1 unit and a nursing station (expandable depending upon delivery load).
- There should be wrap around (covering three sides) curtains for privacy for each labour table.
- The recommended dimension of labour room excluding the toilet should be at least 80 sqft. per labour table. If the existing labour room doesn't have this space and any alternate space is available, consider shifting the labour room. If a single area with the desired space is not available, the labour room can be split into part accommodating labour table as per the available space. However, in no instances the number of tables should be less than 2 that recommended.
- Cross ventilation with exhaust is required, Demarcated area for keeping slippers for the hospital staff and relatives and slippers to be used for entering the labour/pre-labour room
- The nursing station should have the provision for seating of nurses. It should be at least 3'X5' ft with space for storage for documents and consumables.
- There should be a toilet with a size of 5'X6' attached to the labour room with Indian and Western Toilet seat.
- There also should be a dirty utility area with the size of 4'X2'.

- Floor of labour room should be anti-skid vitrified tiles/natural stone/equivalent, with seamless joint and should preferably be of white/ivory colour.
- Walls of labour room should have wall tiles of white colour with seamless joints extending up to the top of the door of the room. Remaining walls and ceiling should be painted white.
- Platform: Granite, one for each labour table, 2 ft wide, at 40 inch height, below which the movable trolley for instruments and other trays will be kept.
- Provision of running water (24x7) in the LR and adjoining toilets, and overhead tank should be set up with facility to pump-up the water
- There should be a steel sink of dimension 18"x18"x9", with two elbow operated taps one for hot water and one for normal water.
- Labor room window should have intact frosted glass panes, protected by grill from the outside. The windows and exhaust vent should be covered with mosquito net on the outside. Window should have curtain of light colour. Windows to be covered with mesh to ward off flies, mosquitoes, insects.
- There should be 2 ceiling LED lights, 1 goose-neck wall mounted shadow less lights for each labour table and 1 fan above each table (as per NQAS guidelines).
- There must also be facility for power back up.
- It must have fire extinguishing facility
- Labor room door should be 4'x7' with one big and small wooden door.
- LDR complex should have public addressing system and cctv cameras in common areas.
- New born care corner with radiant warmer

Standard Trays to be kept in Labour Room with their contents:

- Delivery tray: Gloves, scissor, artery forceps, cord clamp, sponge holding forceps, urinary catheter, bowl for antiseptic lotion, gauze pieces and cotton swabs, speculum, sanitary pads, Kidney tray.
- Episiotomy tray: Inj. Xylocaine 2%, 10 ml disposable syringe with needle, episiotomy scissor, kidney tray, artery forceps, allis forceps, sponge holding forceps, toothed forceps, needle holder, needle (round body and cutting), chromic catgut no. 0, gauze pieces, cotton swabs, antiseptic lotion, thumb forceps, gloves,
- Baby tray: Two pre-warmed towels/sheets for wrapping the baby, cotton swabs, mucus extractor, bag & mask, sterilized thread for cord/cord clamp, nasogastric tube and gloves Inj. Vitamin K, needle and syringe. (Baby should be received in a pre-warmed towel. Do not use metallic tray.)
- Medicine tray: Inj. Oxytocin (to be kept in fridge). Cap Ampicillin 500 mg. Tab Metronidazole 400 mg, Tab Paracetamol, Tab Ibuprofen, Tab B complex, IV fluids, Inj. Oxytocin 10 IU, Tab. Misoprostol 200 micrograms, Inj. Gentamycin, Vit K. Inj. Betamethason, Ringer lactate, Normal Saline, Inj. Hydrazaline, Nefidepin, Methyldopa, magnifying glass. (*-Nevirapin and other HIV drugs only for ICTC and ART Centres)
- Drug tray with emergency drugs: ** Inj. Oxytocin (to be kept in fridge), Inj. Magsulf 50%, Inj. Calcium gluconate-10%, Inj. Dexamethasone, Inj. Ampicillin, Inj. Gentamicin. Inj. Metronidazole, Inj. Lignocaine-2%, Inj. Adrenaline, Inj. Hydrocortisone Succinate, Inj. Diazepam, Inj. Pheneramine maleate, Inj. Carboprost, Inj. Fortwin, Inj. Phenergan, Ringer lactate, normal saline, Betamexthazon Inj. Hydrazaline, Nefidepin, Methyldopa,

IV sets with 16-gauge needle at least two, controlled suction catheter, mouth gag, IV Canula, vials for drug collection Ceftriaxone (3rd generation cephalosporins) - For L3 facility. (**-only for L2, L3 facilities)

- MVA/ EVA tray: Gloves, speculum, anterior vaginal wall retractor, posterior vaginal wall retractor, sponge holding forceps, MVA syringe and cannulas, MTP cannulas, small bowl of antiseptic lotion, sanitary pads, pads /cotton swabs, disposable syringe and needle, misoprostol tablet, sterilized gauze/pads, urinary catheter. (Only at identified facilities)
- PPIUCD tray PPIUCD Insertion Forceps. Cu IUCD 380A/ Cu IUCD 375 in a sterile package.

List of standard practice protocols to be displayed in Labour Room: (Annexure 3.7 (Vol. II))

- Simplified Partograph
- Vaginal bleeding before 20 weeks
- Vaginal bleeding after 20 weeks
- Management of PPH
- Eclampsia
- Active management of third stage of labour
- Hand washing
- Infection prevention
- Management of atonic PPH
- Breast feeding.
- New born Resuscitation
- Kangaroo Mother Care
- ANC
- PNC
- Processing of items for reuse
- Labour room sterilization
- Pre-eclampsia

3.5 Intranatal Care:

Intranatal care is important, as safe delivery is the right of every woman. Efforts should be made to promote institutional deliveries. In PHC areas where proportion of home deliveries is more, ensure that they are attended by ANM or trained Dai. Adapt five clean practices (i.e. clean surface, clean hands, clean thread, clean new blade, and clean umbilical stump).

At PHC, pregnant women are admitted for delivery and MO has to assess them correctly, give primary management to the complicated cases and has to take decision of referral at appropriate time.

When a woman is admitted for delivery, perform complete examination which includes following -

3.5.1 General examination of mother:

- Pulse, blood pressure, temperature
- Urine examination for protein, sugar and volume
- Hb, RBS

3.5.2 Obstetric examination

Per abdomen: -

- Uterine contractions: Frequency, duration and intensity
- Fundal height: Proportionate to POA (Period of Amenorrhea) or greater or lesser than POA
- Presentation: Cephalic or non-cephalic
- Engagement of head: Fetal head felt 2 fingers or less in supra-pubic region indicates engagement of fetal head
- Fetal heart rate: Normal FHR 110-160/min, regular.

Vaginal Examination: -

Take adequate aseptic precautions when performing vaginal examination of a woman in labour. During examination note following:

- Cervical dilatation and effacement
- Bag of membranes intact or ruptured, if ruptured, since how many hours?
- Note colour of liquor as clear or meconium stained.
- Presenting part: Vertex or other than vertex.
- Position: Occiput anterior or posterior
- Head is well flexed or deflexed
- Station of presenting part in relation to ischial spines
- Presence of caput or moulding
- Assessment of pelvis and CPD

3.5.3 Periodicity of these examinations/observations:

- Maternal pulse and FHR: Every 30 minutes
- Uterine contractions and descent of fetal head: Every one-hour and as per need.
- Maternal temperature, BP and urine output: Every four hours
- Vaginal Examination: Every four hours.
- Partograph to be filled

3.5.4 Pelvic assessment

Parameter	Adequate	Suggestive of abnormality
Sacral promontory	Not felt	Felt easily
Sacro pubic diameter	>11.5 cms	< 11.5 cms
Sacral curvature	Well curved	Flat
Lateral Pelvic walls	Parallel	Converging
Ischial spines	Both spines cannot be palpated simultaneously	Both spines can be palpated simultaneously
Subpubic Angle	850	Acute
Inter tuberous diameter	Accommodates closed fist (4 Knuckles)	Cannot accommodate 4 knuckles

Clinical examination for CPD:

- Let the woman lie in dorsal or exaggerated lithotomy position.
- Hold the foetal head by left hand.
- Place two fingers of gloved right hand into vagina at the level of ischial spines.
- Place thumb of right hand on pubic symphysis.
- Push the head into pelvic inlet and note whether it descends into the pelvis (felt by fingers in vagina) or overhangs on the public symphysis.
- If head descends with no overlap at pubic symphysis, then there is no inlet CPD.
- If head is engaged it indicates that the pelvic inlet is adequate. After complete examination, decide whether woman can be delivered at PHC or requires referral.

Partograph: -

Partograph is a simple, inexpensive, managerial tool for the prevention of prolonged labour. (Annexure 3.7(Vol. II))

- Components of a Partograph:
- Foetal condition.
- Progress of labour.
- Maternal condition.
- Intervention.

Plotting a Partograph:

- Each small box on the Partograph represents half an hour interval.
- Plot the Partograph from 4 cm of cervical dilatation.
- Initial finding of cervical dilatation has to be plotted on the alert line.
- Time of p/v examination is to be written in the row marked for time, directly below the plotting of cervical dilatation
- Monitor Half hourly Foetal heart rate.
- Monitor Number of good uterine contractions (lasting more than 20 seconds) in 10 minutes.
- Monitor Pulse rate every 30 min, 4 hourly - Temperature, 4 hourly - Blood pressure, Cervical dilatation
- Reading moving to the Right of the Alert line needs transfer to FRU.
- Reading reaching "Action line" means possible danger, and immediate intervention is necessary. There is a difference of four hours between the alert and the action line. By the time the action line is reached the woman should ideally have reached the higher health facility for the appropriate intervention to take place.

When to refer (Critical Factors):

- < 2 Uterine contractions in 10 min., each lasting less than 40 seconds.
- Foetal heart rate > 160/ min or < 110/min.
- Cervical dilatation crosses the alert line.
- Moulding of the foetal head (++).
- Caput succedaneum.

- Liquor – meconium stained.
- Pulse rate > 100/ min.
- Blood pressure > 140/90 mm Hg.
- Temperature > 100.40 F (> 380C)

Steps for referral:

- Inform the higher health facility and fill in the referral slip stating the interventions/drugs, etc. given to the patient.
- Arrange for transport. Free transport is available by dialling toll free no. 102 or 108
- Start an IV line (Preferred IV fluid: RL).
- Left lateral position.
- Health care worker & a relative to accompany.
- Send plotted partograph with the patient.
- Keep a delivery set and essential drugs handy during transport.

Do not plot Partograph in presence of following condition:

If below signs are detected refer to FRU (with referral slip) after initial management.

- C.P.D.
- Multiple pregnancy
- Severe pre-eclampsia/eclampsia
- Previous caesarean section
- Ante partum haemorrhage
- Preterm labour
- Severe anaemia (< 7 gm%)
- Foetal distress
- Malpresentations
- Intra uterine death

True labour:

- Onset of regular uterine contractions (1 – 2 contractions in 10 minutes).
- Progressive cervical dilatation and "show".

Stages of Labour:

First stage: onset of true labour pains till full dilatation of cervix (Active labour: cervix> 4 cm).
Second stage: full dilatation of cervix till delivery of the baby.
Third stage: delivery of baby till the delivery of placenta.
Fourth stage: for one hour after delivery.

Identify complications and refer (with referral slip).

Supportive care during labour:

- Reassure and inform the woman about the progress of labour.
- Encourage her to void urine frequently.
- Encourage the presence of a birth companion.
- Woman should be allowed to be ambulatory.
- Ensure adequate privacy and cleanliness of the birthing area and the patient.
- Woman should have light, easily digestible food.

Monitoring - Latent labour (not in Active labour):

- Avoid unnecessary intervention.
- Pulse, BP, temperature and cervical dilatation 4 hourly.
- Uterine contractions, Foetal Heart Rate hourly.

Monitoring - Active labour:

- Plot Partograph from 4 cm. of cervical dilatation on the ALERT LINE.

Monitor:

- Maternal pulse, uterine contractions and foetal heart rate half hourly.
- Temperature two hourly.
- BP, cervical dilatation 4 hourly.

Management of second stage of labour:

- Discourage early bearing down: Ask the woman to take deep breaths to prevent early bearing down.

When the cervix is fully dilated encourage the woman to push with contractions:

- Give episiotomy if required.
- Avoid ironing the perineum.
- Ensure controlled delivery of the head with a good perineal support.
- Check for cord around the neck.
- Deliver the shoulder one at a time after spontaneous rotation.
- Clamp and cut the cord.
- Deliver the baby and place over mother's abdomen.

Assess and monitor the progress of labour as given below:

- **First stage of labour: Satisfactory progress:**
  - Latent phase less than 8 hours - (Time of admission to 4 cms cervical dilatation)
  - Active phase progression 1 cm/ hour or more
  - On partographic record, cervical dilatation progress is to the left-of Alert line
  - Continue observation till second stage starts.

- **Second stage of labour: -**
  - Mother starts pushing (bearing down effort), Perineum bulges, anus gapes and cervix is fully dilated
  - Monitor progress and fetal well-being during second stage by:
  - FHR every 15 minutes
  - Assessment of descent of station every 15 min.
  - Presence of caput and moulding.
  - Meconium staining of liquor.
  - Give medio-lateral episiotomy under local infiltration anaesthesia, if mother is unable to push or if there is undue delay.
  - Delivery of head takes place usually within 30minutes in a multi and 60minutes in a Primigravida
  - Conduct delivery with strict aseptic precautions and follow universal bio-safety precautions.

- After delivery put the baby on mother's abdomen

- **Third stage of labour - Delivery of placenta:**

Active management of the third stage should be practiced on all women in labour, since it reduces the incidence of PPH due to uterine atony.

Flow chart for AMTSL: (Annexure 3.7(Vol. II))

- AMTSL is an intervention to facilitate the delivery of placenta by enhancing uterine contraction and retraction.
- Confirm the absence of additional baby by per abdominal examination
- Immediately after delivery of baby, administer inj. Oxytocin 10U IM.
- Clamp the umbilical cord close to perineum and hold with one hand.
- Place the other hand just above the pubic symphysis& apply counter traction upwards.
- Maintain slight tension on the cord & gently pull downwards when the uterus contracts (as evidenced by uterus becoming hard & globular).
- As the placenta delivers hold it with both hands & gently turn the placenta so that the membranes are twisted.
- Massage the uterine fundus until the uterus is well contracted.
- Examine the maternal & foetal surfaces of the placenta for completeness of cotyledons& membranes.
- Make sure that the uterus is firmly contracted, monitor vaginal bleeding and measure vital signs for 2 hours after delivery.

Refer the case if:

- Failure of fetal head to descend (station fails to advance)
- Increasing caput or moulding
- Suspected mid pelvic and outlet contraction
- Occipito-posterior / occipito-transverse position with deflexed head
- Maternal exhaustion.
- Foetal distress

Full dilatation of cervix does not assure a vaginal delivery

3.5.5 Management and appropriate referral in emergency situations:

Many times, emergency cases come to PHC, which require special attention. Some of these cases may not be managed at PHC level. In such situation examine the mother thoroughly, give her primary treatment and then refer. The conditions are as below:

Obstructed labour:

Causes:

- Contracted pelvis and CPD
- Transverse lie, brow presentation, mento-posterior face presentation
- Deep transverse arrest of foetal head.

Diagnosis:

- Non progressive labour, prolonged labour.
- Signs of maternal exhaustion
- Tachycardia, restlessness, sweating, mild fever, signs of dehydration

- Signs of foetal distress or death.

Signs of obstruction:

- Lower uterine segment over stretched
- Bandle's ring seen which is rising progressively towards umbilicus.
- Suprapubic bulge - Oedematous bladder
- Presenting part - High, abnormal or showing excessive moulding
- On catheterization, scanty high coloured urine which may be blood stained

Action:

- Urgent referral
- I.V. Ringer Lactate infusion during referral will help in correcting dehydration. At the institution, patient will be delivered mostly by caesarean section. Delay in referral can result is uterine rupture, infection due to prolonged labour, fetal death, vesico vaginal fistula if presenting part is deep in the pelvis for prolonged period as in case of deep transverse arrest.

Uterine rupture:

- **Causes:**
- Scarred uterus (previous caesarean section, uterine perforation etc.)
- Obstructed labour
- Incorrect use of oxytocic agents like Oxytocin, Prostaglandins
- Intrauterine manipulations such as internal podalic version and manual removal of placenta.
- Excessive Fundal Pressure

Diagnosis:

- Cessation of uterine contractions after prolonged obstructed labour
- Continuous pain in abdomen.
- Maternal tachycardia, restlessness, increasing pallor, hypotension, fresh vaginal bleeding, haematuria
- Intrauterine foetal death
- Abdomen distended, tender all over, foetal parts may be felt easily
- Signs of free fluid in abdomen.
- In labour, presenting part may recede upwards Dangers: Maternal shock and death due to severe internal haemorrhage.

Action:

- Urgent referral
- I.V. Ringer Lactate infusion of 1 litre of fluids will combat hypotension
- At the institution, patient will undergo exploratory laparotomy along with arrangements to replace blood volume lost.

Atonic PPH Flowchart (Refer Annexure 3.7(Vol. II))
Primary Post Partum Haemorrhage (Refer Annexure 3.8(Vol. II))
Management of Retained Placenta: (Refer Annexure 3.8(Vol. II))

Foetal distress:

- Normal FHR is between 110-160 bpm.
- Foetal bradycardia i.e. <110 bpm.
- Foetal tachycardia i.e. >160 bpm.
- FHR slowing down during contraction and picking up immediately after is physiological.
- If a maternal cause for FHR abnormality is identified (maternal fever, drugs) initiate appropriate management.
- Thick meconium stained liquor with FHR abnormalities indicates foetal distress (Meconium in breech presentation is not a sign of foetal distress).
- If delivery is not imminent refer to FRU ().
- If delivery imminent – left lateral position, oxygen, rapid infusion of I.V. fluid and expedite delivery.

Breech delivery:

Breech presentation is the commonest malpresentation seen in around 3-4%cases. Baby is at risk of birth asphyxia and birth trauma. Risk is high if baby is large, pelvis borderline, footling breech and birth attendant is unskilled.

If any pregnant woman arrives for delivery at PHC, following steps should be carried out for safe breech delivery:

- Keep neonatal resuscitation tray ready and take the woman to the edge of delivery table.
- Keep episiotomy tray ready. Give episiotomy when buttocks are on perineum
- Allow the baby to deliver spontaneously till umbilicus is born and note the time. Head should be delivered within eight minutes once it is born up to umbilicus.
- Keep a loop of umbilical cord aside
- Look for winging of scapulae and look for arms across the chest
- Deliver the anterior arm followed by posterior arm.
- Allow the baby to hang by its own weight until the nape of neck is seen
- Hold the feet of baby in right hand and turn the baby gently towards the mother's abdomen while assistant is giving supra-pubic pressure.
- If the head fails to descend within 2-3 minutes, then take the baby on your left forearm, put the finger of your left hand into the mouth of baby or keep two fingers on malar bones. Keep the fingers of right hand on the shoulders and perform jaw flexion and shoulder traction maneuver.

Twin delivery:

At times MO or nursing staff may detect a case of un-diagnosed twin pregnancy only after delivery of the first baby.

- Do not give Inj.Methergine
- Perform per abdominal examination to note the lie and presentation.
- If cephalic presentation, do vaginal examination. Rupture the membranes after fixing the head and monitor uterine contractions. If inadequate, start oxytocin infusion slowly.
- If breech with good-size baby and uterus contracting well, conduct breech delivery.
- If second twin is in transverse position refer urgently to FRU. Such patient with a good sized baby is mostly delivered by caesarean section.
- If you deliver second baby, prevent PPH by active management of third stage.

3.5.6 Important aspects about referral of any obstetric emergency:

Follow the guidelines as below when referring any case to the higher referral centre,

- Counselling of the patient and relatives.
- Before referring, give the medication appropriate for the condition as given above.
- Give the referral note indicating salient points about history, clinical findings, medication given etc.
- Advice to family members regarding specific referral institute where the management required is available, importance of blood donors if blood transfusion is needed to the patient

3.5.7 Guidelines for use of Oxytocin:

Oxytocin cannot be used for augmentation of uterine contractions at PHC level. It enhances the normal pattern of uterine contractions with intermittent relaxation. Following are the guidelines for judicious use at PHC level where MO has under gone BEmOC training:

Dose and administration:

Add 2 IU to a bottle of normal saline or Ringer's lactate. Infuse 8 drops/min (2mIU/min) initially. Increase infusion rate by 8 drops/min. every 30 minutes. Escalating technique: Dose is increased every 30-40min. until optimum response is achieved, which is 3 contractions in 10 minutes, each lasting for 45 seconds.

Contraindications:

- CPD
- foetal distress
- Grand multi-parity
- Malpresentations
- Scar on the uterus

Monitoring:

Monitor following parameters every 15 minutes:

- Drip rate
- Uterine contractions - frequency and intensity
- FHR and maternal pulse
- Check the progress of labour periodically.

Complications:

- Hypertonic uterine contractions - 6 or more uterine contractions / 10minutes
- Uterus failing to relax between the contractions
- Uterine rupture - if drip is not supervised vigilantly.
- Water intoxication if too much of electrolyte free infusion is administered.
- Neonatal hyperbilirubinemia
- Foetal bradycardia (distress)

Caution:

- If hyperstimulation, discontinue the drip & start oxygen to mother.

- Oxytocin should never be given intramuscularly
- Maximum drip rate should not exceed 60 drops/min, otherwise it may lead to the risk of water intoxication.
- Use cautiously in multiparous women.

When to discontinue the drip:

- Monitor progress of labour using partograph. After getting optimum uterine response, if labour progress is unsatisfactory, refer the patient.

For treatment of PPH:

- Oxytocin 10-20 IU in a bottle of normal saline can be given at the rate of 40-60 drops/min for prevention or control of atonic PPH.

3.6 Postnatal Care:

All delivered mothers must be kept in IPD for seventy two hours under observation

Postnatal period is important for mother as some important complications during this period may require immediate attention. Puerperium is a period of 42 days following delivery. Complications occur mostly in first 10 days. Therefore, all delivered cases should be visited by ANM within 48 hours.MO should ensure that the cases are examined by ANM.

3.6.1 Advice and examination required during postnatal period:

- Examination of mother for postnatal complication if any
- Recording birth weight of newborn child
- Advice mother regarding immediate initiation of breastfeeding and exclusive breastfeeding for 6 months.
- Administer zero polio, BCG, Hep-B, Inj.Vit.K. K & advice about next dose of immunization, next date of immunization.
- Rest & diet of mother during postnatal period.
- Counselling regarding contraception
- Iron folic acid supplementation

Postnatal examination:

Observe and monitor PNC mothers for 2 hours after expulsion of placenta (4^{th} Stage of labour) by ANM and MO meticulously.

All postnatal mothers should be examined by ANM within first 24 hours of delivery either in PHC or at home in case of home deliveries.

During this check-up:

- Examine whether mother has excessive vaginal bleeding indicating PPH (atonic or traumatic)
- Examine for pallor, restlessness, tachycardia, uterus retracted or flabby.

During the subsequent postnatal visits examine as below:

Examine Abnormality of following,

- Temperature- Puerperal pyrexia,
- Blood Pressure

- Pulse- Tachycardia,
- Breast Engorgement,
- Mastitis,
- Uterus- Softness, Tenderness, Sub involution
- Lochia- Profuse & Foul smelling.

3.6.2 Management of important postnatal complications:

Main post-partum complications are: -

- Postpartum haemorrhage - Primary and secondary
- Puerperal sepsis - Genital sepsis, peritonitis, septicaemia
- Mastitis leading to breast abscess
- Thrombophlebitis, deep vein thrombosis

Secondary PPH: -

Secondary PPH is profuse vaginal bleeding (>500ml) beyond 24 hours after delivery. It is usually associated with retained lobe of placenta, clots or uterine infection.

- Look for signs of infection and uterine sub involution
- If uterus empty, give antibiotics
- Refer the patient with shock for blood transfusion.
- In case of retained products, patient needs uterine exploration under anaesthesia, blood transfusion and antibiotics. Hence refer to higher facility for these interventions.

Puerperal pyrexia:-

Puerperal pyrexia is suspected when temperature of mother is 38^0C (100 .40 F) on 2 consecutive days excluding first 24 hours.

Management of puerperal pyrexia due to various causes:

Genital sepsis: -

- On examination patient has pallor, tachycardia, soft, tender, sub involuted uterus (i.e. large for the day of Puerperium), abdomen soft, non-tender.
- Get Hb estimation done.
- Treat by giving oral antibiotics for 7 days e.g. Cap. Amoxycilin 500 mg 3 times a day
- Review after 48 hours. If response is seen, continue treatment and in case of no response, refer the patient.

Puerperal Sepsis:

- Puerperal sepsis is defined as infection of the genital tract which occurs as a complication of delivery, characterized by any two or more of the following signs and symptoms:
- Fever > 100.4° F (>38° C).
- Abnormal, foul smelling vaginal discharge.
- Lower abdominal pain.
- Sub involuted, tender and soft uterus.

Clinical Presentation	Place of care	Principles of care
Perineal wound infection, uterine infection	PHC	*Oral antibiotics, haematinics. Review after 48hrs. No response-Refer
Pelvic peritonitis	FRU	**Hospitalization. Parenteral antibiotics for 7to10 days.
General peritonitis Septicaemia	Tertiary Care centre	Critical care, higher Antibiotics, evaluation to explore need for surgical intervention

*Cap Ampicillin/Amoxycillin 500mg 6 hourly for 7days.
** Inj. Ampicillin1gm IV followed by 500 mg 6 hourly
Inj. Gentamycin 80mg twice a day I.M.
IV Metronidazole 500 mg 8 hourly IV fluids.

After48hours if patient improves and resumes oral intake, cap Ampicillin and tab Metronidazole can be given orally.

Prevention:

- Puerperal sepsis is to a great extent preventable; provided certain measures are undertaken during antenatal, intranatal and postnatal period.

Antenatal:

- Improve Hb level to > 11 gms. %.
- Treat any septic focus (skin, throat and tonsils, etc.).

Intranatal:

- Asepsis during delivery.

Postpartum:

- Maintain perineal hygiene
- Use clean sanitary pad
- **Prevent uterine inversion by use of controlled cord traction technique during 3rd stage of labour.**

3.7 Reproductive Tract Infections (RTI) / Sexually Transmitted Diseases (STDS)

Reproductive Tract Infections (RTI) The infections of genital organs are poly-microbial and mostly preventable, forming a major disease burden amongst women from reproductive age groups.

Clinical profile

STI-RTI Syndromic Case Management:

- Urethral Discharge
- Cervical Discharge
- Painful Scrotal Swelling
- Vaginal Discharge
- Genital Ulcer (Herpatic & Non Herpatic)
- Lower Abdominal Pain (LAP)
- Inguinal Bubo (IB)

(for details Refer Annexure 3.9 (Vol. II))

Sexually Transmitted Diseases (STDs)

Diagnosis of STDs at PHC

Examination of women

- Abdominal examination: Look for tenderness, mass, inguinal lymph nodes
- Local examination: Genital lesions.
- Speculum examination: Vulva, vagina, cervix for inflammation, discharge, ulcers, warty lesions
- Vaginal examination: Cervical motion tenderness, fornicial tenderness, adnexal mass, uterine retro-version, and restricted mobility.

Examination of men

- Local Examination: Genital lesions
- Palpation:
  - Look for urethral discharge (milking the urethra if necessary)
  - Groin: Enlarged lymph nodes
  - Scrotum: Testes, epididymis for tenderness or swelling
  - Ulcers: Painful/painless, indurated

Syndromic Management of STDs

Clinical syndromes in women

- Vaginal discharge
- Genital ulcer disease
- Inguinal bubo
- Lower abdominal pain.

Clinical syndromes in men

- Urethral discharge
- Genital ulcer disease
- Inguinal bubo
- Scrotal pain or swelling

STI/RTI syndromic Management Chart: (Refer Annexure 3.10 (Vol. II))

3.8 Family Welfare Program

Family planning means not only sterilization but also it refers to practices that help individuals or couples to attain broader objectives.

3.8.1 Objectives

- To avoid unwanted births
- To bring about wanted births
- To regulate interval between pregnancies
- To control the time at which births occur in relation to the ages of the parent
- To determine number of children in the family

Correct advice to the couples with infertility is also one of the important aspects of FP. Presently the services under family welfare are incorporated in Reproductive and Child Health Program.

Contraception means prevention of conception and the medicine or devices used to prevent conception are called as contraceptives. Thus, with the help of contraceptives, couple can avoid pregnancy, can regulate (decide) interval between pregnancies, and can also determine how many children they want (family size).

Numbers of methods are available which prevent conception. Few are available free of charge through our PHCs and many are available on payment through private hospitals. Each of these methods prevents pregnancy in different way.

Various surveys have shown that many women really want to avoid pregnancy but do not have knowledge of contraceptive, how to use them and from where to obtain. Such women may become pregnant and face complications during pregnancy and delivery or may go for MTP by untrained person under unhygienic conditions that may lead to complications and even death. This unfulfilled need of contraception is called as unmet need for contraceptives. According to DLHS IV reports Total Unmet Need is 13.9 % which is reduced from 14.2 in DLHS III. However Unmet Need for spacing methods is increased from 6.3 (DLHS III) to 8.3 (DLHS IV).

MO and PHC staff should be aware of the fact that providing the contraceptive services to all the needy and willing couples will prevent pregnancy and childbirth related mortality and morbidity. Although some of the contraceptives have a few side effects, risk associated with this is much less than risk of pregnancy, MTP and childbirth.

It is now accepted fact that easy accessibility to good quality family planning services is basic right of all women to prevent pregnancy, unsafe abortion and childbirth related deaths and long term morbidity.

Family planning program services in your PHC should be planned and managed in such a way that unmet needs of all the women in the PHC are fulfilled. Regular contact between client and health workers is very essential for satisfactory use and continuation of contraceptive methods.

3.8.2 Implementation of Family Planning Program

Aims and Objectives:

The State has already achieved Total Fertility Rate (TFR) as 1.5 (SRS 2020) In the coming year the objectives is to maintain this level below 2.0.

Implementation Strategy:

As per guidelines from Government of India the programme is being implemented on following strategies.

- Voluntary Adoption of Family Planning Methods
- Based on felt need of the community
- Children by choice & not chance.
- Counselling of beneficiaries is done by Health Personnel regarding various available methods of contraception and then beneficiaries select one of the methods depending

on their choice. Presently Government of India is giving emphasis on Post Partum Family Planning Services.

Activities to be followed for systematic implementation of family planning Program

Village wise Integrated RCH Register:

It is new register for data collection and maintenance of information on various aspects under Reproductive and Child Health Program (RCH-II) like family planning, maternal health, child health, immunization etc in single register. It was printed as per the design and guidelines by MoHFW, New Delhi & implemented from year 2014-15. As name suggest its architecture has been made in a such way to avoid duplication of ANMs efforts replacing old multiple registers e.g. R-14, R-15, R-16 and R-17.

It acts as physical data base by providing information source for uploading data in RCH portal. It aims at Name Based Tracking of Eligible couples for contraceptive usage & sterilization services, Pregnant women for ANC, Delivery & PNC services and Children for immunization.

The RCH Register need to be recorded by respective ANM of Sub-Center and it should be maintained village wise. It has four sections as Eligible couples tracking, Pregnant woman tracking, Child immunization tracking and lastly Annexure including separate index for each section. The village profile needs to be recorded first followed by service providers for that village. Pregnant woman need to be registered first as eligible couples along with details of husband. If husband's information is not available/not known then "Not Applicable" should be mentioned in the register while registering pregnant woman.

For tracking of Eligible Couples, Family Planning Survey should be carried out every year in the month of April and May by ANM & MPW, House to house visit should be carried out. Entry of Newly married couples should be taken. Women who have passed 49th year of age should be deleted from the list.

The following information need to be captured in Integrated RCH Register.

- Village profile - Census Population, estimated ELAs for eligible couple, pregnant women & live births, service providers for the village etc.
- Health providers - ANM, ANM2, MPW, GNM, Link workers, AWW etc.
- ASHA workers – In rural area
- Eligible couples – As per family health survey where age of wife is in the age group 15 to 49 years.
- Pregnant Women – From women registered in eligible couples & tested positive for pregnancy test
- Children – For immunization services
- AADHAR number, bank account information need to be captured for all excluding children.

Eligible couple (Married Women in Reproductive Ages- MWRA) and Family planning survey

The term eligible couple is now substituted as Married Women in Reproductive Ages (MWRA). Married Women in Reproductive Ages (Eligible couple) survey provides village wise information about total couples and couples requiring spacing/permanent methods of contraception. This will help in planning the programme of PHC.
MWRA (Eligible couple) survey is carried out in the month of April and May every year and information is entered/updated in RCH register MWRA (Eligible couple) means couple in which age of a wife is between 15 to 49 years. Couples who have accepted permanent methods of contraception are also considered as eligible couples. There are 160-170 eligible couples per thousand population.

Planning of the survey
MO should plan MWRA survey with the help of HA male and female. Steps for planning survey are:

- **Prepare map of PHC & distribute villages**
  - Make map of PHC. Show all villages, wadi-vastis along with roads. Do not forget to show lonely farmhouses.
  - Distribute all villages among health workers M and F with the help of this map.
- **Prepare day wise programme**
  - Prepare day wise programme of survey. One MPW must survey 500 population daily. Remote areas, lonely farm houses should preferably be given to MPW (M).
  - Identify daily starting house and last house by M number and make chart of daily survey area, population, M number wise starting point and end point for each MPW.
  - Add other important activities to the survey if required like enumerating child deaths which were missed, M numbering, cataract survey etc.
- **Provision of formats**
  - Provide sufficient copies of formats to each worker for the survey. RKS or NHM fund can be utilized for purchase of stationary required for survey by going through the required procedure. MWRA (Eligible couple) information should be collected as per format of RCH register.
- **Plan for supervision**
  - Divide all workers among Health Assistants for supervision. Health Assistant should verify 10% of survey carried out by MPWs. HA must visit few houses along with MPW and should also check the survey independently. If there are some mistakes, HA should report this to MO. Survey should be repeated if necessary.
  - MO should verify 1-2% of all the houses surveyed. One MO should fully supervise the survey.
  - Summary of survey should be prepared by health worker sunder supervision of HA (M and F) and MO. There are total twelve formats in which summary is drawn. MO should check correctness; crosscheck the information given in various formats.

Verification of quality of survey
Quality and completeness of survey can be judged with the help of following points.

- First tally the surveyed population with estimated population of that area. If survey population is less, some areas must have been missed. If it is more, then the worker has not deducted the deaths and out-migration and simply added new births and in-migration to old population.

- As per norms, there are 160-170 eligible couples per 1000population, check this norm for survey reports of each MPW. If couples are less, then health worker has missed some of the couples; most probably newly married couples and if couples are more, higher age group couples may not have been deducted by MPW.
- Get independent information of few newly married couples in the area. This information can be obtained from marriage invitations cards sent to MO and PHC staff. Check whether these couples are included in survey.
- Check proportion of EC according to number of issues: The norm or approximate proportion of MWRA (eligible couples) as per number of issues is as below:

Issues	**% of MWRA**
No issues	5-10%
1 issue	20-25%
2 issues	27-50%
3+ issues	25-38%

If the proportion is not more or less as above, then possibility of entry of incorrect information should be ruled out.

- Similarly check whether MWRA (eligible couples) are correct as per the norm according to age of wife as given below:

Age group	**% of MWRA**
15 - 19 years	05%
20 - 24 years	32%
25 - 29 years	27%
30 - 34 years	18%
35 - 39 years	10%
40 - 49 years	08%

- If there are fewer couples in 15-19 age group, possibly newly married couples have been missed and if more couples in 40-44 age group, then over-age couples are include.
- Examine number of ANCs identified in survey. At any given time, there should be 15-18 ANCs per 1000-surveyedpopulation. If total ANCs enumerated as per survey are approximately within this range, then survey is correctly done. If less ANCs are identified, some houses (most probably remote houses) have been missed.

Use of survey and RCH register for MO

- To know exact population of PHC and also village wise population.
- To know total number of MWRA (eligible couples) in PHC area.
- To know total protected and unprotected MWRA (eligible couples) from area.
- To calculate village wise couple protection rate (CPR).
- To identify villages with lower CPR and take actions accordingly to fulfil unmet needs of couples.

Calculate couple protection rate for each village

Couple Protection Rate (CPR)

CPR is proportion of couples protected by using particular temporary or permanent family planning method. Calculate Couple Protection Rate (CPR) for PHC as well as for each village with the help of following formula –

$$CPR = \frac{\text{No. of eligible couples using any FP method x 100}}{\text{Total number of eligible couples in the area}}$$

Calculate CPR of each village and CPR for whole PHC as below:

- All the methods (Permanent and temporary): Total CPR
- Each method i.e. method specific CPR
- For all permanent methods
- For all temporary methods

Village wise comparison of CPR will give information about villages with low CPR that need to be paid more attention. MO should try to find out reasons for low use of FP methods in that village and take actions accordingly.

As the state Population policy emphasizes 'two child norm', MO should calculate CPR for couples with 2 issues. This will help to know proportion of EC yet to be protected and therefore
needing attention.

3.8.3 Various contraceptive methods that can be offered through PHC

Temporary (Spacing) methods:

These are for delaying first pregnancy or for spacing between two pregnancies for desired period. This includes contraceptives and natural method of contraception like Breast Feeding and Safe Period. Contraceptives available for spacing through PHC are Intra Uterine Contraceptive Devices (PPIUCD/PAIUCD), Condoms (Nirodh) and Oral pills (Mala-N). Emergency contraception, Inj. MPA(Antara) &Weekly Centcroman Pills (Chhaya) is also recently introduced in the Program.

Now Government of India has introduced scheme of "Distribution of Contraceptives by ASHA at the doorstep of beneficiaries." In this scheme ASHA distributes Condoms, Oral Pills, Emergency Contraceptive Pills and Weekly Centcroman Pills (Chhaya) to the beneficiaries as per the needs of the beneficiaries. (For a Temporary Spacing method of PPIUCD/PAIUCD beneficiary will be given benefit of Rs. 300/- and ASHA worker will be given incentive Rs.150/- & for Inj. MPA(Antara) beneficiary will be given benefit of Rs.100/- and ASHA worker will be given incentive Rs.100/-).

Natural methods of contraception

Two important natural methods:

- Breast-feeding
- Calendar (Safe period) methods

But 100% contraception may not be assured.

Condoms (Nirodh)

Condoms are most widely used barrier method. Large numbers of commercial condom brands are also available in the market.

Recommendations

- Condoms are best recommended for newly married couples. Another important group is partners at high risk of exposure to STDs.
- Condoms are routinely recommended as back up method to couples after vasectomy and when pills are forgotten for two or more days.
- Recommended when other methods like Oral Pills, sterilization operation are contraindicated due to medical reasons.
- Condom is best choice for breast-feeding women who are not willing for Cu-T.

Oral Pills

Combined Oral Contraceptives (Oral Pills):

Oral pills are safe, effective and reversible contraceptive for women desiring to delay their first pregnancy or space the next child. These are called Combined Oral Contraceptives as they contain two types of hormones in low dose. Oral pills are available in two brand names in government distribution system: Mala - N under free distribution scheme and Mala - D at subsidized price under social marketing scheme. Large number of commercially available combined OP preparations are also available in the market. OPs are available in packet of 28 tablets; first twenty one white tablets are hormonal tablets and remaining seven coloured tablets are iron tablets for maintaining the continuity.

Contents of oral pills:

Estrogen in the form of Ethinyl Estradiol - 0.03 mg
Progestogen in the form of Norgestrel - 0.3 mg

Effectiveness

It is very effective when taken correctly and consistently and the failure rate is 0.2 - 1 per 100 women years.

When to start Oral Pills (OP)

- On 5th day of menstruation to be sure about not being pregnant
- Immediately after abortion

Selection of the patient (as per Check list):

First contact person for client willing to use OP as contraceptive is MPW (F). As OP is scheduled drug and can cause serious adverse effects, few precautions must be taken before starting OP. She must ask following questions to client before starting the OP -

- Whether the age of client is more than 35 years.
- Is the client pregnant or breast feeding
- Does she have habit of smoking or using tobacco by any means
- Does she has complains of headache off and on.
- Is the client having yellow eyes (Jaundice) or Obesity / malnutrition
- Is there h/o convulsions, hypertension, heart diseases or diabetes.
- H/o Inter menstrual bleeding or bleeding after intercourse
- Is patient taking OP since last 5 Yrs.
- Whether client has oedema over feet?
- Whether client has breast lump?

If answer to any question is yes then do not start OP to this patient and recommend other method of contraception. If patient still insists for OP then refer to specialist or MO for opinion.

After starting OP to any client by MPW(F) or HA(F), Medical officer must examine the client within three cycles of OP and at least once a year thereafter.

Side effects

- Minor side effects that are common during the first three months of use of OC disappear with continued use. These are amenorrhea, intermenstrual bleeding, spotting, nausea, headache, high blood pressure, weight gain and breast tenderness.
- Serious side effects are rare and risk is high among women above 35 years.

Recommendations

- OPs are most suitable for women who have regular and fix routine and who can take tablet daily without forgetting even for single day.
- OP is ideal for spacing between first and second pregnancy.

Oral Contraceptives (Oral Pills) Weekly Centchroman Pills (Chaya)

Centchroman are safe and effective Non –Hormonal Non- Steroidal OP, twice a week up to three months and after three months once a week. This pills also available In Market as a name Saheli

How it is work?

- Chhaya prevents implantation of fertilized egg in the uterus

How is it Used?

- Take one pill twice a week for the first 3 months
- From 4th months take pill once a week on the first pill day
- The first pill can be taken on first day of the menstrual cycle or any other day provided pregnancy has been ruled out.
- After finishing one pack, take the first pill from next pack on scheduled day.

Indication

- Chhaya is an effective reversible method of contraception
- It is safe for women of all age groups
- It is safe for breast feeding women, even immediately after childbirth.
- Return to fertility on stopping the pills is prompt.

Disadvantages

- Disadvantages are very less
- In some women delayed menstrual cycle for first 3 months.

Instruction to be given to client by health worker

- Start taking pill from where it is marked as START and follow the arrow thereafter.

- Take pill at fixed time every day. Connecting pill consumption with any other regular activity e.g. taking pill immediately after diner will reduce chances of missing the pills.
- Missed pill will not protect from conception, so daily consumption of pill is most important.
- Do not discontinue taking pill during menstruation.
- If you miss the pill consumption follow guidelines given below:
  - ➢ If one pill is missed, take it when you remembered or as soon as possible and next pill at the same time as usual
  - ➢ If pills are missed for two days or more:
    - ✓ Two tablets should be taken for number of days the pill has been missed.
    - ✓ Use condoms or any other method for 7 days or observe abstinence till the pills are taken for continuous 7 days.
- Oral pills contain hormones. OP may lead to serious complications occasionally. It is important to inform the client about warning signs and advise to contact Medical Officer if client experiences any of the warning sign.

Following acronym will help to remember the warning signs:

A - **A**bdominal pain

C - **C**hest pain, cough, breathlessness

H - **H**eadache, dizziness, weakness

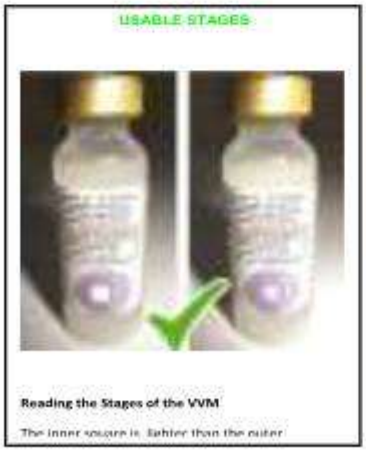
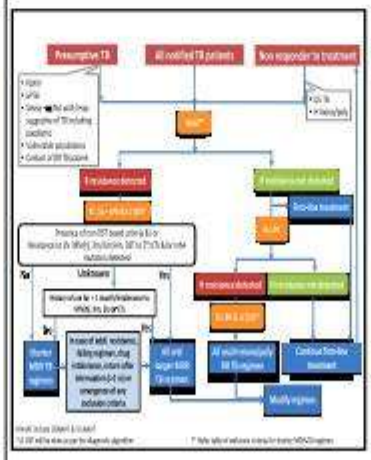
E - **E**ye problems like loss of vision or blurring

S - **S**evere pain in leg (Calf or thigh)

IUCD (Intra uterine contraceptive devices) Copper T – 380 A and Copper T - 375

It is a T shaped device of polyethylene with fine copper wire wrapped on its vertical stem. CuT is impregnated with Barium Sulphate for visibility on X- rays. in national programme, currently CuT 380 A is used Surface area of copper wire is 380 sq mm. and this device is effective for 10 years after insertion due to more surface area of copper wire. Government of India has recently introduced Copper T – 375.

Figures of Cu IUCD

Cu IUCD 380 A	Cu IUCD 375
	

Eligibility criteria

- Any woman in reproductive age group who has at least one child.
- Method of choice in women who are breast-feeding and have a child below 6 months.
- User does not have history of PID and Infection of Upper Genital Tract.

Absolute contraindications

Never insert IUD if you find any of the following conditions -

- Pregnancy
- H/o excessive menstrual bleeding or irregular bleeding in between periods.
- Active genital tract infection (Vaginitis/PID/STD)
- Any uterine abnormality
- Severe anemia
- Previous history of ectopic pregnancy
- If the client had infected abortion in past three months or Post Partum Endometritis.

If the patient has history of Caesarean Section, or any chronic disease like heart disease, diabetes, hypertension, MO PHC must examine the patient before inserting the Cu-T.

Timing of insertion

Preferably within 7 days of the LMP or on fifth day of menstruation

Immediately after abortion, if pregnancy was in first trimester. For later abortions, insertion should be delayed by 6 weeks.

- Post Partum: -
  - Postplacental: Insertion within 10 minutes after expulsion of the placenta following a vaginal delivery, on the same delivery table.
  - Intracaesarean: Insertion that takes place during a cesarean delivery, after removal of the placenta and before closure of the uterine incision.
  - Within 48 hours after delivery: Insertion within 48 hours after delivery.

- **For insertion of PPIUCD a special forcep known as PPIUCD forcep is required and also trained Service Provider is required.**

Assessment of patient by MO:

MO should perform following examination:

- Examine the external genitalia for evidence of STDs. Do speculum examination for evidence of vaginal and cervical infection. If you see ulcer, abnormal discharge, growth, and erosion on speculum examination, do not insert Cu-T.
- Conduct bimanual examination for determining the uterine position and to rule out PID. If movement of cervix is painful do not insert Cu-T. If uterus is retroverted, enlarged, irregular, soft or mobile do not insert Cu-T.
- Measure length of cavity of uterus by uterine sound. Uterine sound should be introduced in uterus till slight resistance is felt. Determine the uterine length. It varies from 6 to 9 cm.

- Cu-T should not be introduced if uterine length is less than 6 cm. and more than 9 cm. If there is difficulty in introducing sound in the cervical canal or it causes pain stop procedure and refer to a specialist.

Warning signs:

P: Periods late, spotting, bleeding.
A: Abdominal pain, pain with intercourse, severe cramps
I: Infection
N: Not feeling well, fever, chills along with lower abdominal pain
S: String missing, shorter, longer.

Follow up

1st visit - Immediately after first menstrual period or after 1 month
Subsequent visits - After 3 months and there after once a year

Record and reports of Cu-T:

Register:
All Cu-Ts insertions from PHC or Sub-Centre are recorded in this register.

- Check that remuneration is given to all cases.
- In MIS Reports, ANM has to report number of Cu-T inserted during the month, report on issue wise insertion and follow up at one month and at three months and also cohort analysis.

Emergency contraceptive pills

Emergency contraceptive pills (ECP) are introduced in the Program, which help to prevent unwanted pregnancy.

Benefits of ECP

- It prevents unwanted pregnancy.
- Prevention of unwanted pregnancy will help to reduce number of maternal deaths from unsafe abortions.
- It helps to reduce fertility level.
- Emergency Contraceptive Pills (ECP)- Under the Program, Levonorgestrel (Progestogen only), which is oral hormonal contraceptive pill, is used. It is available as 1.5 mg tablet.

Indications

Indicated in all cases within 110 hours of the first act of unprotected intercourse in following conditions:

- Non-use of any contraceptive
- Inconsistent use of contraceptive
- Contraceptive accident due to following:
  - Rupture or slippage of condom
  - Failed coitus interruptus
  - IUD expulsion
  - Miscalculation of safe period days
  - Failure to take oral pills for three or more days in a row

Guidelines for use

- ECPs should be used to prevent pregnancy following first unprotected sexual intercourse within the past 110 hours.
- Packet of two tablets is available.
- One tablet is to be taken as soon as possible but within 110 hours of unprotected sexual act.
- Second tablet is to be taken after 11 hours of first dose.

Effectiveness

When used in correct dose, within stipulated time period and after a single unprotected sexual intercourse, it prevents pregnancy in 85% of women.

Disadvantages

- Has to be used within 72 hours of the first unprotected sexual intercourse, as use beyond this period increases the risk of pregnancy.
- Effectiveness decreases with frequent use.
- Side effects – Nausea, vomiting, irregular bleeding per vagina, breast tenderness, headache, dizziness, fatigue.
- Does not protect from RTI / STI.

Follow up

Follow up is important, as it is a good opportunity for initiating regular use of contraceptive by the client. Follow up is essential:

- Immediately after menstruation for initiating regular use of any contraceptive method.
- If there is delay in menstruation for more than one week of the expected date.
- Severe side effects.

Terminal methods of contraception (Sterilization)

Family Planning sterilizations are operative methods and called as terminal methods because they are Permanent and are used by clients when family size is completed.

For males, two methods - Classical Vasectomy and No Scalpel Vasectomy are available and for females, two methods - Minilap and Laparoscopy are available.

The Module namely Standard for Female and Male Sterilization services is published by Government of India in November 2014. It contains all standard guidelines regarding sterilization.

Selection of client (Eligibility criteria)

This is the responsibility of MPW (Male/Female) who should check for following criteria before counselling the client for sterilization. Clients should be ever married.

- Female clients should be above the age of 22 years and below the age of 49 years.
- Male clients should be above 22 years and below the age of 60 years.
- The couple should have at least one child, whose age is above one year unless the sterilization is medically indicated.
- Clients or their spouses / partners must not have undergone sterilization in the past (not applicable in cases of failure of previous sterilization).

- Clients must be in a sound state of mind so as to understand the full implications of sterilization.
- Mentally ill clients must be certified by a psychiatrist, and a statement should be given by the legal guardian / spouses regarding the soundness of the client's state of mind.
- If client for tubectomy is home delivered, then ensure that 6 weeks are completed.
- TT immunization should be complete. If no, give full course of TT and perform surgery after 10 days from booster (in previously immunized mothers) or from second dose.
- It is good practice to recheck the information given by client with the help of eligible couple register. Medical Officer should again check these criteria before admitting the patient for sterilization.

Registration of patient following proper counseling and informed consent.

- Registration of patient is responsibility of HA (Female). Admit the patient to ward. Prepare indoor papers.

Female sterilization:

Pre-operative procedures

Preoperative examination is essential to assess the clients' physical fitness for surgery and also to ensure that the consent for surgery is voluntary and informed.

Preoperative examination should be carried out one day before sterilization operation and in sufficient daylight. This is important as MO may miss early jaundice during examination in ordinary bulb. It is mandatory for Medical Officer to carry out Preoperative examination himself. Pre-operative examination for sterilization should not be carried out by Intern or paramedical workers (MPW/HA).

Following steps should be followed for preoperative examination:

Case paper and consent form

Clinical assessment

All the points of clinical examination are mentioned in Tubectomy case paper. Examine the client as per the sequence given in case paper. Do not fill up any point in case paper blindly without examining the client. You may miss important contraindication, by which client may land into complications during or after surgery.

Physical examination - Pulse, BP, RR, temperature, general condition, body weight, auscultation of heart and lungs, abdominal and pelvic examination.

Laboratory tests - Hemoglobin, urine for sugar and albumin, Pregnancy test using UPT.

Sensitivity tests - *It is essential to perform Skin sensitivity test for local anaesthetic agent (lignocaine).*

Timing of sterilization procedure:

When to perform Female Sterilization

Having Menstrual Cycles	• **Any time within 7 days after the start of her menstrual bleeding.** • **Any time of menstrual cycle, provided it is reasonably certain that she is not pregnant.**
Switching from	• OCP: To be done any time, but she can continue

another method	the pill until the pack is finished to maintain her regular cycle. • IUCD: To be done anytime, concurrently with removal of IUCD.
No monthly menstrual bleeding	• Any time provided it is reasonably certain she is not pregnant.
After childbirth	• Within 7 days after giving birth (only Post-Partum Minilap tubectomy can be performed). • Any time 6 weeks or more after childbirth if it is reasonably certain she is not pregnant. (Interval Sterilization).
After MTP	• Concurrently with surgical MTP or within 7 days post MTP. • In case of Medical Abortion, the tubectomy should be done after next menstrual cycle. • Laparoscopic tubal occlusion procedure can be performed only in MTPs up to 11 weeks of gestation
After miscarriage or abortion	• Within 7 days, if no complications.
After using emergency contraceptive pills (ECPs)	• Within 7 days after the start of her next monthly bleeding or any other time if it is reasonably certain she is not pregnant.

Laparoscopic tubal occlusion should not be done concurrently with second-trimester abortion and in the early post-partum period up to 42 days.

Preoperative instructions

- NBM 4 to 6 hours prior to surgery.
- Patient should wear clean and loose clothing.
- Empty bowel in the morning of day of surgery. Not necessary to give enema.
- Empty bladder before entering OT.
- Do not shave operating area but clean with soap and water.
- Use Betadine, 60-70% solution of ethyl alcohol or Savlon for skin preparation.
- Apply antiseptic solution in a circular motion, beginning at the site of incision and working out for several inches.

Pre-operative medication

- Injection Pethidine 50 mg intramuscularly 45 minutes before operation.
- Injection Phenargan 50 mg. intramuscularly 45 minutes before operation.
- Injection Atropine 0.6mg. Intramuscularly 30 minutes before operation.

Precautions for pre-medication

- Never give any of the pre-medication by intravenous route.
- All the medicines should be given at least 30 minutes before operation.

- MO should always write the order of pre-medication in mg and not in ml.
- Always see the concentration of medicine supplied and adjust the volume of dose accordingly. For example, Atropine is available in 0.6 mg/ml (for preoperative medication) and 6mg/ml (for the treatment of organo-phosphorus poisoning).
- Ensure every time that you are using correct dose for pre-medication. Remember, high dose of pre-medication can cause serious complications to client that may sometimes lead to death.

Local Anaesthesia

- Use 1% Lignocaine without adrenaline as the local anaesthetic
- If you have been supplied 2% Lignocaine, dilute it with equal amount of distilled water and use. Maximum dose is 20ml of 1% Lignocaine. Never exceed the maximum dose.

Surgical Techniques -

General Requirements

- Ensure client's bladder is empty. If there is a doubt, the client must be asked to void urine immediately before the procedure and should be catheterized, if indicated.

Laparoscopy Requirements

- To avoid hypoventilation, the client must not be placed in the Trendelenburg position in excess of 20 degrees.
- The skin incision should not exceed the diameter of the trocar.

Monitoring of the patient

- **Pre-operative: -** Pulse, RR, BP prior to pre medication and thereafter every 15 minutes
- **Intra - operative: -** Pulse, RR, BP every 15 minutes, maintain verbal communication
- **Post operative:** - Patient should be examined for every 15 minutes in 1st hour, for every half hour in next 2 hours. Then twice in a day till discharge. During these examinations all vital signs should be observed and patient should be examined per abdomen. Besides this patient must be examined as and when required. If you suspect any complication (bleeding, injury) increase the frequency of observation.

Postoperative care and examination

- Minilap client should be examined twice a day (morning and evening) after 24 hours till discharged.
- As per circular from DHS dated 23.04.2015, Hospitals stay of Minilap patient is reduced from 7 days to 3 days. Patient should be kept in hospital for at least 48 hours after completion of surgery and then discharged on 3rd day. These guidelines are applicable to only patients who have undergone Minilap surgery. Patient should be given Discharge Card in prescribed format at the time of discharge. Patient should be called at health facilities for removal of stitches on 7th day.
- Laparoscopic sterilization patient can be discharged after 24 hours from operation, after checked by MO.

Postoperative instructions to the client

- Resume normal diet as soon as possible

- Keep incision area clean and dry
- Bathe after 24 hrs following surgery keeping incision area dry.
- Slowly return to full activity by two weeks
- Detail instructions are given in Discharge Card

Follow up of patient

Schedule of follow up by health worker is as below and MO should ensure that follow up takes place. Review of follow up should be taken during weekly meeting of HAs and monthly meeting of MPWs.

- First follow up within 48 hours after laparoscopic surgery discharge to rule out any immediate complications.
- First follow up within 7 days after mini-laparotomy discharge to rule out any immediate complications.
- Second follow up within 7 days after laparoscopic surgery, Examine the wound. It should be healthy without any discharge.
- Second follow up at one month after mini-laparotomy. Patient should resume full physical work. No wound discharge, gaping should not be seen.
- Third follow up at one month after laparoscopic surgery discharge to rule out any, Patient should resume full physical work.
- Emergency follow up any time after surgery.

Certificate of sterilization

This should be issued in prescribed format. (Refer Annexure 3.11(Vol. II)). It should be issued when patient has resumed her menstrual cycle or she has not resumed her menses within the month of sterilization but pregnancy test is negative.

Male sterilization

- Indications Contraindications, Clinical assessment and screening, pre-operative preparation, Pre medication are almost similar to female sterilization in addition to this - Local genital conditions (large varicocele, hydrocele, inguinal hernia, intra scrotal mass etc.)

Technique: Conventional vasectomy

- Either two incisions just below root of scrotum on either side or one incision in midline is taken. Length should not be more than 2cm.
- Vas must be separated from tissues and mid scrotal point should be excised not more than 1 cm.
- Vas must be tied with non-absorbable sutures (2 '0' silk)
- Depending on the length of suture, skin is closed with non-absorbable suture. In case of very small incision no need to suture.
- Dressing and use of T shaped bandage for 1 week.

No scalpel vasectomy (NSV)

- Basic difference in NSV procedure over conventional is surgical approach to vas. NSV approach is through a small puncture in the scrotum rather than incision. Thereafter

the procedure of vas ligation is same as in conventional vasectomy. As there is no incision, NSV is less invasive, takes much less time and causes fewer complications.

Postoperative care

- Patient should rest at PHC for 6 hours.
- Examine pulse, RR and BP of the patient.
- Examine the vasectomy site for bleeding, hematoma or severe pain.
- Give scrotal support by suspensory bandage.
- Discharge the patient if vital signs are stable, patient is alert and ambulatory.
- Give analgesic for 5 days. Other medications should be prescribed only if needed.

Instructions to the client

- Detail instructions are given in Annexure 3.11(Vol. II)
- Wear scrotal support or snug undergarments for 48 hours.
- Resumed normal work after 48 hours and return to full activity including cycling after one week following surgeries.
- Resumed normal diet as soon as possible.
- Keep the incision area clean and dry.
- Do not disturb or open dressing.
- Analgesics if required and contact health worker in case of bleeding, increase in scrotal size or severe pain.

Follow up:

First follow up:

- First follow up should be carried out within 48 hours after discharge.
- Examine the site of operation. Restructure the scrotal support if necessary.
- Advise the patient to resume normal work after 48 hrs.
- Client can walk and move around and can take bath after 24 hours.
- Normal diet.
- Provide client with 20 condoms and advise that he does not become sterile immediately after operation and therefore use of condom or other method for 20 ejaculations or three months whichever is earlier.

Second follow up

Second follow up seven days after surgery.

- Observe for any complications or persistence of pain.
- Client can resume normal work except Cycling, running etc. for long distance.
- Client can have intercourse if he desires but should use condoms.

Third follow up

- Third follow up after 3 months
- Enquire the patient about any problems related to operation.
- Client need not use condoms.
- Client can resume full normal work without any fear.
- Semen examination should be done.
- If semen still shows sperms return to facility every month till six months.

Emergency follow up

- Emergency follow up as needed.

Certificate of sterilization

This should be issued in prescribed format. (Annexure 3.11(Vol. II) *section 3- Annexure 4 of book*). It should be issued when his semen examination under taken reveals no sperms (Azoospermia).

Laparoscopy camp management:

(Refer Annexure 3.11(Vol. II) *--Chapter 4. Sterilization Services in 'Camp Mode'*)

Compensation to beneficiary after sterilization operation:

- Compensation for female sterilization and vasectomy acceptors and other details are as per *Government circular No. Kunish-2007/ Pra.kra. 197/07/ ku.ka.1, Dated 20 December, 2007.*

Involvement of Private practitioners / Hospitals

- If any practitioner is interested for performing tubectomy operations in his hospital then MO should take lead to get the hospital recognized, as availability of additional facility will result into more use of contraceptives.
- Recognition for performing family planning sterilization operations is given by DHO in rural area, by Civil Surgeon in urban area and by medical officer of Health in corporation area.
- Private practitioner has to apply in prescribed format. After checking availability of instruments equipment's, OT and training status of doctor recognition is given to the hospital.
- Do not pay compensation to patients in unrecognized hospitals. Ensure full address of patient while paying the compensation.

Family Planning Indemnity scheme:

The Family Planning Indemnity Scheme (FPIS) is a financial assistance program that provides compensation to beneficiaries undergoing sterilization surgery, doctors, and health facilities in case of death, failure, or complications arising from the procedure.

The scheme aims to incentivize family planning by mitigating the risks associated with sterilization procedures. It covers both men and women undergoing sterilization surgeries like vasectomy and tubectomy.

Details of Indemnity scheme (Refer Annexure 3.12(Vol. II))

Some other important aspects about family welfare services.

Increasing male involvementCommunity mobilization through 'Satisfied Acceptor Couples'

Follow Guidelines of Hon'ble Supreme Court on safety, precautions & guidelines for conducting sterilization procedures. For Complying interim orders issued by the Hon' Supreme Court, following guidelines / instructions have been issued as per *G.R. No. Kuniyo - 2013/pra kra. 74/ku ka. Mantralaya, Mumbai dated 09.05.2013.*

- Medical case cards for male & female sterilization should be scrupulously filled in & is to be signed by the operating surgeon before the sterilization operation.

Post-partum sterilization:

"Post-partum sterilization should be done after 24 hours up to 7 days of delivery".

Newer Contraceptives:

ANTARA

Antara is a Depot Medroxy Progesterone Acetate (DMPA) which is a injectable contraceptive.

Is an injectable, progestin-only contraceptive that provides highly effective, relatively long-acting (three months), reversible contraception. Use of DMPA eliminates both the need for user action daily or near the time of sexual intercourse and the need for partner cooperation.

Guidelines for use

- Within day 1-7 of menstrual cycle: Give MPA – no backup method required
- After day 7 of menstrual cycle: Take history of unprotected coitus since LMP if no history of unprotected coitus: give MPA and advise backup method for next 7 days. If history of unprotected coitus – do not give MPA advise condoms till next menses.
- Immediately after abortion or within 7 days of abortion- give MPA no back up method require.
- More than 7 days after abortion: Take history of unprotected coitus since LMP if no history of unprotected coitus: give MPA and advise backup method for next 7 days. If history of unprotected coitus – do not give MPA advise condoms till next menses.

When to start MPA for Post-partum women [Breast feeding (fully or partially)]

Situation	Instructions for service provider
< 4 weeks postpartum	Can start MPA any time-***No back up method*** required
> 4 weeks postpartum	Take history of resumption of menses • **If menses have returned**, *MPA can be given as advised for women having MC* • **If menses have NOT returned- rule out pregnancy,** then **give MPA.** *Also* advise ***back up method for next 7 days***

Situation	Instructions for service provider
<6 weeks postpartum	**Delay her 1st injection** until she is six weeks postpartum
6 weeks postpartum	**Give MPA-*No back up method*** required
6 weeks-6 months Postpartum	**Ask about resumption of menses** ▪ if menses have NOT returned - **Give MPA** (i) ***No back up method required*** (if 3 conditions of LAM met), (ii) otherwise **needs back up method** after ruling out pregnancy If menses have returned, ***give MPA*** *as given to women having MC*
More than 6 months postpartum	Can be started at any time, if her monthly bleeding has not returned and if it is reasonably certain that the woman is not pregnant. She will need a backup method (e.g. Condom) for the first 7 days after MPA injection. If her monthly bleeding has returned, she can start injectable as advised for women having menstrual cycles.

When to start MPA for Post partum women NOT Breastfeeding

MPA: Time of Initiation in other situations

- No bleeding (unrelated to childbirth or breastfeeding
- Anytime if pregnancy is ruled out
- Back up method for 7 days
- After taking ECPs
- Same day of intake of ECPs
- Anytime, within 7 days of monthly bleeding, a backup method for 7 days

Effectiveness of MPA

Highly effective, with perfect use i.e. when the method is used correctly first year effectiveness **is 99.7%.**

Dose: 1ml IM- 150 mg/ ml. Repeat after 3 months

Mechanism of Action

Antara Exerts Anti-Androgenic and Anti-Gonadotrophic Effects.

- It suppresses ovulation.
- It causes thinning of endometrium.
- It causes thickening of cervical mucous, thus it prevents entry of sperm into uterine cavity.
- In first 3 months common menstrual changes are irregular bleeding, prolonged bleeding then amenorrhoea sets in and by 1 year most of women become amenorrhoeic, after discontinuing MPA normal menses return in due course of time.

Advantages

- Can be used by women of any age and parity who at risk of pregnancy.
- Does not affect quantity and quality of milk therefore suitable for breast feeding women (after 6 weeks postpartum)
- Can be used as immediate postpartum (non breast feeding) and post abortion contraception
- Very effective and reversible method: fertility returns 7-10 months after last injection.
- MPA protects against endometrial cancer and ovarian cancer.
- Helps to prevent uterine tumours (fibroids)
- Decreases benign breast disease and ovarian cyst.
- Reduces sickle-cell crises.
- Protects against ectopic pregnancy.
- In case a pregnancy occurs during MPA use there is no increased risk of congenital anomaly or effect on growth and development of foetus.
- Long term contraceptive benefit act for 3 months
- Easy and convenient to use does not interfere with intercourse and pleasure.
- Private and confidential method.

Disadvantages

- Weight gain of 1-2 kg after 1 year of MPA use.
- Minor alteration of lipid metabolism, fluid nitrogen balance, glucose tolerance, steroid metabolism.
- Causes changes in menstrual cycle and bleeding.
- Return of fertility takes 7-10 months from date of last injection.

Important Aspects for Women

Nearly all women can use MPA safely and effectively except those having any of the following conditions:

- Women breastfeeding infant less than 6 weeks

- Unexplained vaginal bleeding
- High blood pressure (160/100 or more)
- Sever cirrhosis, liver tumours (benign or malignant)
- Migraine with aura at any age
- Current or past history of breast cancer
- Current or history of ischemic heart disease or stroke
- Diabetes of more than 20 years duration or complicated with nephropathy/ retinopathy
- SLE with positive antiphosholipid antibodies
- Sever thrombocytopenia.
- Is an injectable, progestin-only contraceptive that provides highly effective, relatively long-acting (three months), reversible contraception. Use of DMPA eliminates both the need for user action daily or near the time of sexual intercourse and the need for partner cooperation.

3.8.4 Formats Related to Sterilization Operation:

Important formats /forms required for sterilization services are given in Annexure 3.13(Vol. II). They are useful for the safe and effective conduct of family planning procedures. These formats include a checklist for pre-operation assessments, application and consent forms, certificates for medical officers and surgeons, and documentation for denial of sterilization. Additionally, it covers economic, social, and demographic details of clients, follow-up procedures, and other relevant information. These standardized forms are crucial for maintaining quality control, ensuring informed consent, and documenting the entire process to meet standards.Medical Termination of Pregnancy:

Abortion is defined as expulsion of products of conception before viable for birth. Reproductive health care for women includes provision of safe abortion services in primary health care setting. This is important because, unsafe abortion by untrained persons accounts for nearly 11% maternal deaths. Provision of easily accessible, cheap, safe abortion services can reduce burden of maternal morbidity and mortality. MTP Act 1971 is implemented in India since 1st April 1972. Aim of the act is improvement of maternal and child health by avoiding unwanted births. Previous legal limit of abortion as per the act was 20 weeks. Abortion is safe when performed early, not repeatedly and on unscarred uterus. The act has been amended during the year 2002 & came into force from 2003 and again it is amended in the year 2021. The legal limit of abortion as per the recent amendment is extended up to 24 weeks. Important aspects as per the amendment of MTP Act are as below:

3.8.5 **Indications:**

- Pregnancy likely to endanger woman's life or likely to Cause grave injury to her physical or mental health.
- Child is likely to suffer from serious physical or mental Disability.
- Pregnancy caused by rape.
- Pregnancy following contraceptive failure.

Only the consent of the woman is required to terminate the pregnancy. Married as well as unmarried or single woman can seek safe and legal abortion services (Form C). In case of minor (less than 18 years) or a mentally ill female, consent of a guardian is required (Form C).

In amendment 2021:

- For termination of pregnancy up to 20 weeks, the opinion of one registered medical practitioner is required.
- For termination of pregnancy between 20 to 24 weeks, the opinion of not less than two registered medical practitioners are required.

Now in amendment 2024:

- For termination of pregnancy beyond 24 weeks is permitted in specific cases as per *GR-nya ya pra-2024/54/pra.kra.100/ku.k/mantralay Mumbai dated 3 June 2024* (Refer Annexure 3.14(Vol. II))

Abortion service providers must respect and follow PCPNDT Act when providing abortion services.

3.8.6 Experience and training for conducting MTP:

- MBBS doctor who has assisted for performing 25 MTP Cases, of which at least 5 have been performed independently in the government approved hospital can conduct MTP up to 11 Weeks of gestation. This training will enable RMP to do only first trimester termination (up to 11 weeks)
- Following doctors can perform MTP up to 20 weeks: -
- A doctor having postgraduate diploma or degree in OBGY or
- MBBS doctor who has completed 6 months house job in OBGY or
- MBBS doctor who has experience in practice of OBGY for a period not less than 1 year at any hospital.

3.8.7 Approved place for conduction of MTP:

- Primary Health Centers, Rural Hospitals, Sub District Hospitals, District Hospitals, Women Hospitals, Government Medical Colleges are approved Places.
- As per the Amendment of Act, private places for MTP are to be approved for this purpose by the district level Committee chaired by the Civil Surgeon of the respective district and Corporation level Committee chaired by the Medical Officer of Health of the respective corporation.
- Private institution has to apply for approval of place in Form A & certificate of approval is given in form B.
- A place previously approved as per previous Rules, will Continue to have approved.
- Facilities essential for termination up to 11 weeks: -
- Gynaecological examination table or labour table,
- Resuscitation equipment
- Sterilization equipment
- Facilities for treatment of shock, including emergency Drugs
- Facilities for transportation.
- Facilities essential for termination up to 24 weeks:
- Operation table and instruments for performing abdominal and gynaecological surgery
- Drugs and parental fluids in sufficient supply for Emergency use
- Anaesthetic equipment, resuscitation equipment, sterilization equipment

Record and register

- After termination of pregnancy, within 3 hours RMP has to certify termination in a prescribed format (Form I).
- The consent given by a pregnant woman (Form C) and certified form (Form I) has to be sealed by RMP in an envelope. Write down serial number assigned to the pregnant woman in an admission register & name, address of doctor conducting MTP & date of termination of pregnancy on an envelope. Such envelope is to be marked as 'SECRET' & is to be kept in custody.
- Admission register (Form III) has to be maintained in which details of woman admitted for termination of pregnancy should be recorded. This register is a secret document and information should not be disclosed to anybody except under the authority of law. This register should be preserved for five years.
- Certificate for the purpose of MTP leave can be given to a woman whose pregnancy was terminated.
- No entry shall be made in any case sheet, operation theatre register, follow up card or any other document / register other than admission register maintained for this purpose.
- Serial number of the admission register can be recorded on such records.
- Submit the monthly statement of cases in the form II to the Civil Surgeon.
  (Refer Annexure- 3.15(Vol. II) for MTP Formats).

3.8.8 Responsibilities of Medical Officer:

- Perform only after training.
- Perform MTP only up to 11 weeks of pregnancy at PHC.
- Maintain record.
- Ensure confidentiality.
- Display in your OPD, "unwanted pregnancy can be Terminated at this clinic legally free of charge".
- IEC for availability of MTP services, facilities.
- Do not perform gender specific MTP.
- Encourage women for use of reliable contraception

MTP- Pre-existing Conditions, Requiring Special Attention and Contraindications:

Condition	Comments
Hypertension	Methergine, an ergotamine derivative, should ONLY be used with caution in hypertensive women for treatment of post-abortal atony. It should be avoided in women with blood pressure greater than 160/100mm of Hg.
Seizure disorder	The woman should take her usual dose of anti-seizure medication on the day of the abortion procedure. Several anti-epileptic drugs interfere with some forms of combined hormonal contraception.
Anaemia	If very low haematocrit or haemoglobin, be prepared to treat appropriately.
Blood-clotting disorders	If the woman has an active clotting disorder, proceed with caution, preferably in a facility that is able to treat women who are haemorrhaging.
Diabetes	High blood-glucose levels are not dangerous, but ketoacidosis should be avoided. Insulin dose will probably not be changed if procedure is performed under local anaesthesia.
Heart disease	If symptomatic or severe disease, abortion procedure may be performed in an operating room and monitored with the assistance of an anaesthetist.
Asthma	Some prostaglandins (PGF2 alpha) should be used with caution in asthmatics in case of post-abortal atony; PGE1 and PGE2 (Prostin) can still be given. The woman should be stable and not having an acute asthmatic attack prior to procedure.
Suspected ectopic pregnancy	Evaluate, treat or refer according to local protocol.
Cervical stenosis	Consider performing procedure under ultrasound guidance, using an agent such as misoprostol or laminaria to prepare the cervix prior to procedure, or waiting until 8 weeks after the LMP.

Alcohol or drug abuse	Be prepared for low pain threshold. Consider use of narcotic analgesic and parenteral sedative.

Contraindications:

Women with following conditions and factors are not eligible for medical methods of abortion:

Contraindications	
Heart problems such as angina, valvular disease, arrhythmia. It can lead to sudden cardio vascular collapse	Glaucoma
Anaemia (Haemoglobin <8 gm %)	Uncontrolled hypertension, BP > 160/100
Confirmed or suspected ectopic pregnancy; Undiagnosed adenexal mass.	Severe renal, liver or respiratory disease
Chronic adrenal failure	Current long term systemic corticosteroid therapy
Current anti-coagulant therapy	Inherited porphyrias
Uncontrolled seizure disorder	Allergic or intolerance to mifepristone/misoprostol or other prostaglandins
Psycho-social Situations (unsuitable for medical methods of abortion)	
Woman unable to take responsibility	Anxious women wanting quick abortion
Language or comprehension barrier	Not willing for VA procedure in case of failure
Special Precautions (where the drugs need to be used cautiously)	
Pregnancy with IUD in situ: IUD has to be removed before medical methods of abortion	Pregnancy with fibroid: big symptomatic fibroids encroaching on endometrial cavity can cause heavy bleeding and may interfere with uterine contractility
Bronchial asthma: prostaglandins other than misoprostol should not be used. Misoprostol is a weak bronchodilator	Lack of access to 24 hours emergency services
Special Precautions (where the drugs need to be used cautiously)	

Pregnancy with uterine scar (previous caesarean section, hysterotomy or myomectomy) caution should be exercised	If on anti-tubercular drugs, efficacy of the MMA drugs may decrease and there are more chances of failure requiring surgical abortion
Serious pelvic infection/sepsis	

3.8.9 Methods of MTP:

Menstrual Regulation:-

Menstrual Regulation by using Menstrual Regulation kit can be performed up to 6 weeks. Menstrual Regulation kit consists of plastic syringe of 50 ml capacity, which has piston with rubber stopper and two-flange plastic valve to create
negative pressure and rubber valve liner.

Advantages:-

- No anaesthesia is required, as cervix need not be dilated for introducing 6mm cannula.
- Minimal bleeding.
- Safe, simple, economical.

Suction evacuation (Up to 11 weeks):

This method is performed by using set of cannula & an electrical suction machine.

Manual Vacuum Aspiration (MVA):

By using double valve MVA kit consisting of a syringe & a set of cannula of different sizes.

Medical Abortion:

Table: Medical Methods of Abortion Protocol

Summary of drug protocol for medical methods of abortion				
Gestational	Mifepristone on Day1	Misoprostol on Day 3		Day 15
Up to 49 days	200 mg orally (Once 200 mg tablet)	400 mcg (two 200mcg tablets)	Oral/Vaginal	Confirm & ensure completion of the process Contraception
Up to 63 days	200 mg orally (one 200 mg tablet)	800 -mcg (four 200 mcg tablet)	Sublingual/ vaginal	

Inform women as below:

- Three visits schedule is necessary.

- Efficacy is up to 95%.
- If treatment fails, surgical termination is necessary; pregnancy cannot be continued, as there is risk of foetal malformation.
- Vaginal bleeding and uterine cramping may occur for 7-14 days.

Complications of medical methods of abortion are few-.

- Failed abortion
- Haemorrhage.
- Infection

Failed Abortion

- If the woman has not expelled the FOC by the time of her follow-up visit and the -uterus remains soft and bulky.
- Confirm the status of pregnancy by ultrasound Pregnancy is said to be viable if the gestation sac is complete with active cardiac activity
- If the gestation sac is seen but it is non-viable, then expectant management may be offered to the woman:
  - wait for the pregnancy tube expelled naturally with time without any further intervention
  - Alternatively, an additional dose of Misoprostol may be provided to woman with non-viable gestation sacs.
  - Proper counselling of the client is required to comply with return visits if she does not want any intervention.
  - The client should be willing to return to the clinic after one week to ensure that the abortion is complete
- If the woman does not wish to return for follow-up visits or has continuous viable gestation sac or heavy bleeding, vacuum aspiration may be performed to remove products of conception (FOC).

Haemorrhage

- Acute haemorrhage associated with medical methods of abortion in the absence of any physical trauma to the pelvic organs should be managed with vacuum aspiration
- Fluid replacement with Fingers lactate solution IV infusion at 30 drops per minute depending on the general condition of the woman to be started.
- In some cases, blood transfusion may be required. Refer the woman to a higher facility for management.

Infection

- Infection of uterus is rare with medical methods of abortion.
- If FOC is retained and the woman has symptoms like fever, chills, foul smelling discharge or bleeding and pain in lower abdomen, uterine infection may be suspected.
- Start broad spectrum antibiotics as soon as possible and remove the FOC using vacuum aspiration

3.9 Maternal Health related schemes under NHM:

3.9.1 Janani-Shishu Suraksha Karyakram (JSSK):

In order to reduce the maternal and infant deaths, the Government of India has announced the Janani Shishu Suraksha Karyakram. As per Government resolution dated 26th September 2011 and Janani Shishu Suraksha Karyakram has been launched from 7th October 2011 in all districts of Maharashtra. Under this scheme transport and free health services are provided to pregnant women and delivered mothers upto 42 days after delivery and infants upto 1 year through all government health facilities by all irrespective of poverty level, caste and parity.

Sr.No.	Indicator *	Goals
1	MMR	< 10
2	IMR	< 10
3	TFR	< 2

(* Source: SRS Bulletin 2022)

- At present Maharashtra state MMR is 33
- At present Maharashtra state IMR is 16
- At present Maharashtra state TFR is 1.7

Implementation of Janani Shishu Suraksha Karyakram:

- Free drugs & Consumables - List of medicines required for mothers and sick infants is provided under JSSK as per GoI guidelines to all the districts & corporations..
- Free Referral Transport - Each village, district or city is connected to one of the 1811 PHCs, 447 RH-SDH, 23 DH, 11 WH, 4 GH and 14 Government medical college hospitals under public health department, Mothers and infants are being referred to nearest facility with availability of transport services needed.
- Free Diagnostics – Both essential and desirable laboratory investigations are conducted free of cost for pregnant mother during ANC, INC and PNC up to 6 weeks. Sick neonates up to the age of 1 year are also provided free diagnostic services when needed.
- Free Diet to Delivered Mothers – Delivered mothers are provided free diet in health facilities up to 3 days for normal deliveries and up to 7 days for caesarean section. During this period, mother is guided for initiating breast feeding, diet, and immunization of neonates.
- Provision of Free Blood – Blood transfusion is done whenever required to tackle emergencies and complications of deliveries & caesarean section. Blood is provided free of cost.

Exemption from User Charges – Every pregnant mother, delivered mother up to 42 days and sick neonates up to the age of 1 year are exempted from all kinds of user charges at public health facilities 24 X 7 centralized call centre is established with 102 and 108 Toll Free Number.

Various Schemes & Activities under JSSK:

The important components of the program are as follows:

Entitlement for Pregnant/ Delivered Mothers:

- Free & zero expense Delivery & Caesarean section
- Free drugs & consumables
- Free essential diagnostics (blood, urine tests & ultra sonography etc.)
- Free diet during stay in the health institutions. (Upto 3 days for normal delivery & 7 days for caesarean section.)
- Free provision of blood
- Free transport from home to health institutions
- Free transport between facilities in case of referral
- Free drop back from institutions to home
- Exemption from all kinds of user charges to pregnant, delivered mothers

Entitlement for Sick infants up to the age of 1 year:

- Free & zero expense treatment
- Free drugs & consumables to sick infants
- Free essential diagnostics / Lab investigation
- Free provision of blood
- Free transport from home to health institutions
- Free transport between facilities in case of referral
- Free drop back from institutions to home
- Exemption from all kinds of user charges to all sick infants

Facilities Providing JSSK Services:

These facilities are provided at Sub-Centers, Primary Health Centers, Rural Hospitals, Sub-District Hospitals, District Hospitals, Women Hospitals and other Govt. Institutes.

3.9.2 Janani Suraksha Yojana (JSY)

Government of Maharashtra is implementing **Janani Suraksha Yojana (JSY)** *Vide Circular No JSY/2006/ Pra.Kra.175/FW 3 dated 22/11/2006* in the State. of Under this Scheme Benefit is to be given to SC, ST, BPL beneficiaries both in Urban and Rural area.

Aim and Objectives:

To reduce Maternal and Neonatal Mortality by promoting institutional delivery among beneficiaries from BPL, SC and ST family in rural and urban areas.

Implementation Strategy:

- This scheme is applicable for pregnant women from BPL, SC and ST families irrespective of age and parity.
- To collect all necessary documents such as caste certificate, copy of yellow ration card or number of BPL family as per lists prepared by Block Development Officer or certificate by Tahsildar, etc. from eligible beneficiaries.
- To issue prescribed JSY Card to beneficiaries by filling all required information in the card.

- Provide and /or help the beneficiary in receiving at least three ANC checkups to give services of physical examination, Inj. TT and IFA tablets.
- With the help of ANM and ASHA worker motivate the beneficiary for institutional delivery either at Government health institution or an Accredited private health institution.

Various Schemes and Activities:

- In JSY, along with beneficiary, ASHA workers are given incentive. ASHA worker is benefited if she motivates eligible JSY beneficiary for institutional delivery in Health Institution.
- Under this scheme if beneficiary is from Rural area ASHA is benefited Rs.600/- per case Rs 300/- for antenatal component and Rs.300/- for facilitating institutional delivery.
- If beneficiary is from Urban area, ASHA/Link Worker is benefited Rs.400/- per case. In this case Rs 200/- for antenatal component and Rs.200/- for facilitating institutional delivery.
- Rs 500/- is given to beneficiary if she is delivered at home in presence of trained birth attendant in both urban and rural area.
- Rs 600/- is given to beneficiary if she is delivered at Urban Govt/Govt aided Health Institute.
- Rs 700/- is given to beneficiary if she is delivered at Rural Govt/Govt aided Health Institute.
- Role of Medical Officer
  - Identify all eligible beneficiaries
  - Essential document
  - Payment to beneficiaries immediately after discharge

Direct Benefit Transfer Through Aadhar Enabled Payment System:

Every eligible beneficiary is entitled for prescribed incentive through Aadhar enabled payment.

3.9.3 Other schemes for Maternal Health

Matrutva Anudan Yojana:

Govt. of Maharashtra introduced this scheme in Tribal (Navsanjivani) district in Maharashtra from 25 June 1995 to get sufficient nutrition during ANC and PNC period. Tribal ANC mother will get Rs 400 in cash or through direct benefit transfer and ANC mother will get Rs 400 in the form of medicine. ANM and HA(F) will have to keep all the record and submit it to PHC clerk, and after approval from MO clerk should transfer the money in ANC mother's account.

This scheme is being implemented in all sixteen tribal districts of the state.

Important aspects of scheme

Monetary benefit

This benefit is given only upto 2 live births. Rs.800/- is sanctioned to each antenatal case. Out of this, Rs.400 is given through DBT & remaining is in the form of medicines.

Medicines provided under the scheme

- IFA Tablets.
- Ferrous gluconate syrup (2 bottles): If there is a child in the age group of 1-6 years give one bottle.
- Calcium syrup (3bottles)
- Malt extract with vitamins (3bottles)
- Multivitamin syrup(3bottles)

Implementation of scheme

i) At PHC level

- Calculate number of ANCs in each sub centre area of PHC.
- Describe the scheme carefully to all the PHC staff. Make sure that all ANMs have understood the criteria of inclusion of mother in Matrutva Anudan Yojna.
- Submit the report to DHO about number of ANCs registered before 16 weeks, benefit given to women and receipts along with monthly MIS.
- MO should randomly check 10% of beneficiaries by home visit in at least 5-6 villages of PHC every month and discuss the findings during monthly meeting.
- Medicines under this yojana should be given as package along with money during health check-up. Do not call mother separately for medicine, money and checkup.
- Following important messages should be given to the mothers by ANM:
  - Take IFA after meals.
  - Calcium syrup & multivitamin syrup should be taken one hour before the meals.
  - Do not take IFA & calcium syrup simultaneously. There should be gap of two hours between these two medicines.

At Sub-Centre level

- It is responsibility of Health worker to implement Matrutva Anudan Yojna.
- Understand the scheme completely, particularly criteria for inclusion of mother, payment schedule, instructions to be given while giving medicines.
- Always give anudan immediately at the end of check-up.
- Submit account details without fail to MO at the end of month during MIS meeting.

ii) Human Development Programme:

The Human Development Programme was first launched in 12 backward districts in the state in 2006 to improve the Human Development Index (HDI).

Later on, it was extended in identified 125 backward blocks in 23 districts. These districts are Thane, Palghar, Raigad, Sindhudurg, Nashik, Dhule, Nandurbar, Jalgaon, Jalna, Parbhani, Hingoli, Beed, Nanded, Buldhana, Akola, Washim, Amaravati, Yavatmal, Nagpur, Bhandara, Gondia, Chandrapur and Gadchiroli (23). This programme was extended in the Nagarpalika area, in identified 43 C-cadre Nagarpalikas of 15 districts.

Aim:

To improve the Human Development Index in23 districts selected 125 backward blocks and 43 'C' Cadre Nagarpalika of 15 Districts.

Objective:

- To reduce IMR
- To reduce MMR
- Identification of high-risk mothers and referral to higher health facilities.

Various Schemes &Activities: -

- Examination & Treatment of pregnant and lactating mothers, Infants & Children upto 2 years by specialists in Gynaecology, Obstetrics & Paediatrics.
- Payment of ₹ 2,000/- to pregnant mothers (SC/ST/BPL) is made in the 7th to 9th month of pregnancy and the remaining amount of ₹ 2000/- is paid within one month after delivery, in favour of loss of wages.
- Health Camps are organized at the Primary Health Centre and in the Nagarpalika area. Specialists in Gynaecology & Obstetrics are called for the examination of pregnant and lactating mothers. Paediatricians are called for the examination of children.
- Two camps are organized at the Primary Health Centre in a month and one camp is organised in the Nagarpalika area in a month.
- As per G. R. dated 3 October 2022, Budget of Rs.19500, Rs.25500, Rs.18000 sanctioned to non-tribal area, Tribal area, and urban area resp.
- Out of which ₹ 3000/-are for transport and honorarium of Specialists in Non-tribal and Urban areas. ₹. 6000/- is for transport and honorarium of Specialists in tribal areas. Rs.2500/- for emergency medicine and laboratory material, ₹ 3000/- for transport of beneficiaries, Rs 8000/- for lunch of beneficiaries.
- Also, if necessary ₹ 1500/- for pandal.

Sr. No.	Particular	Non-Tribal Area	Tribal Area	Municipal area /urban area
1	Specialist honorarium and Transport	₹ 3000)-/2 Specialist for single Camp Rs.6000 (-/	₹ 6000/- (2 Specialist for single Camp Rs.12000/-)	₹ 3000/-(2 Specialist for single Camp Rs.6000/-)
2	Lunch	₹.8000/- (Per Beneficiary ₹ 100/)	₹ 8000/-(Per Beneficiary ₹ 100/)	₹ 8000/-(Per Beneficiary ₹ 100/)
3	Emergency Medicine and Laboratory equipment	₹ 2500/-	₹ 2500/-	₹ 2500/-
4	Expenditure on Transportation of Beneficiaries	₹ 3000-/	₹ 3000/-	₹ 1500/-
	Total	₹ 19500 -/	₹ 25500/-	₹ 18000/-

iii) Vatsalya Program

"Vatsalya" is a comprehensive health promotion program to enhanced and focused implementation of existing MCH services from Pre-Pregnancy period till postnatal period. It is designed to ensure an optimal environment for conception and support healthy foetal growth during pregnancy and perinatal outcome through continuous tracking of important indicators from Pre-pregnancy to Postnatal period. This program contributes existing maternal and child health initiatives to intensify the efforts to reduce maternal mortality and child mortality.

"Vatsalya" emphasises on the Pre-pregnancy period of life course continuum which will be extended to healthy pregnancies and healthy Child Birth. Through the set of interventions, Vatsalya is intended to improve the pregnancy and child health outcomes. Major focus is on restoring maternal health in pre-pregnancy period, adequate maternal weight gain in pregnancy and reducing low birth weight babies. It also promotes the health and well-being of women and couples.

There will be convergence of various health care and nutrition programs during this period in addition to comprehensive package of preventive, promotive and curative care for creating safe environment for conception and child growth during antenatal period.

Objectives

Vatsalya programme is intended to reduce the all-preventable morbidity and mortalities among the mothers and child by preparing for conception and growth monitoring. It will ensure the quality health care from pre-pregnancy to first 1000 days of life of a child. Main objectives of the programme are given as follows;

- Reduce the prevalence of LBW and premature babies
- Reduce the prevalence of congenital birth defects
- Reduce the still births rate
- Improve the birth preparedness
- Improve the intake of ANC services
- Improved identification and follow up of high risk from pre-pregnancy period
- Ensure proper child growth through growth monitoring in his first 1000 days

Target beneficiaries

As health care services will be given from pre-pregnancy phase of life, primary beneficiaries of the programme will be unprotected eligible couples who are willing to have a baby. In addition, to follow the life course approach all pregnant women, lactating mothers and children under 2 years of the age will be catered the health care services under the integrated package of Vatsalya.

Vatsalya Health Care Package

Vatsalya service package include comprehensive health services for pre- pregnancy care and also will be integrated with existing health programmes for high- risk pregnant women, safe delivery and children under 2 years of age.

This will include the following components;

- Pre-pregnancy care package to unprotected EC
- Identification and management of high risks during pre-pregnancy and antenatal period
- Strengthening of Mothers weight monitoring and IFA compliance in ANC period
- Ensuring appropriate Breast feeding & Complementary feeding practices
- Growth and Development monitoring of Children
- Integrating PMSMA, PMMVY, DAKSHATA, HBNC, HBYC, RBSK, DEIC program

Program Activities

- Monthly check up of Eligible couples at Village or SC level
- Lab test, micronutrient supplementation
- Identification and management of disease among EC
- Counseling of EC for diet, nutrition, family planning methods etc.
- Check-up of high risk ANCs and management
- Check-up of children for growth monitoring and developmental delay
- Referral of sick mother, children to higher facilities
- Follow up of high-risk EC, mother and children

3.10 The Pre-Conception and Pre-Natal Diagnostic Techniques (Prohibition of Sex Selection) Act 1994 and Rules 1996.

3.10.1 Objective of the Act

- To provide for the prohibition of sex selection, before or after conception
- For regulation of pre-natal diagnostic techniques for the purposes of detecting abnormalities or metabolic disorders or chromosomal abnormalities or certain congenital malformations or sex-linked disorders
- The prevention of their misuse for sex determination leading to female feticide and for matters connected therewith or incidental there

3.10.2 Salient Features of the Act

- Use of PCPNDT only allowed on medical grounds & not for determination of sex
- PCPNDT can be conducted only by clinics registered under the Act
- No person conducting prenatal diagnostic procedure shall communicate to pregnant women or her relatives, the sex of the foetus by words or signs or any other method
- Clinics involved in advertisement (conducting sex determination) are liable for punishment
- Declaration on each report that he/she has neither detected nor disclosed the sex of foetus to pregnant woman or to any body
- Offence under PCPNDT is cognizable, non-bailable and non-compoundable
- Clients and their relatives asking for sex determination are also punishable

3.10.3 Registration under the Act:

According to Section 18 of PCPNDT Act registration of all imaging centres, Genetic centres, Genetic Laboratory is compulsory. It is applicable to all Government as well as private centres.

3.10.4 Appropriate Authority:

Appropriate Authority can be notified by Central / State Government in the official gazette. Appropriate Authorities have following functions:

- To grant, suspend or cancel registration
- To enforce standard prescribed and to supervise
- To investigate complaints and take actions
- To seek & consider advise of advisory Committee
- To take appropriate legal actions
- To initiate independent investigations
- To create public awareness
- To take actions on recommendations of advisory committee

Presently, Civil Surgeon, Medical Superintendent, Medical Officer of Health & Ward officer of Municipal corporations (Mumbai Only), Dist Collector, Municipal Commissioner, are the appropriate authority under the Act. But the power of registration and renewal is vested with Dist. Appropriate Authority i.e. Civil Surgeon and Medical Officer of Health.

3.10.5 Advisory Committee:

Advisory committee is to be notified by Govt to aid and advise the Appropriate Authority. It should meet once in sixty days.

State Functioning:

State Supervisory Board:

State Supervisory Board is to be constituted under the Act to supervise, review the activities of appropriate authorities and the implementation of PCPNDT Act. This is under the Chairmanship of Hon'ble Health Minister of Health and shall meet once in the four months.

State Appropriate Authority:

Govt. should notify the State Appropriate Authority for particular state. Presently, in Maharashtra State multi-member state appropriate authority is notified under the Chairmanship of Hon'ble Commissioner (FW) and member of Law and Judiciary and representative of Women organization. are as a member of State Appropriate Authority. Additional Director of Health Services is invitee member. It is to supervise and monitor the activities in the state and develop circular for effective implementation of the Act. Appeal against order of Dist. Appropriate authority is to be heard by this authority as contemplated under Rule 19(2) of the Act.

State Advisory committee

It is constituted to aid and advise the State Appropriate Authority.

3.10.6 Maintenance of Records

Following records should be maintained by centres

- Register as contemplated under Rule 9(1).
- Form A regarding application to be submitted by the centre.
- Counselling Centre should maintain form D.
- Genetic Laboratories should maintain form E.
- Genetic Clinics should maintain form F.

- Consent Form G (Invasive process).
- Appropriate Authority should maintain H register.

All centres should display the certificate of Registration in (Form B) duplicate in conspicuous part of business. Centre should also submit monthly report before 5th of every month. Appropriate Authority should inspect centres at least once in quarter.

3.10.7 Cognizance of Offences

Complaint should be made by Appropriate authority or the officer authorized by the appropriate authority.

Offences and penalties

- According to Section 23 (1) who ever contravenes provision of Act and Rules shall be punishable for a term which may extend to three years and with fine which may extend to Rs.10,000 and on subsequent conviction, with imprisonment which may extend to five years and with fine which may extend to Rs. 50,000.
- According to Section 23(2) the names of medical practitioner should be communicated to State Medical Council on framing charge for suspension of the name of medical practitioner and on conviction for removal of name for 5 years and permanently on subsequent offence.
- According to Section 23(3) who seeks aid of centres for conducting sex selection shall be punishable with imprisonment for term which may extend to 3 years and with fine which may extend to Rs. 50,000 and for subsequent offences with imprisonment which may extend to 5 years and fine of Rs. 1, 00,000.
- A pregnant woman is exempted presuming that she was compelled for this test.
- Offence under this Act shall be cognizable, non-bail able and non-compoundable.

Section 4

Reproductive & Child Health (Child Health)

4.1 Introduction

Child health is an important component of RCH. Children are exposed to risk during foetal life, birth & early childhood. This results in high incidence of morbidity & mortality in children. Risk of mortality is highest in early period of life & there is gradual reduction in the risk as age advances. Although children up to 5 years constitute about 12% of the population, they contribute more than 40% of total deaths. Further, highest mortality occurs in first year of life.

First four weeks of life are termed as neonatal period. Neonatal mortality constitutes two thirds of infant mortality. Till 2015, NMR declined significantly. However, NMR in recent years has become static, which is a major cause of concern, as improving neonatal survival holds the key for reducing infant and child mortality.

Within neonatal period, first week is even more crucial. Three fourths of all newborn deaths occur during first week of life (early neonatal period). Major causes of neonatal mortality are Pre-term birth complications (39 %), birth asphyxia (20%) Pneumonia (14%), Congenital anomalies (11%) & Sepsis (8%) (Source - Global Burden of Disease 2019).

Newborn deaths in first week of life are predominantly caused by birth asphyxia and prematurity, whereas those after first week are mostly due to Sepsis. Irrespective of primary causes of deaths, over two thirds of neonatal deaths occur among infants who are born with low birth weight (weighing less that 2500 gm at birth). Over one third of all neonates are low birth weight. Mortality rate is three times higher in LBW babies than normal birth weight babies.

Important causes of mortality in post neonatal period are Pneumonia, diarrhoeal diseases and vaccine preventable diseases.

Status of important child related mortality indicators of Maharashtra state is given below:

Sr. No.	Indicator	Present status (Per 1000 live births)
1	Neonatal Mortality Rate	11 (SRS 2020)
2	Early Neonatal Mortality Rate	8 (SRS 2020)
3	Perinatal mortality rate	11 (SRS 2020)
4	Infant Mortality Rate	16 (SRS 2020)
5	Under 5 Mortality Rate	18 (SRS 2020)

Important child health and nutrition interventions:

Based on the prevalent mortality & morbidity pattern, important child interventions under the programme are as below:

- Newborn care
- Breast feeding and complimentary feeding
- Immunization
- Management of diarrhoeal diseases

- Management of Acute Respiratory Infections (ARI)
- Nutrition Interventions (Anaemia Mukt Bharat, Vitamin A Supplementation, deworming etc)

In children under five years of age prematurity and LBW, Pneumonia, diarrhoea and neonatal infections are the most important causes of death. Many children suffer from more than one illness at a time and also many different diseases present with similar symptoms. This booklet is prepared keeping in mind the cases frequently seen by the PHC Medical officers and how he has to manage with minimal resources and expertise available with him. It describes a sequential process for managing sick young infants and children as soon as they arrive in the facility. Only the key protocols for common illness are disclosed. Book also contains guidelines for Triage, Emergency treatment and outpatient as well as inpatient cares for all children.

4.2 Newborn Care

Principles of newborn care are simple and eminently achievable through primary care. Higher the non-institutional home delivery rate by untrained persons, higher the neonatal mortality rate. This is because of high rate of infection, unavailability of treatment of asphyxia and low quality care of Low Birth Weight (LBW) babies.

4.2.1 Basic components of newborn care

- Quality antenatal and intrapartum care
- Skilled attendance at birth including basic resuscitation
- Thermal protection
- Prevention of infection
- Exclusive breast feeding and early skin to skin care.
- Extra care of Low Birth Weight (LBW)babies
- Early detection of danger signs & early care seeking.
- Care of sick babies at homes and at facilities including care during transport

4.2.2 Role of MO in newborn care

- Ensure that, all antenatal mothers in PHC area get registered before 12 weeks & get all antenatal services as mentioned in chapter on antenatal care.
- All deliveries should be conducted in institution. In difficult remote areas if institutional deliveries are not possible, home delivery should be conducted by trained personnel by using six clean practices.
- Provide newborn care emphasizing on following points:
- Establishing Newborn care corner-

This is a space within the delivery room for facilitating immediate care of the newborn. This area is mandatory for all health facilities where deliveries take place.

Equipment and supplies that should be available in the corner:

Equipments:

- Radiant warmer with bassinet
- Suction machine (electrical / foot operated)
- Weighing machine
- Self inflating resuscitation bag (250 and 500 ml) with masks (size 0,1)
- Oxygen source
- Stethoscope

- Laryngoscope (straight blade, size 0,1)
- Wall Clock with seconds hand.
- Room thermometer

Supplies:

- Two Clean warm baby sheets/towels
- Sterile cord clamp
- Sterile Gloves
- A folded piece of cloth as a shoulder roll
- Sterile blade/scissors (Dee Lee's)
- Mucus extractors
- Suction catheters (10F, 12F)
- Feeding tube (6F, 8F)
- Endotracheal tubes (3, 3.5 mm)
- IV cannula (26G)
- Syringe (1 ml)
- Needle (26 gauge)
- Drugs (Inj. Epinephrine, Normal saline, Inj.Vitamin K -1)

Immediate Newborn Care

Most babies would require routine care which is as follows:

- Note the exact time of birth
- Receive the baby in warm, dry, clean linen
- Place the baby prone on the mother's abdomen (skin to skin contact)
- Dry the baby with a warm clean sheet. Do not wipe off vernix.
- Observe if the baby is breathing or crying
- Clamp the cord after 1-3 min and cut with a sterile instrument. Tie the cord with a sterile tie
- Support initiation of breastfeeding
- Examine the baby quickly for malformations/birth injury
- Leave the baby between the mother's breasts to start skin-to-skin care.
- Cover the baby's head with a cloth. Cover the mother and baby with a warm cloth
- Place an identity label on the baby
- Give Inj. Vit K 1mg IM (0.5mg for preterm)
- Record the baby's weight
- Refer if birth weight < 1800g, and has major congenital malformations or has severe respiratory distress to higher centres.

Neonatal Resuscitation:

Approximately 10% of newborns require some assistance to begin breathing at birth; about 1% need extensive resuscitative measures to survive.
The "ABCs" of resuscitation are the same for babies as for adults. Ensure that the '**Airway**' is open and clear. Be sure that there is '**Breathing**', whether spontaneous or assisted. Make certain that there is adequate '**Circulation**' of oxygenated blood. Newly born babies are wet following birth and heat loss is great. Therefore, it also important to maintain body temperature during resuscitation. Detail resuscitation steps are to be followed as in Annexure 4.1(Vol. II)

4.2.3 Management Of Low-Birth-Weight Babies

Nearly 75 percent neonatal deaths and 50 percent infant deaths occur among the low birth weight babies. Even after recovering from neonatal complications, some LBW babies may remain more prone to malnutrition, recurrent infections, and neurodevelopmental delay. Low birth weight, therefore, is a key risk factor of adverse outcome in early life.

- Low birth weight (LBW) baby is the one who weighs less than 2500 gm at birth.
- Low birth, weight may result from either prematurity (gestational age <37 weeks) or intrauterine growth retardation (IUGR), which is also called small for date baby (SFD).

Treatment :

Keeping LBW Babies warm:

- Room temperature should be kept between 28-300C.
- Baby should be provided skin to skin contact care by Kangaroo Mother Care (KMC) in the following ways:

➢ Provide privacy to the mother. If mother is not available, skin to skin contact may be provided by the father or any other person

➢ Request the mother to sit or recline comfortably.

➢ Undress the baby gently, except for cap, nappy and socks.

- Place the baby prone on mother's chest in an upright and extended posture, between her breasts, in Skin to Skin contact; turn baby's head to one side to keep airways clear.
- Cover the baby with mother's blouse or gown; wrap the baby-mother duo with an added blanket or shawl.

- **Breastfeed the baby frequently.**
- If possible, warm the room (>250C) with a heating device.
- Skin to Skin contact is the most practical, preferred method of warming a hypothermic infant in a primary health care facility.
- If skin to skin contact is not possible:
- Cloth the baby in 3-4 layers, cover head with a cap and body with a blanket or a shawl; hold baby close to caregiver's body, OR
- Place the baby under overhead radiant warmer, if available.
- Keep the young infant warm on the way to the hospital
- By Skin to Skin contact OR
- Clothe the baby in 3-4 layers, cover head with a cap and body with a blanket or a shawl; hold baby close to caregiver's body.

Indication for referral to higher centres are:

- Birth weight of less than 1800 gm
- Gestational age of less than 34 weeks
- Neonate who is not able to take feeds from the breast or by cup (Katori) and spoon (irrespective of birth weight and gestation);
- A neonate with danger signs and sick neonate (irrespective of birth weight and gestation).

4.2.4 Management of Child Illness at PHC.

Integrated Management of Neonatal & Childhood Illnesses (IMNCI)

Among all child deaths, neonatal mortality is having significant contribution. Majority of these deaths are due to ARI, diarrhoea, measles, malnutrition or a combination of these conditions. In view of the problem of high child mortality, WHO in collaboration with UNICEF has developed Integrated Management of Childhood Illnesses approach.

This approach has been slightly modified in India, as neonatal mortality component is high. Therefore, this component is also included & is called as Integrated Management of Neonatal & Childhood Illnesses

Rationale of IMNCI

Most children present with signs & symptoms related to more than one of the conditions mentioned above. Therefore, single diagnosis is not possible or appropriate & there is a need to combine therapy for several conditions. Thus, the management is beyond single diseases & addresses overall health of a child.

Objective of IMNCI strategy

To reduce deaths, the frequency & severity of illness & disability, & to contribute to improved growth & development.

IMNCI interventions (New IMNCI Module 2023)
IMNCI interventions are divided into young infants (0 to 2 months) and old infant (2 month to 5 year is integrated case management of the most important causes of childhood deaths:

- Possible Serious bacterial infections
- Acute Respiratory Infections
- Diarrhoea
- Fever / Malaria
- Malnutrition
- Anaemia

Components

- Improvement in the case management skills of health staff through the locally adapted guidelines in integrated management of neonatal, childhood illnesses and activities to promote their use.
- Improvements in the health system required for effective management of neonatal and childhood illnesses.
- Improvements in family and community practices.

IMNCI case management process:
At outpatient facility

- Assessment for major symptoms & examination for general danger signs
- Classification & identification of treatment
- Referral, treatment or counselling of the child's care taker depending on the classification identified

Check **all** sick children for general danger signs like:

- The child is not able to drink or breastfeed.
- The child vomits everything.

- The child has, had convulsions.
- The child is lethargic or unconscious.

4.2.5 Assessment & Classification of 0 to 2 months sick young infants

0 to 2 Months:

- Young Infant (0 to 2 months) have special characteristics that must be considered when classifying their illness.
- They can become sick very quickly from serious bacterial infections.
- They frequently have only general signs such as few movements, fever, or low body temperature.
- Mild chest indrawing is normal in young infants because their chest wall is soft.
- For these reasons, assessment, classification and treatment of young infants is somewhat different from that of older infants or young children.

Signs	Classify as	Identify Treatment
Any one or more of the Following signs: • **Not able feed at all or not feeding well or** • **Convulsions or** • **Fast breathing (60 breaths per minute or more) or** • **Severe chest in drawing or** • **If axillary temperature 37.50C or above (or feels not to touch)** • **If axillary temperature less than 35.50C (or feels cold to touch) or** • **Movement only when stimulated or no movement at all**	**Possible Serious Bacterial Infection**	➢ Give first dose of oral amoxycillin and intra-muscular gentamicin. ➢ Treat to prevent low blood sugar. ➢ Advise mother how to keep the young infant warm on the way to the hospital. ➢ Refer URGENTLY to hospital
• **Umbilicus red or draining pus or** • **Pus discharge from ear or** • **< 10 skin pustules.**	**Local Bacterial Infection**	➢ Give oral Amoxycillin for 5 days. ➢ Teach mother to treat local infection at home ➢ Advise the mother to give home care ➢ Advise the mother when to return immediately ➢ Follow up in 2 days
No signs of bacterial infections	**Infections unlikely**	➢ Advise the mother to give home care

Treatments in PHC for Possible serious bacterial infection (sepsis) in 0-2 months infants

- Explain to the mother why the drug is given.
- Determine the dose appropriate for the infant's weight (or age)
- Use a sterile needle and sterile syringe. Measure the dose accurately. Do not mix ampicillin and gentamicin
- Give the drug as an intramuscular injection.

Young Infants weight	Amount of Gentamycin to be given intramuscularly as injection (vial* contains 80mg in 2 ml)	Amount of Amoxicillin to be given per-orally as syrup**(contains 125mg/5ml)	Amount of Amoxicillin to be given per-orally as tablet (contains 250mg)
	Dosage 5mg/kg/dose* once a day	Dosage 25mg/kg/dose** twice a day	
Less than 1.5 kg	To be referred to higher facility		
Above 1.5 kg – upto 2.0 kg	0.2 ml	2 ml	¼
Above 2.0 kg – up to 3.0 kg	0.3 ml	2.5 ml	½
Above 3.0 kg – up to 4.0 kg	0.4 ml	3 ml	½
Above 4.0 kg – up to 5.0 kg	0.5 ml	4 ml	½

Referral is the best option for a young infant classification with Possible serious bacterial infection.

If referral is not possible, give oral amoxicillin every12 hours and intramuscular gentamicin once daily.

Treat the Infant to Prevent Low Blood Sugar

- **If the child is able to breastfeed:** Ask the mother to breastfeed the child.
- **If the child is not able to breastfeed but is able to swallow:** Give 20-50 ml (10 ml/kg) expressed breast milk or locally appropriate animal milk (with added sugar) before departure, If neither of these is available, give 20-50 ml (10 ml/kg) sugar water.
- **To make sugar water: Dissolve 4 level teaspoons of sugar (20 grams) in a 200 ml cup of clean water.**
- **If the child is not able to swallow:** Give 20-50 ml (10 ml/kg) of expressed breast milk or locally appropriate animal milk (with added sugar) by nasogastric tube.

4.2.6 Assessment & classification of Illness in 2 months to 5 years:

Assessment & Classification of Cough or Difficult Breathing (ARI) at PHC:

- Respiratory infection can occur in any part of the respiratory tract such as the nose, throat, larynx, trachea, air passages or lungs. A child with cough or difficult breathing may have pneumonia or another severe respiratory infection. Pneumonia is an infection of the lungs. Children with bacterial pneumonia may die from hypoxia (too little oxygen) or sepsis (generalized infection).

- Doctors can identify almost all cases of pneumonia by checking for two clinical signs: fast breathing and chest indrawing. One of the body's responses to stiff lungs and hypoxia (too little oxygen) is fast breathing. When the pneumonia becomes more severe, the lungs become even stiffer. Chest indrawing may develop. Chest indrawing some times may be the only sign of severe pneumonia. Stridor in a clam child and grunting are signs of severe Respiratory distress. Stridor is a harsh noise made when the child breathes IN. Stridor happens when there is a swelling of the larynx, trachea or epiglottis. A child who has stridor when calm has a dangerous condition.

Pneumonia :

<table>
<tr><th>SIGNS</th><th>CLASSIFY AS</th><th>IDENTIFY TREATMENT</th></tr>
<tr><td>• General danger signs(inability to breastfeed or drink, lethargy or unconsciousness, persistent vomiting, convulsions) or
• Chest indrawing or
• Oxygen saturation < 90%</td><td>Severe Pneumonia or very Severe Disease</td><td>Pre-referral treatments
➢ Give pre referral dose of oral amoxycillin and IM gentamicin Refer URGENTLY to hospital</td></tr>
<tr><td>Fast breathing
Count the breath in 1 min.
<table><tr><td>If the child is:</td><td>Fast breathing is:</td></tr><tr><td>2 months up to 11 months</td><td>50 breaths per minute or more</td></tr><tr><td>12 months up to 5 years</td><td>40 breaths per minute or more</td></tr></table></td><td>Pneumonia</td><td>Treatment
➢ Give Amoxycillin for 5 days.
➢ Advise home care for cough and cold.
➢ Follow-up in 2 days.</td></tr>
<tr><td>No signs of pneumonia or very severe disease.</td><td>No Pneumonia Child is having Cough or Cold</td><td>➢ Advise home care for cough and cold.
➢ If coughing more than 14 days, refer for assessment.*</td></tr>
</table>

*** If referral is not possible:**

- Give oral amoxycillin (25-30mg/kg) every 12 hrs and intramuscular gentamicin Once daily. Repeat the Chloramphenicol injection every 12 hours for 5 days.
- Then change to an appropriate oral Amoxicillin to complete 7 days of treatment.
- **Give Paracetamol for High Fever (> 38.50C)**

Paracetamol		
AGE Or Weight	**Tablet (100 mg)**	**Tablet (500 mg)**
2 months upto 1 years (4-<10kg)	**1**	**1 /4**
1 years upto 3 years (10 -<15kg)	**1 ½**	**1/2**
3 years upto 5 years (15 -20kg)	**2**	**1/2**

- Give a single dose of paracetamol in the PHC & give 3 additional doses at home every 6 hours until high fever sub sides.
- Do tepid sponging.

4.2.7 Management of Children (2 months to 5 years) Presenting with Fever

There are three major categories of children presenting with fever:

- Fever due to infection without localized signs (no rash).
- Fever due to infection with localized signs (no rash).
- Fever with rash.

Majority of the children with fever do not require hospitalization. As many of these are respiratory tract infections which are viral in origin and there can be mild variant of malaria, typhoid fever, or other disease entities.

Following are the indications for children with fever who would require admission in the health facility and therefore refer to higher centres:

- If any emergency signs
- Toxic child.
- Sometimes prolonged fever not responding to conventional treatment.

Child is said to have fever by history or feel is hot or temperature is 37.5^{0}C* or above

IF YES: **Decide the area where child stays is High or Low Risk for Malaria**	
ASK:	**LOOK AND FEEL:**
• **Fever for how Long?** • **If more than 7 days, has fever been present every day?** • **Has child had measles within the last 3 months?**	• Look or feel for stiff neck. • Look and feel for bulging fontanelle. • Look for runny nose. **Look for signs of MEASELS.** • Generalized rash **and** • One of these: cough, runny nose or red eyes.
If the child has measles now or within the last 3 months:	• look for mouth unclers. Are they deep and extensive? • Look for pus draining from the eye. • Look for clouding of the cornea.

Classify Fever

Signs/Symptoms	Classification	Treatment
• **Any general danger signs** or • **Stiff neck** or	**VERY SEVERE FEBRILE DISEASE**	➢ Give first dose of oral amoxycillin and IM gentamicin ➢ Treat the child to prevent low blood sugar ➢ Give one dose of paracetamol for high fever (temp. 38.5°C or above). ➢ Refer URGENTLY to hospital.
• **Positive RDT or** • **RDT not available and no other obvious cause of fever**	**MALARIA**	➢ Give oral antimalarial as per national guidelines after making a smear ➢ Give one dose of paracetamol in clinic for high fever (temp. 38.5°C or above). ➢ Advise mother when to return immediately. ➢ Follow-up after 2 days
• **Negative RDT and/or other causes of fever PRESENT**	**FEVER MALARIA UNLIKELY**	➢ Give one dose of paracetamol in clinic for high fever (temp. 38.5°C or above) ➢ Give appropriate treatment for an identified cause of fever ➢ Advise mother when to return immediately. ➢ Follow-up after 2 days if fever persists ➢ If fever is present every day for more than 7 days, refer for assessment

Note: Child should be referred after stabilization to RH/SDH/DH if:

- Any Emergency signs:
- Toxic Child
- Prolonged fever (>7 days) not responding to conventional treatment

Management of Common Clinical Conditions in New Borns

There are several phenomena after birth that are normal and mothers only need reassurance.

These include:

- **Milia, Epstein pearls, Mongolian Spots, capillary nevi,** etc. There are a few developmental variants which may be present and be of concern to the mother. The mother needs to be reassured.
- **Red rashes** on the skin may be seen on 2-3 days of life. These are normal.
- **Weight loss** of 6-8% (10-12% in preterm infants) in the first few days of life is normal and

most infants regain their birth weight by 10-14 days.

- **Regurgitation of feeds and vomiting.** Unlike vomiting, non-projectile expulsion of stomach contents without force (regurgitation) is normal and simply needs advice regarding feeding technique.
- **Bowel disorders.** No medication should be prescribed for passage of stools after each feed (exaggerated gastrocolic reflex) as this is normal in some babies. From 3rd to 14 days many exclusively breastfed babies pass loose stools (10-15 times/day) without illness/dehydration. These are transitional stools and require no medication.
- **Delayed passage of urine.** Non-passage of urine by 48 hours after birth may suggest urinary tract anomalies. Such babies need to be investigated. Crying before passing urine is normal.
- **Jitteriness** is abnormal only when it is excessive or persists even during feeding and then it may suggest hypoglycaemia or hypocalcaemia.
- **Dehydration fever.** Transitory moderate fever (up to 38.50C) usually during the second or third day of life in summer months in an active baby, who sucks well, is normal and responds to lowering the environmental temperature.
- **Excessive crying.** Most baby cry when either they are hungry or are having discomfort such as due to full bladder before passing urine, wet napkin, nose block, etc. Excessive inconsolable crying or high-pitched crying is indicative of meningitis or any other painful inflammatory conditions.
- **Umbilical sepsis.** If there is pus discharge not extending to periumbilical skin, apply 10% Gentian violet or Povidone Iodine locally twice a day. However, if there is periumbilical erythema or induration administer syrup erythromycin – 40 mg/kg/day in 3-4 divided doses. If the newborn has any other high-risk factor, refer to a higher centre.
- **Umbilical granuloma.** A red flesh-like nodule at the base of umbilical cord can be managed by cautery with Silver Nitrate or application of common salt for 3 to 4 days.
- **Engorgement of breasts** in both sexes and vaginal bleeding after 4 days of birth is normal.

4.2.8 Role of Medical Officers in Monitoring Childhood Illness

- Monitor sub centre / village wise reporting of Possible Serious Bacterial Infections, Pneumonia, Dehydration cases during monthly meeting.
- Train ASHAs / ANMs / MPWs / CHO in correctly counting respiratory rate & to diagnose chest in-drawing, dehydration, danger signals etc. by demonstrating in patients, so that they can correctly manage & refer cases.
- Ensure that, ASHAs / ANMs / MPWs / CHO are diagnosing & treating cases correctly.
- In addition to health workers, ASHA Anganwadi Workers should be oriented about home management of cases with no pneumonia, dehydration and signs for referral and place of referral.
- Confirm adequate stock of Injection Gentamicin, Amoxycillin, Cotrimoxazole & Paracetamol with all ANMs.
- Educate families in early care seeking for danger signals.
- Provide Basic Life Support, management of shock in SAM child and other child.Neonatal Resusitation. (Refer Annexure 4.1(Vol. II))

4.3 Diarrhoeal Diseases (IDCF)

Prevention And Management of Childhood Diarrhoea Under Intensified Diarrhoea Control Fortnight (IDCF)

Introduction

Diarrhoea is considered if the stool has change in consistency and more water than faecal matter and are passed three or more stools in last 24 hours. The normally frequent or semi-solid stools of a breastfed baby is not diarrhoea. Diarrhoeal diseases include acute diarrhoea, persistent diarrhoea (diarrhoea duration two weeks or more) and dysentery (blood-stained stools with fever). Diarrhoeal diseases are most common in young children, and incidence falls with increasing age. It is one of the important causes of death among under five children contributing to 10 percent of all under-five deaths i.e. around 1 lakhs death every year in the country.

Most of the deaths in diarrhoeal diseases are due to dehydration which is preventable by timely and adequate replacement of fluids. Persistent diarrhoea contributes to malnutrition, which further enhances risk of morbidity and mortality in under-five children. Dysentery is an acute form of diarrhoeal disease due to invasive bacteria that leads not only to dehydration, but also multi-system manifestations, which can prove fatal. Use of home available fluids (HAF) and Oral Rehydration Solution (ORS) and administration of Zinc tablets along with adequate nutritional intake by the child during diarrhoea has resulted in significant decline of mortality associated with diarrhoea in under-five children.

Important causes of diarrhoeal diseases in under five children

- Acute diarrhoea - Cholera, Rota virus, Food poisoning, gastrointestinal disorders and medications (rare)
- Persistent diarrhoea - Chronic bacterial infections
- Dysentery - Shigellosis

Important diarrhoeal diseases related to childhood diarrhoea are discussed below. Other diarrhoeal diseases are described in detail in Section - 04: Communicable diseases

4.3.1 Rotavirus

Rotavirus infection is common in under-five children. In early childhood, rotavirus is one of the most important causes of severe dehydrating diarrhoea.

Causative agent:

Rotaviruses are double strained RNA containing viruses belonging to family Rotaviridiae. They are called as Rotaviruses because of wheel like appearance of complete virion on electronic microscopy.

Epidemiology:

Rotavirus spreads through faeco-oral route. Rotavirus infection is most common during winter season. Virus is shed in stools at very high concentration before and few days after clinical illness. Very few infectious virions are needed to cause disease in susceptible host.

Clinical features:

Rotavirus infection typically begins after incubation period of less than 48 hours with mild to moderate fever and vomiting followed by onset of frequent watery stools. Vomiting and fever disappears on second day of illness but diarrhoea continues for5-7 days. Dehydration may develop and progress rapidly, particularly in infants.

Diagnosis:
As there is no facility available for virus isolation, diagnosis of rotavirus infection is made by clinical presentation of patient.

Treatment:
There is no specific medicine to act against rotaviruses. Therefore, most important management of rotavirus diarrhoea is correction of dehydration. Careful examination of child for hydration status and prompt management of dehydration are most important. Second important aspect is feeding the child. There is no role of antiviral treatment in rotavirus infection.
Prevention:

Good hygiene reduces transmission of viral gastroenteritis. Live rotavirus vaccine is available but not marketed commonly and is not included in national immunization schedule.

4.3.2 Shigellosis
Shigella infection is most common in under 5 children.

Epidemiology
Infection with shigella is most common during rainy season. Although infection can occur at any age, it is most common in 2nd and 3rd year of life. It is transmitted through contaminated food and water because of lack of personal hygiene.

Clinical features
After incubation period of 12 hours to several days, shigellosis begins with fever, abdominal pain and watery diarrhoea without blood. At this stage diarrhoea is difficult to distinguish from that caused by other organisms. With invasion of colonic mucosa, stool often becomes bloody, mucoid and of low volume.

Treatment
First concern of shigellosis treatment is correction of dehydration. Examine patient for dehydration and start ORS/RL as per severity of dehydration. Start antibiotic treatment simultaneously. Drug of choice for Shigellosis is Cotrimoxazole. Alternatively Tablet Cefixime (8mg/kg/24 hours) can also be given.

Prevention
Hand washing with soap and water after defaecation, before food handling and before meals is most effective intervention to prevent spread of shigella infection.

Definition of diarrhoea
By definition, diarrhoea is passage of three or more liquid/ watery stools in 24 hours. However, change in consistency has more importance than number of stools passed.

Estimation of diarrhoea cases
Estimate number of diarrhoea cases for each village, sub centre and for PHC for planning of diarrhoea management.

- On an average each under-five child gets 2-3 attacks of diarrhoea per year.
- There are approximately 10% under-five children in population. Thus, village of 1000 population will have 100 under-five children. Number of attacks of diarrhoeal diseases will be 100 3 = 300.

- Out of these, 10% will develop some dehydration requiring ORS, i.e. 10% of 300 = 30 children of village with 1000 population will require treatment of dehydration by giving ORS in one year.
- Amongst all attacks of diarrhoea, 1% will develop severe dehydration requiring IV therapy, i.e. 1% of 300 = 3 children from village with 1000 population will require IV therapy for treatment of severe dehydration in one year.

Calculate number of diarrhoea cases, ORS requirement and IV requirement for Sub-centre and PHC on similar lines.

4.3.3 Estimation of ORS requirement

Requirement of ORS for village of 1000 population is calculated in the table below:

Table: Calculation of ORS requirement for 1000 population

Type of diarrhoea case		No. Of attacks	Requirement calculation criteria	ORS Requirement	Remarks
Diarrhoea without dehydration (90% cases)		270	One ORS packet per attack	270	Patient with severe diarrhoea and vomiting should be started ORS immediately without waiting for signs of dehydration to appear as such patient may go quickly into severe dehydration.
Diarrhoea with some and severe dehydration (10%)		30	Average 3 ORS packets per attack	90	Give ORS to all children. with some dehydration. Children with severe dehydration should be given ORS till child reaches IV facility. Continue ORS during IV therapy, if child can take orally.
Total requirement				360	One-year requirement of ORS packets for village of 1000 population is 360 packets.

ORS should be given on priority basis to all the cases with signs of dehydration. For patients of diarrhoea without signs of dehydration, advise home available fluid (HAF) and provide ORS if child is passing large volume of stools, has continuous diarrhoea or stays away from health facility. For other children, provide ORS if available in sufficient quantity.

Since 2014 **Intensified Diarrhoea Control Fortnight (IDCF)** is being implemented before/during monsoon season each year.

Zinc deficiency is one of the primary reasons for this unacceptably high burden of diarrhoeal deaths.

4.3.4 Zinc Deficiency in Indian Children

Zinc is an essential trace element that is required for normal intestinal mucosal integrity, sodium and water transport and immune function. Zinc deficiency is common in India, for the following reasons:

- Poor intake: Zinc is found mainly in non-vegetarian foods. Since the diet eaten in India is predominantly vegetarian, the intake of Zinc is poor
- Poor absorption of Zinc from the diet because of presence of phytates in cereals
- Loss of Zinc from the body during diarrhoea

Zinc deficiency in children results in:

- Increased risk of diarrhoea, pneumonia and malaria because Zinc deficiency affects the immunity of the body
- Increased severity of diarrhoea – makes episodes of a diarrhoeal illness in a child more severe, last longer and increases the risk of dehydration and other complications
- Impaired growth

Benefits of giving Zinc in a child having diarrhoea are:

- Are more playful during the illness
- Recover faster
- Have reduced amount of diarrhoeal stools.
- Have lesser chances of diarrhoea lasting for>7 days
- Have lesser chances of being hospitalized are less frequently given unnecessary oral and injectable drugs; and cost of care is reduced
- Have lesser chances of getting diarrhoea and pneumonia over the next 2–3 months
- Have substantially increased use of ORS when Zinc and ORS are promoted together, as compared to ORS alone.

Objectives:

- To ensure high coverage of ORS and Zinc use in under-five children with diarrhoea
- Inculcating appropriate behaviour in parents and care givers for diarrhoea prevention and management
- To ensure management of childhood diarrhoea cases at community and facility level as per standard treatment protocol

Strategies:

- The various strategies include:
  - improved availability and use of ORS and Zinc in households having under-five children,
  - facility level strengthening to manage cases of childhood diarrhoea with dehydration and
  - focus on advocacy and communication on prevention and control of diarrhoea during the pandemic.
- Special focus needs to be given to high priority areas like urban slums, flood prone areas, Sub-centres having no ANM, nomadic sites, brick kilns and vulnerable communities such as migrants and street children etc.
- Routine visits of the frontline health workers/ASHAs/ANMs may be utilized for prepositioning of the ORS

- The CHOs of the HWCs should be involved in the capacity building and monitoring of FLWs.

Activities to be Conducted

- Adequate stocking of ORS and Zinc with ASHA, AWW, ANM and health facility up to the sub health centre level
- Distribute 2 ORS packets and a strip of 14 tablets of Zinc to children having diarrhoea
- Explain the process of use of ORS and Zinc
  If the child has diarrhoea, then assess the dehydration status.
- If it is 'no dehydration' diarrhoea, then do home treatment with ORS and Zinc along with following advice:

➢ Give extra fluid, children less than 6 months should be breastfed frequently and for longer period, and those more than 6 months to be given plenty of home available fluids (drinks made of lemon juice, yogurt, soups made of rice and pulses, green coconut water etc.) along with ORS.
➢ Continue breastfeeding/and age appropriate feeding
➢ Inform the caregiver to report if child becomes sicker (not able to drink/breastfeed, fever, irritability, blood in stool etc.).

- If it is 'some dehydration' diarrhoea, then initiate treatment with ORS and Zinc and refer to ANM, also inform ANM over phone.
- If it is 'severe dehydration' diarrhoea, then refer the child to a health facility with child receiving sips of ORS during referral travel.

➢ Counselling on hand washing and nutrition including infant and young child feeding practices and breastfeeding to be done by ASHAs and ANMs during home visits and to walk-in beneficiaries. Mother and Child Protection Card (MCPC) should be used for counselling on diarrhoea prevention and treatment.
➢ Tele-counselling services should be offered to those who are unable to visit facilities and who cannot be contacted through home visits.
➢ For facility level management of childhood diarrhoea cases with dehydration, the Standard treatment protocols should be followed.
➢ The standard treatment protocols should be made available at all levels of facilities including the health and wellness centres.
➢ The sensitisation of the CHOs of the HWCs should also be conducted in the overall programme implementation, facility level treatment protocols and activities related to monitoring and review.

4.3.5 Awareness Generation

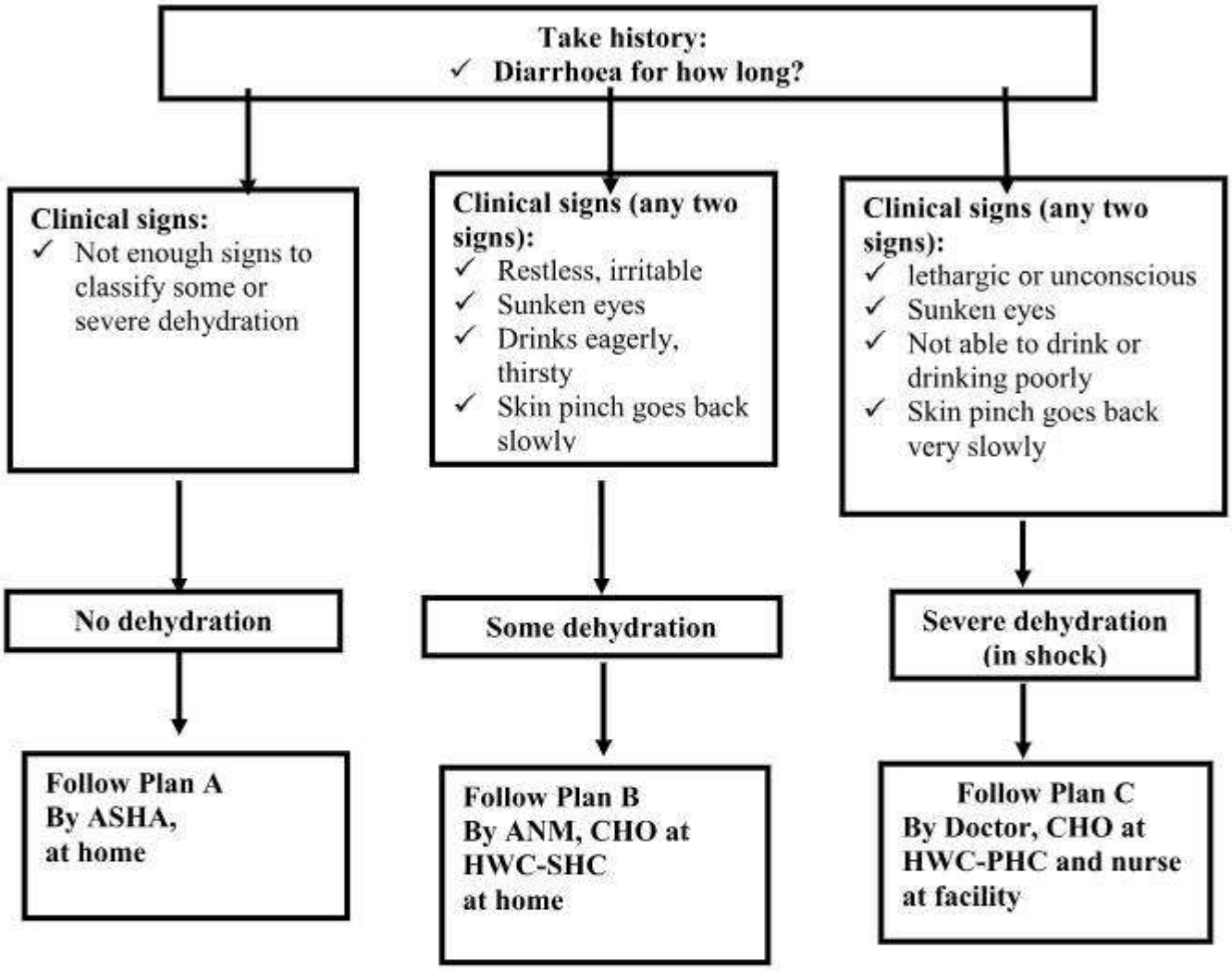
- Awareness generation using various means of communication as per population needs should be undertaken in local language. Television, Radio, Mobile vans, and Digital platforms (WhatsApp, Facebook, Twitter etc.) should be utilized to increase reach of messaging. Social media handles of Chief Minister, Health Minister, and other important personalities may be utilized for this purpose. Encourage people within WhatsApp groups to share their photographs or videos pertaining to them getting ORS / Zinc or following hygienic practices.

4.3.6 Involvement of Development partners and private Health Sector

- Support of various Development Partners working with State governments and involvement of Women and Child Development (WCD), Social Welfare department, Panchayati Raj Institutions (PRIs), Urban Local Bodes (ULBs) and Self-Help Groups (SHGs) should be ensured for implementation and monitoring of the activities, in addition Private Health Sector involvement must be ensured through the professional bodies like IMA, IAP etc.

4.3.7 Classification and Management of Children with Diarrhoea

CLASSIFICATION AND MANAGEMENT OF CHILDREN WITH DIARRHOEA



Treatment for Diarrhoea: (Refer Annexure 4.2(Vol. II))

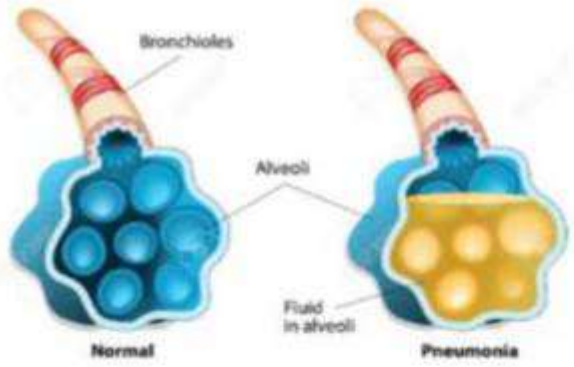
4.4 Acute Respiratory Infection

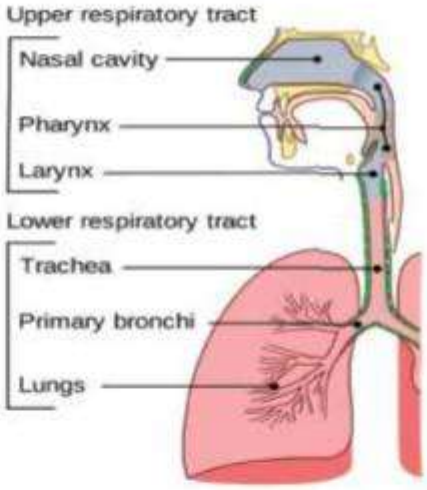
Acute Respiratory Illness

4.4.1 SAANS (Social Awareness and Action to Neutralize Pneumonia Successfully):



Pneumonia is a lung infection caused by bacterial, viral or fungal infection, in which the air sacs(alveoli) at the end of airway tube (bronchioles) as shown below fill with pus and may become solid. The infection interferes with delivery of oxygen from air-sacs into the blood and removal of carbon dioxide from the blood. Childhood Pneumonia is caused by a combination of risk factors related to the host i.e. the child and infecting organisms (microbes). Within the child, low birth weight, malnutrition, non-exclusive breastfeeding (during the first 6 months of life), indoor air pollution, lack of measles, HIB, PCV immunization and concomitant diseases e.g. cleft palate, congenital heart disease, asthma all contribute towards Pneumonia. Pneumonia is inter-changeably used as Acute Lower Respiratory Tract Infection (ALRI) or Acute Respiratory Infections (ARI).





The common signs and symptoms of Childhood Pneumonia are cough, cold, fever, fast breathing and chest indrawing. Bacteria are the major cause of Pneumonia mortality in under 5 children. Streptococcus Pneumonia and Haemophilus Influenzae type b (Hib) are the common cause of bacterial Pneumonia in children beyond 2 months of age. Staphylococcus aureus is another important bacteria, which though less common, can lead to severe and rapidly progressive Pneumonia. In infants under 2 months, gram negative enteric bacilli – Escherichia Coli, Klebsiella spp and gram positive organism like group B Streptococcus are more often incriminated. Respiratory Syncytial Virus is the most common viral cause of Pneumonia and in infants infected with HIV, Pneumocystis Jiroveci is one of the most common causes. At all ages Mycobacterium Tuberculosis should be considered as cause of acute Pneumonia.

Community acquired Pneumonia is an acute infection of lungs, acquired outside of hospital setting. The child should not have been hospitalized within 14 days prior to the onset of symptoms or may have been hospitalized for less than 4 days prior to onset of symptoms.

Childhood Pneumonia continues to be the topmost infectious killer among under 5 children, contributing to 15 percent of under 5 deaths in the country. Around 1.4 lakh children die due to Pneumonia annually in the country.

Pneumonia morbidity & mortality in India

Number of episodes of ARI/Pneumonia every year[1]	30 Million
Incidence Rate (per child per year)[2]	0.22
Severe cases out of total cases	3 Million (10%)
Mortality Rate per 1000 live births[3]	5.7

According to SRS 2017 report, the under 5 mortality is 37/1000 live births and the goal of National Health Policy 2017 is to reduce U5N to 23/1000 live births by 2025. In order to achieve the National Health Policy goals, the Pneumonia mortality needs to reduce to less than 3 per 1000 live births. This is also in tune with the goal of India Integrated Action Plan for Pneumonia & Diarrhoea (IAPPD).

Key facts about Childhood Pneumonia

- Pneumonia deaths are usually clustered in winter months and the worst affected are children from poor socio-economic situations.
- Exposures to household air pollution almost doubles the risk of childhood Pneumonia and is responsible for 45% of all Pneumonia deaths in under 5 children
- In India according to analysis of NFHS4 data, 65% of cases of children suffering from ARI had unclean fuel use (wood/straw/kerosene/coal/charcoal/animal dung).
- Social factors are closely linked to childhood Pneumonia, for example prevalence of ARI cases were found to be 35% more in the lowest wealth quintile as compared to highest wealth quintile.
- Less number of girls were given treatment for Pneumonia compared to boys.
- Birth defects like cleft palate, Congenital Heart Disease etc. are important contributors of recurrent childhood Pneumonia.
- Untreated severe Pneumonia can lead to hypoxia, which is lack of oxygen in the body. Hypoxia causes death among children with Pneumonia.

Protect, Prevent and Treat Strategy for Pneumonia Management in SAANS

- **PROTECT** children by establishing good health practices from birth
  - Exclusive breast feeding for 6 months
  - Adequate complimentary feeding
  - Vitamin A supplementation
- **PREVENT** children becoming ill from pneumonia and diarrhoea
  - Vaccine pertussis, measles, Hib, PCV and rotavirus,
  - Hand washing with soap
  - Safe drinking water and sanitation
  - Reduce household air pollution
- **TREAT** children who are ill from pneumonia with appropriate treatment
  - Improve care seeking and referral
  - Case management at the heath facility and community level
  - Oxygen therapy
  - Continue feeding (including breastfeeding)



The objective of the guidelines is to provide a complete overview of the community and facility based approaches to managing children presenting with symptoms of cough, fast breathing and/or difficulty in breathing due to Pneumonia, at all levels of the health system. These guidelines are specific for children under five years of age.
Children under 5 years of age are managed in 2 age bands i.e. young infants (0-59 days) and Children (2-59 months) as clinical presentation, assessment and treatment differs in two age groups.

Effective case management of Pneumonia includes:

- Early recognition of cases of Pneumonia
- Appropriate use of antibiotics against major causes of bacterial Pneumonia
- Prompt referral of cases of severe Pneumonia and providing pre-referral treatment
- Providing good supportive care including appropriate and effective use of oxygen in health facilities to treat hypoxia which is usually in the causal pathway of Pneumonia related deaths
- Appropriate use of bronchodilators in children with wheeze at health facility and identification of conditions mimicking Pneumonia for their rational therapy
- Recognition of cases that do not have Pneumonia and do not require antibiotics but may benefit from supportive treatment

Algorithm for 0-59 days and 2 months to 59 months children's management

The following section describes management algorithm for Pneumonia cases at community and facility level for age groups 0-59 days and 2 months to 59 months. The existing sub health centres and primary health centres are being transformed to Health and Wellness Centres for providing comprehensive primary health care closer to the families. The HWC are envisaged to provide preventive, promotive, rehabilitative and curative care for RMNCAH+N, Communicable diseases, Non-Communicable diseases, Ophthalmology, ENT, Dental, Mental, Geriatric care, Palliative care, treatment for acute simple medical conditions and emergency & trauma services. This guideline is integrating Pneumonia management and control services through the service delivery framework of HWCs. The team at the HWC includes a Community Health Officer (CHO) trained for 6 months who would serve as the team leader. Other members of the team include the ANM, second ANM or MPW (male), and the ASHAs of the area.

Community and facility based case management of infection in young infants (0-59 davs)

It has been estimated that neonatal infections (sepsis, meningitis and Pneumonia) contribute to 33% of the neonatal deaths. In the second month of life, Pneumonia is the leading cause of child death.

Even though in young infants, it is clinically difficult to differentiate between Pneumonia, sepsis and meningitis, the treatment of these conditions is quite similar and therefore these conditions are grouped as Possible Serious Bacterial Infection (PSBI).

4.4.2 Community And Outpatient Case Management of Young Infant With PSBI

The Primary Health Care providers (ANMs/CHOs/Medical Officers) should assess, classify & treat young infants with Possible Serious Bacterial Infection (PSBI) as given in table below:

Points to Remember While Assessing Young Infants

- Respiratory rate should be measured in all sick young infants. Cough is not an essential criterion for screening of Pneumonia in this age group.
- Respiratory rate should be measured for a full minute. If the respiratory rate is fast i.e. respiratory rate > 60 breaths per minute counted for a complete one-minute period, the rate should be counted for a second time; fast breathing is significant only if second count is also 60 breaths per minute or more. The respiratory rate should be counted when the baby is calm and not crying or being fed.
- Normal young infants often have mild chest indrawing. However, severe chest indrawing is very deep and easy to see and is a sign of severe Pneumonia. In case of doubt, the infant should be observed in a different position, lying flat in the mother's lap or on a bed. Chest indrawing is significant if it is present all the time, in all positions and not only when the child is crying or upset but also when calm and peaceful.

Signs	Classify as	Treatment
Not able to feed **OR** **Convulsions** **OR** **Fast breathing [60 breaths per minute or more]** **OR** **Severe chest indrawing** **OR** **Axillary temperature 37.5°C or above (or feels hot to touch)** **OR** **Axillary temperature less than 35.5°C (or feels cold to touch)** **OR** **Movement only when stimulated or no movement at all**	POSSIBLE SERIOUS BACTERIAL INFECTION	Give first dose of oral Amoxicillin and injectable Gentamicin Treat to prevent low blood sugar (breast feed/age appropriate feed) Warm the young infant if temperature less than 35.5°C(or feels cold to touch) while arranging referral Advise mother how to keep young infant warm on the wayto the hospital. Refer URGENTLY to hospital

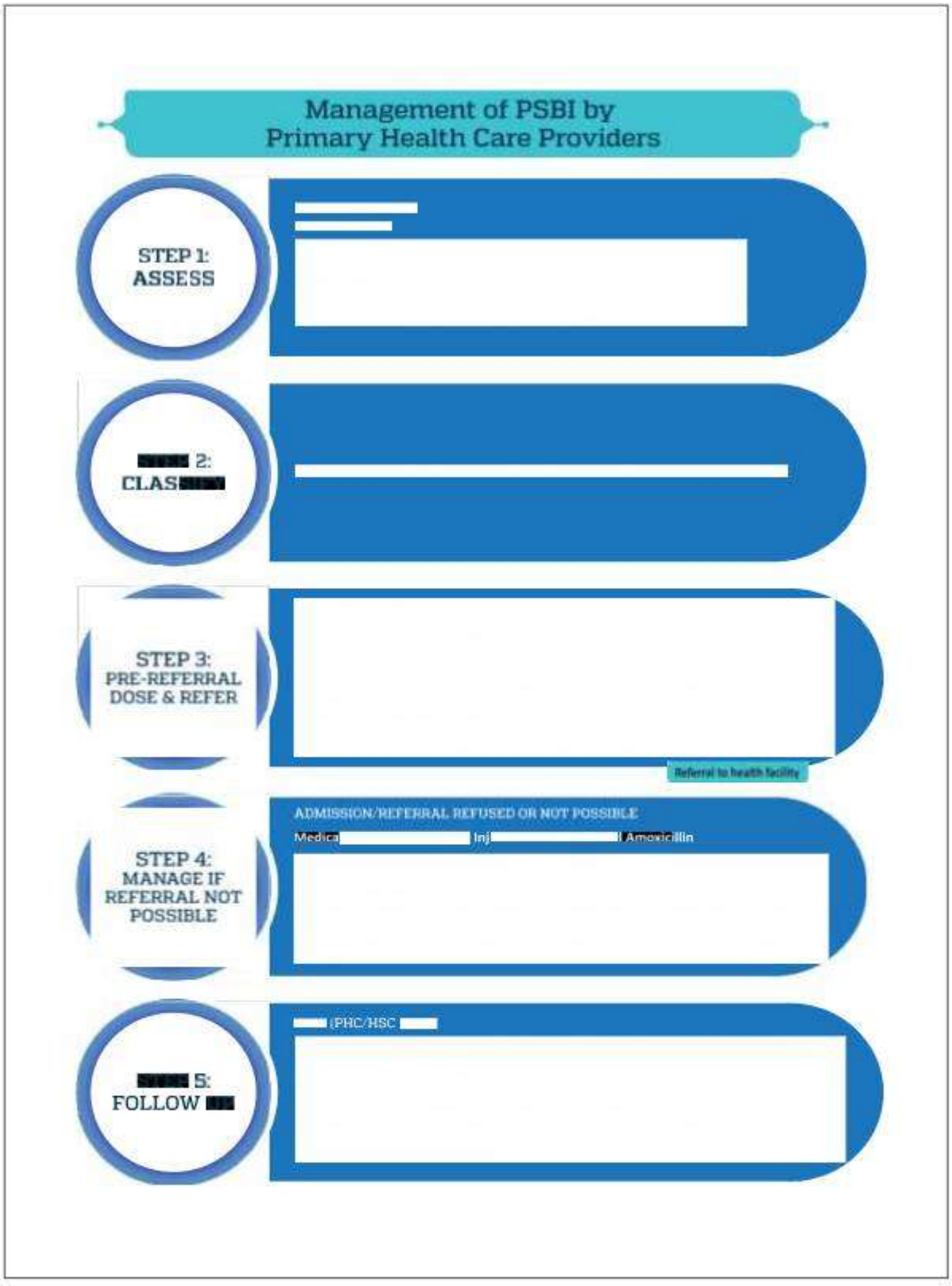
Details of treatment by Primary Health Care Providers (ANMs, CHOs and Medical Officers):
First dose of Oral Amoxicillin and Injectable Gentamycin:

Young Infants weight	Amount of Gentamycin to be given intramuscularly as injection (vial* contains 80mg in 2 ml)	Amount of Amoxicillin to be given per-orally as syrup**(contains 125mg/5ml)	Amount of Amoxicillin to be given per-orally as tablet (contains 250mg)
	Dosage 5mg/kg/dose* once a day	Dosage 25mg/kg/dose** twice a day	
Less than 1.5 kg	To be referred to higher facility		

Above 1.5 kg – upto 2.0 kg	0.2 ml	2 ml	¼
Above 2.0 kg – up to 3.0 kg	0.3 ml	2.5 ml	½
Above 3.0 kg – up to 4.0 kg	0.4 ml	3 ml	½
Above 4.0 kg – up to 5.0 kg	0.5 ml	4 ml	½

Table: Antibiotic Therapy for management of PSBI- Pre-referral dose or where referral is not feasible (0-2 months)

- Warm the young infant by skin to skin contact with mother/caregiver if temperature is less than 35.5 degree Celsius (or feels cold to touch) while arranging referral and during transport.
- Treat to prevent low blood sugar:
  - If the child is able to breastfeed: Ask the mother to breastfeed the child.
  - If the child is not able to breastfeed but is able to swallow: Give 20-50 ml (10 ml/kg) expressed breastmilk or locally appropriate animal milk (with added sugar) before departure. If neither of these is available, give 20-50 ml (10 ml/kg) sugar water.
  - To make sugar water: Dissolve 4 level teaspoons of sugar (20 grams) in a 200-ml cup of clean water.
- Make all efforts to ensure that a young infant with PSBI is referred for admission to the nearest health facility for appropriate treatment after giving the first dose/pre-referral doses of Injection Gentamicin & Syrup Amoxicillin.
- In case referral is refused by caregivers or is not feasible, management of illness should be done using oral Amoxicillin & injection Gentamicin for 7 days by Primary Health Care providers.
- ASHA during her home visits will identify young infants with PSBI and refer them to ANM/Medical officer for further management. She will also follow up young infants to ensure completion of antibiotic treatment.



4.4.3 Facility Based Management of Young Infants With PSBI

Pneumonia in 0-59 days children is difficult to diagnose as the clinical presentation is non-specific & often overlaps with septicaemia. Even though it is clinically difficult to differentiate between severe Pneumonia, septicaemia & meningitis, the treatment of these conditions is quite similar.

Clinical classification of sick young infants aged 0 to 2 months:

Clinical category	Essential feature
Possible serious bacterial infection — (pneumonia, septicaemia or meningitis)	- Not able to feed or convulsions or - Fast breathing (Respiratory rate > 60 per minute) or - Severe chest indrawing or Axillary temperature >= 37.5 degree Celsius (or feels hot to touch) or - Axillary temperature < 35.5 degree Celsius (or feels cold to touch) or Movement only when stimulated or no movement at all

The steps for management of PSBI/Pneumonia in young infants admitted in health facilities are:

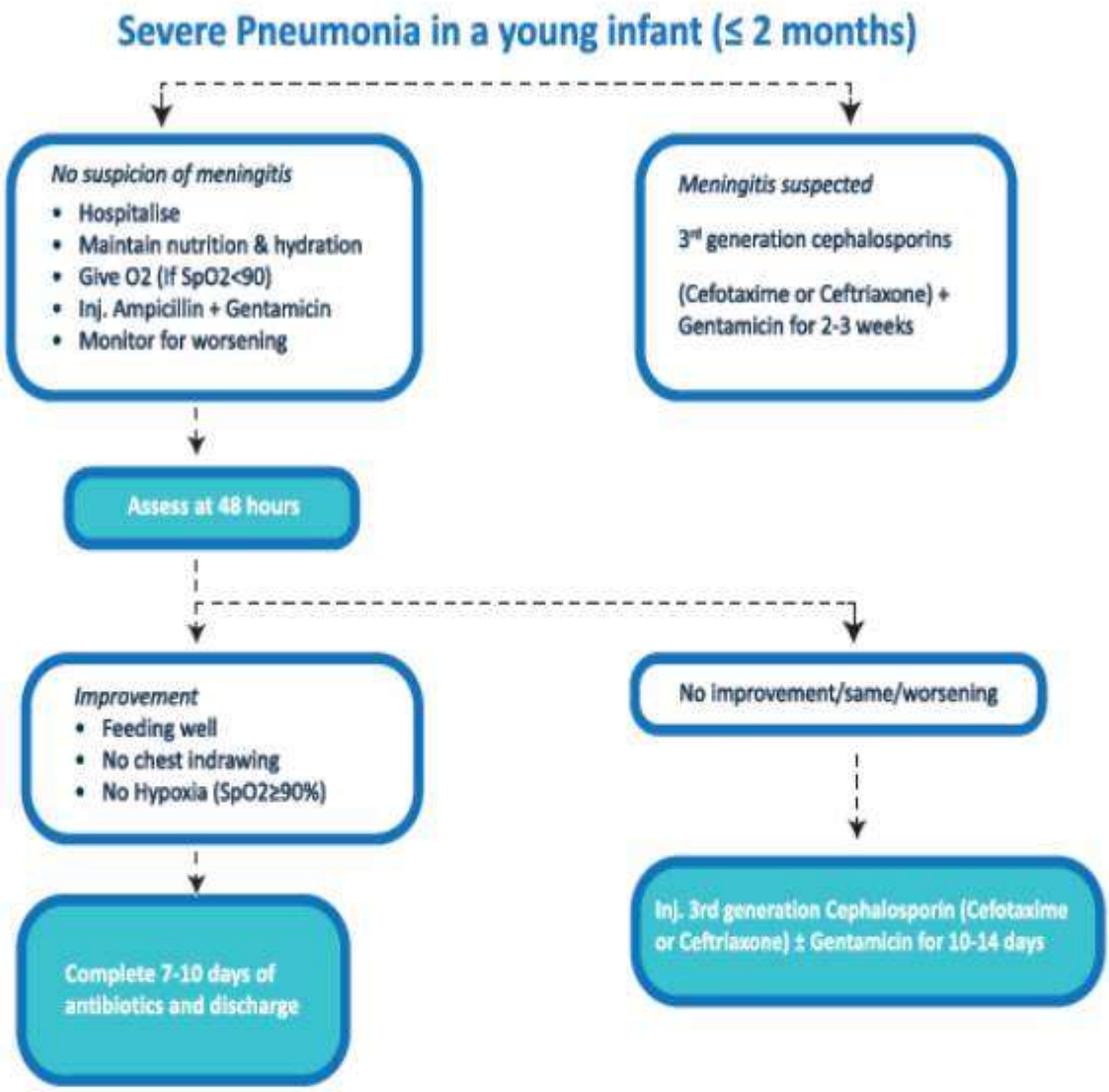
- Injection Ampicillin and Gentamicin is used as initial treatment. In case there is suspicion of concomitant meningitis, a combination of injection Cefotaxime and Gentamicin should be used instead.
- Oxygen should be given where required (presence of cyanosis, grunting, severe respiratory distress i.e. RR > 70/bpm, SpO2 < 90%).
- The infant should be kept warm.
- Breast-feeding should be continued to prevent hypoglycaemia. If the infant is unable to suck, he should be given expressed breast milk. Infants on oxygen should be given intravenous fluids until the infant is able to take it orally.

Table: Antibiotic Therapy for Pneumonia/Sepsis in Infants < 2 Months

Antibiotic	Each Dose (mg/kg/dose)	Frequency		Route	Duration (Days)
		< 7days age	**> 7days age**		
Inj. Ampicillin*	50	12 hourly	8 hourly	IV, IM	7-10
And Inj. Gentamicin	5	24 hourly	24 hourly	IV, IM	7-10
Inj. Amikacin	15	24 hourly	24 hourly	IV, IM	7-10

*If concomitant meningitis is suspected, the drugs should be given IV and Inj. Cefotaxime 50 mg/kg IV 8 hourly is usedinstead of Ampicillin. The total duration of therapy in meningitis is 2-3 weeks.

In case of suspected staphylococcal infection, Injection Cloxacillin 50mg/kg 8 hourly is to be added to the regime.



Flow Chart: Management of PSBI

4.4.4 Community And Facility Based Case Management in Children (2-59 Months)

Management protocol for children (2 months to 59 months of age) with cough and/or difficulty in breathing by ASHA:

ASHA worker being a community mobilizer would assess and classify children with cough and/or difficult breathing using the classification table given below and the MCP card. ASHA would refer the children with classification of very severe disease/severe Pneumonia and Pneumonia to the appropriate health facility after giving first dose (pre-referral) of Oral Amoxicillin. In case of children with 'No Pneumonia', ASHA would counsel on home care. ASHA will also follow up children discharged from health facilities.

Fast Breathing

The respiratory rate is a valuable clinical sign for identifying Pneumonia among children who are coughing and breathingfast. Respiratory rate should always be counted for full 1 minute when the baby is calm and not feeding. A respiratory rate of over 50 breaths per minute in children between 2 months to 1 year and over 40 breaths per minute in children 1 to 5 years of age is called as fast breathing and this simple clinical sign is used by the health worker to identify likely cases of Pneumonia in the community.

Lower Chest Indrawing

Lower chest wall indrawing is a definite inward movement of the lower chest wall on breathing in. This identifies cases with severe disease in which lungs become stiffer. It is important to point out that the definition of chest indrawing does not include intercostal or supraclavicular retractions in which the soft tissue between the ribs or above the clavicle goes in when the child breathes. A child with chest indrawing may not have fast breathing because the respiratory rate can fall when Pneumonia becomes severe and the child is exhausted.

Pulse oximetry is an important tool to identify children with co-existent hypoxemia (SpO2<90%) and should be at least available up to the level of HWCs.

Signs	Classify As	Management by ASHA
- General danger signs (inability to breastfeed or drink, lethargy or reduced level of consciousness, convulsions) Or - Chest indrawing	Severe Pneumonia Or Very severe disease	- Give pre-referral dose of Oral Amoxicillin - Refer urgently to health facility
- Fast breathing: (Respiratory rates: 2-11 months>=50/min 12-59 months>=40/min	Pneumonia	- Give pre-referral dose of Oral Amoxicillin - Refer urgently to health facility
- No signs of severe Pneumonia or Pneumonia	No Pneumonia/ Cough or cold	- Advice home care for cough and cold - If coughing for more than 14 days, refer for assessment

Dosage of Amoxicillin for Pneumonia

AGE or WEIGHT	Amount of Amoxicillin to be given per-orally as syrup (contains 125 mg per 5 ml)	Amount of Amoxicillin to be given per-orally as a tablet (contains 250 mg)
2 months up to 4 months (4 to < 6 kg)	5 ml	½
4 months up to 12 months (6 kg to < 10 kg)	10 ml	1
12 months up to 3 years (10 kg to < 14 kg)	15 ml	1 ½
3 years up to 5 years (14 kg to < 20 kg)	-	2

Home Care for cough and cold

Children having no signs of either Pneumonia or severe Pneumonia are classified as 'NO PNEUMONIA' and worker will advise on home care.

- An infant below 6 months who is exclusively breast fed should not be given any home remedy.

- Breast-feeding should be continued. The mother is advised to continue feeding the child during the illness.
- Mother is advised to give home available fluids as much as the child would take. This would help in the relief of cough.
- The mother is advised to give the child a safe homemade soothing cough remedy if the child is more than 6 months of age like honey, tulsi, ginger, herbal concoctions and other safe home remedies. Avoid cough syrups.
- The mother is advised to keep the nose clean by putting in nasal drops (boiled and cooled water with salt mixed in it) and by cleaning the nose with a soft cotton cloth. Mothers can also prepare saline nasal drops at home by adding 1/2 teaspoon of common salt (2.5 gm) to 250 ml (1 glass) of clean drinking water. Fresh solution should be prepared daily.
- The mother should also be advised on how to give drugs at home.
- She should look for signs of worsening of illness, like child becomes sicker or is not able to drink or breastfeed, fast breathing, difficult breathing or if child develops fever. If any of these signs appear, mother should immediately contact ASHA or ANM for referral to the nearest health facility.

Management protocol for children (2 months to 59 months of age) with cough & or difficult breathing by ANM

The ANM, based on the assessment for danger signs like respiratory rate and chest indrawing will classify these children into action-oriented categories.

General Danger Signs

- Not able to breastfeed/drink
- Vomits everything
- Convulsions
- Lethargy or reduced level of consciousness

Presence of any one of the general danger signs mandates quick assessment, pre-referral treatment and urgent referral to a hospital.

The ANM based on the assessment for danger signs, respiratory rate and chest indrawing will classify these children into action oriented categories as given in table below.

Signs	Classify As	Management by ANM
- General danger signs (inability to breastfeed or drink, lethargy or reduced level of consciousness, convulsions) **Or** **- Chest indrawing**	Severe Pneumonia Or Very severe disease	- Give pre-referral dose of Oral Amoxicillin & IM Gentamycin - Refer urgently to hospital
- Fast breathing: (Respiratory rates: 2-11 months>=50/min 12-59 months>=40/min)	Pneumonia	- Give Amoxicillin for 5 days - Advice home care for cough and cold - Follow up in 2 days*
- No signs of severe Pneumonia or Pneumonia	No Pneumonia/ Cough or cold	- Advice home care for cough and cold - If coughing for more than 14 days, refer for assessment

*For fast breathing Pneumonia, ANM to start oral amoxicillin and instruct for follow up in 2 days preferably at Health and Wellness centre. The Community Health Officer (CHO) will reassess the case and use pulse oximeter to decide on further course of action in consultation with Medical Officer (PHC). If the child is improving, then 5 days therapy is to be completed. However, if the child's condition is same or worsened, child should be referred to the next higher level facility. In case the Health and Wellness centre is yet to be functional, ANM assesses the cases after two days of antibiotic therapy and follows up under supervision of Medical Officer for further course of action. If the condition of child is same or improved, complete the five days course of Amoxicillin and in case the condition of the case deteriorates, refer for indoor facility management. If referral is not feasible or refused, manage with oral Amoxicillin and injection Gentamicin for 7 days with daily assessment.

Table: Dosage of Amoxicillin for Pneumonia and Pre-referral dosage of antibiotics for very severe disease/severe Pneumonia

AGE or WEIGHT	Amount of Gentamicin to be given intramuscularly as Injection (vial* contains 80mg in 2 ml)	Amount of Amoxicillin to be given per-orally as Syrup (Contains 125mg/5ml)	Amount of Amoxicillin to be given per-orally as tablet (Contains 250mg)
2 months up to 4 month (4kg to < 6 kg)	0.5 – 1.0 ml	5 ml	½
4 months up to 12 month (6kg < 10 kg)	1.1 – 1.8 ml	10 ml	1
12 months up to 3 years (10kg to < 14 kg)	1.9 – 2.7 ml	15 ml	1 ½
3 years up to 5 years (14kg to < 20 kg)	2.8 – 3.5 ml	-	2

Management protocol for children (2 months to 59 months of age) with cough & or difficult breathing by Community Health Officer (CHO) at Health and Wellness Centres (HWCs)

The case management process is similar to ANM and the CHO in addition assesses children for wheeze.

Signs	Classify As	Management by ANM
- General danger signs (inability to breastfeed or drink, lethargy or reduced level of consciousness, convulsions) Or - Chest indrawing	Severe Pneumonia Or Very severe disease***	- Refer urgently for hospitalization after pre-referral dosage of oral Amoxicillin & IM Gentamicin - Give oxygen if saturation < 90%, while arranging referral*
- Fast breathing: (Respiratory rates: 2-11 months>=50/min	Pneumonia	- Give oral Amoxicillin for 5 days in consultation with MO PHC - Treat wheeze if present**

12-59 months>=40/min)		- Advice home care for cough and cold - Advice mother when to return immediately - Follow up after 2 days
- No signs of severe Pneumonia or Pneumonia	No Pneumonia: Cough or cold	- Advice home care for cough and cold - If coughing for more than 14 days, refer for assessment - Follow up after 5 days if not improving

*If oxygen saturation < 90%, refer as Severe Pneumonia or Very Severe Disease
**If the child has wheezing, give 3 doses of nebulized salbutamol for 20 minutes; or 2-4 puffs of salbutamol MDI (at a gap of 2-3 min between each puff) with spacer repeated every 20 minutes and if there is improvement continue bronchodilators under monitoring
*** If referral is not feasible or refused, manage with oral amoxicillin twice a day and injection gentamicin once a day for 7 days in consultation with MO PHC and daily assessment (see table 4)

Management protocol for children (2 months to 59 months of age) with cough and/or difficult breathing by Medical Officer

The case management process is similar and the physicians in addition, assess children for stridor and wheeze. (They can use a stethoscope as wheezing is better heard with a stethoscope)

If the child has wheezing and either fast breathing or chest indrawing, they need to perform an additional assessment by giving a trial of rapid acting inhaled bronchodilator for up to three times 15 - 20 minutes apart. They need to reassess the child and then classify the problem. In addition, doctors should also use pulse oximetry to identify children with co-existent hypoxia (SpO2 < 90%).

Signs	Classify As	Management
- General danger signs (inability to breastfeed or drink, lethargy or reduced level of consciousness, convulsions) **- Stridor in calm child**	Severe Pneumonia Or Very severe disease	- Hospitalize - Give oxygen if saturation < 90% - Manage airway - Give recommended antibiotics
- Chest indrawing **or** **- Fast breathing:** **(Respiratory rates:** **2-11 months>=50/min** **12-59 months>=40/min)**	Pneumonia	- Give Oral Amoxicillin for 5 days - Treat wheeze if present* - Advice home care for cough and cold - Advice mother when to return immediately - Follow up after 2 days
- No signs of severe Pneumonia or Pneumonia	No Pneumonia	- Advice home care for cough and cold - If coughing for more than 14 days, refer for assessment

		- Follow up after 5 days if not improving
***If the child has wheezing, give 3 doses of nebulized salbutamol for 20 minutes; or 2-4 puffs of salbutamol MDI (at a gap of 2-3 min between each puff) with spacer repeated every 20 minutes**		

4.4.5 Facility Based Management (In-Patient) of Severe Pneumonia In Children 2 months - 5 Years of age

- Severe Pneumonia is defined as cough or difficult breathing in a child with at least one of the following conditions:
  - Central cyanosis or Oxygen saturation < 90%
  - Severe respiratory distress (Laboured of very fast breathing {Respiratory Rate >70 per minute} or severe lower chest indrawing or head nodding or stridor or grunting)
  - Signs of Pneumonia with general danger sign (inability to breastfeed or drink, lethargy or reduced level of consciousness or convulsions)

Such children are very hypoxic and need urgent treatment and oxygen therapy. They often cannot take it orally and therefore need to be given intravenous fluids and parenteral antibiotics.

- Give antibiotics:
  - Ampicillin 50 mg/kg or Benzyl penicillin 50000 U/kg IM or IV every 6 hours.
  - Gentamicin 7.5 mg/kg IM or IV once a day.
- Give Cloxacillin or Amoxicillin + Clavulanic acid if Staphylococcal infection is suspected (presence of skin pustules/boil)
- Give Ceftriaxone with Vancomycin in case of septic shock.
- If the child does not show signs of improvement within 48 hours, switch to Gentamicin 7.5 mg/kg IV once a day combined with ceftriaxone 100 mg/kg IV in two divided doses or Cloxacillin 50 mg/kg IV 8 hourly.
- Shift to oral drugs as soon as the child is able to take it orally, except those with shock or complicated Pneumonia, where longer parenteral therapy is advised.
- Total duration of antibiotics in severe Pneumonia:
  - Clinical response within 48 hours: 7 days
  - Clinical response after 48 hours: 10 days

Oxygen therapy

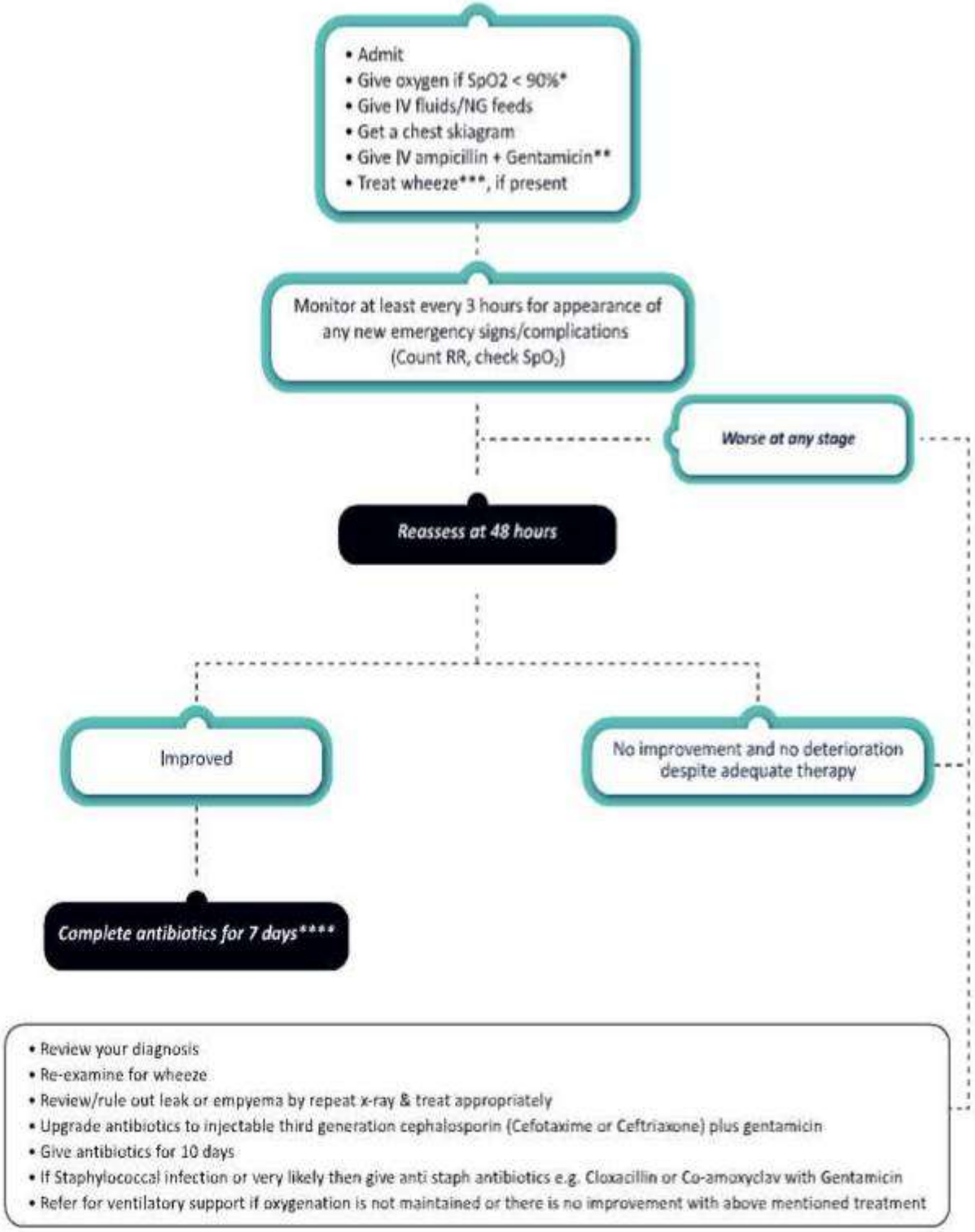
- Give oxygen to all children with oxygen saturation < 90% (< 94% if they also have other emergency signs like shock etc).
- Use nasal prongs as the preferred method of oxygen delivery to young infants; if not available, a nasal or nasopharyngeal catheter may be used.
- Use a pulse oximeter to guide oxygen therapy (keep oxygen saturation > 90%). If a pulse oximeter is not available, continue oxygen until the clinical signs of hypoxia (such as inability to breastfeed or breathing rate >= 70/min) are no longer present.

Tuberculosis: Consider the possibility of tuberculosis in a child with Pneumonia if:

- Child has unremitting fever and cough for more than 2 weeks and cause of fever cannot be found.
- Contact with a pulmonary TB case.
- Lack of response of respiratory symptoms and signs to broad-spectrum antibiotics.
- Weight loss or failure to thrive.

The following flow chart summarizes the steps for management of Severe Pneumonia cases admitted in the health facilities by a Paediatrician or trained medical officer.

Management of Severe Pneumonia cases (2-59) months admitted in health facilities



*<94% in presence of other emergency signs

**If staphylococcal infection is suspected, give anti-staph antibiotics like cloxacillin and gentamicin in case of severe pneumonia with septic shock consider ceftriaxone and vancomycin

*** In case the child improves significantly with bronchodilator therapy, review the

diagnosis

****Shift to oral drugs as soon as the child is able to take orally

Pneumonia in a child with severe acute malnutrition

Pneumonia is not only more common, but is also more likely to be fatal in children with severe acute malnutrition. Clinical presentation is less specific and may overlap with sepsis.

- The child should be admitted and be treated as a case of severe Pneumonia even though they may not have chest indrawing or signs of severe respiratory distress. Severely malnourished children sometimes can have Pneumonia without fast breathing though will have other signs of respiratory distress like accessory muscle use and nasal flaring.
- Inj. Ampicillin and Gentamicin is the antibiotic of choice. The antibiotics are to be given for 7-10 days. Inj. Cloxacillin should be added whenever there is suspicion of staphylococcal infection.
- Management of severe acute malnutrition i.e. maintaining temperature, prevention and treatment of hypoglycaemia and appropriate feeding is essential.
- Pulmonary tuberculosis and HIV should be a diagnostic consideration if the patient does not show expected response.

Summary Algorithm for management of Pneumonia:

Summary Algorithm for Management of 0-59 days children with PSBI

	ASHA	ANM	CHO	MEDICAL OFFICER
PSBI	Refer	**Community and OPD** - Refer after pre-referral dose of Amoxicillin and Gentamicin - Manage with oral Amoxicillin and Gentamicin if referral not possible	**In OPD:** - Refer after pre-referral dose of Amoxicillin and Gentamicin - Manage with oral Amoxicillin and Gentamicin if referral not possible	**In OPD:** - Refer after pre-referral dose of Amoxicillin and Gentamicin - Manage with oral Amoxicillin and Gentamicin if referral not possible **In patient:** - Hospitalize and treat

Summary Algorithm for management of 2-59 months children with cough and /or difficult breathing

	ASHA	ANM	CHO	MEDICAL OFFICER
Severe Pneumonia/ very severe disease	Refer after pre-referral dose of Amoxicillin Refer	Refer after pre-referral dose of Amoxicillin & Gentamicin Refer	Refer after pre-referral dose of Amoxicillin & Gentamicin	Hospitalize & treat
Pneumonia	Pre-referral dose of	Treat with Amoxicillin	Treat with Amoxicillin in	Treat with Amoxicillin

	Amoxicillin Refer		consultation with MO PHC	
No Pneumonia	Home care	Home care	Home care	Home care

4.5 Navsanjeevani Yojana

Tribal population stays in remote, hilly and difficult to reach areas of the state. They do not have interaction with modern world and utilization of health services is poor. Infection load, poor nutrition and indifference towards modern health facilities are important factors for poor health condition of tribes. This has resulted in high proportion of Protein Energy Malnutrition, vitamin deficiency disorders, high infant and childhood mortality and overall, less productivity. Tribal development department and health department is implementing number of schemes for tribal areas. Majority of these are grouped under Navsanjeevani Yojna which started on 1st May 1995. Maharashtra state has 15 tribal districts. All the schemes under Navsanjeevani Yojna are implemented in these tribal districts. Medical Officers working in tribal area must understand the scheme and implement it effectively to reduce maternal and child morbidity and mortality.

4.5.1 Schemes under 'Navsanjeevani Yojana' Matruva Anudan Yojana:

Govt of Maharashtra introduced this scheme in Trible (Navsanjeevani) district in Maharashtra from 25 June 1995 to get sufficient nutrition during ANC and PNC period. Trible ANC mother will get Rs 400 in cash or through direct benefit transfer and ANC mother will get Rs 400 in the form of medicine. ANM and HA(F) will have to keep all the record and submit it to PHC clerk, and after approval from MO clerk should transfer the money in ANC mother's account.

Matrutwa Anudan Yojana

This scheme is being implemented in all fifteen tribal districts of the state.

Importance of scheme

Pregnant women in tribal area do not attend health centres regularly for health check-up during pregnancy. This results into man y avoidable pregnancy and delivery related complications. Low birth weight is most important contributing factor for high infant mortality in tribal areas. Poor nutrition and hard work during last trimester of pregnancy are important causes of low birth weight.

Regular checkup during pregnancy, adequate diet and consumption of IFA, multivitamin, protein preparations and rest during pregnancy, particularly during last trimester are crucial to avoid pregnancy complications and birth of Low Birth Weight babies.

Regular visit of mother to health centre during last trimester is essential to recognize pregnancy related complications and their timely management. Therefore, to motivate tribal mothers for health check up during pregnancy, to follow the advice of MO during pregnancy and post-natal period, Matrutwa Anudanis given to pregnant women.

Important aspects of scheme

Monetary benefit

This benefit is given only up to 2 live births and 3rd (current) pregnancy.

Rs. 800/- sanctioned for each eligible mother.

- Out of this, Rs. 400 is given through DBT to beneficiary when admitted for Delivery in Health Institute & remaining is in the form of medicines. *(Ref.- GR dated 1 August 2009)*

Medicines provided under the scheme

- IFA tablet during ANC for 6 months from second trimester.
- Tab. Calcium Lactate during ANC for 6 months from second trimester
- Tab. Albendazole

Implementation of scheme

At PHC level

- Request DHO for advance and medicines required for Matrutva Anudan
- Calculate number of ANCs in each sub centre area of PHC.
- Describe the scheme carefully to all the PHC staff. Make sure that all ANMs have understood the criteria of inclusion of mother in Matrutva Anudan Yojna.
- Medicines under this Yojana should be given during health check-up. Do not call mother separately for medicine and check-up.
- Keep one register indicating anudan distribution to each eligible mother of anudan distribution.

At Sub-Centre level

- It is responsibility of MPW (M/F) and CHO to implement Matrutwa AnudanYojna.
- Understand the scheme completely, particularly criteria for inclusion of mother, payment schedule, instructions to be given while giving medicines.
- Submit account detail of eligible pregnant women without fail to MO at the end of month during MIS meeting.

Honorary doctors scheme (Flying squads)

Though population of PHCs is around 20,000 in tribal areas, many padas are far away from PHCs due to low population density. Honorary doctors are appointed for such remote places in tribal areas to improve the access of health services to tribal population. They are appointed for the period of 11 months with honorarium of Rs. 40000/- per month (Rs.22000 under Navsanjeevani scheme + Rs.18000 through NHM). Reappointment as per their performance and need of scheme.

Implementation of scheme

- Honorary doctors are appointed by CEO-ZP and they work under MO PHC.
- Insist honorary doctor to stay at headquarter. This is responsibility of PHC MO.
- Headquarter of honorary doctor should be such a place which is difficult, interior village of underserved or unserved area with high IMR/MMR, more malnourished children, epidemic in last 3 years.
- They should ensure ANC services to all mothers, identification of high risk mother and referral service if needed, ensure Institutional Deliveries, PNC services, conduct OPD in Villages, examine SAM, MAM children, other patients & biological examination of potable water and water sources.
- Meet Sarpanch and other community leaders and inform them about honorary doctor scheme for maximum utilization of the scheme.
- Be sure that sufficient medicine is always available with the honorary doctor.
- Regularly check the prescription pattern, clinical examination notes of honorary doctor to see whether treatment given is as per guidelines.
- Honorary doctors are provided with vehicle & medicines.
- Flying squads is composed of one Honorary doctor, 1 MPW-M and 1 Non-technical worker from other than Health department.

4.5.2 Responsibilities of MO in tribal area:

Survey before rainy season

MO should visit all tribal villages, before rainy season & should carry complete health check-up in that area.

Ensure that

- PHC staff stays at HQ.
- All staff has sufficient medicines and this should be personally verified by MO every month.
- Health workers and MOs should work in team with participation of local community.

Water supply & sanitation

Visit all the Gram Panchayats and check whether required quantity of TCL is purchased and water chlorination is done daily. Train Gram Sevak and the person responsible for water supply regarding important aspects of chlorination, OT test, TCL storage, record keeping etc.

- Check whether PHC staff is regularly taking OT test and collecting water samples of all water sources for each village.
- In case of contaminated water samples, immediately advice Gram Panchayat about corrective measures.

Anganwadi check up

- Visit all Anganwadis & perform health check-up of all children below 6 years regularly. Similarly, all antenatal mothers & postnatal mothers delivered recently should be examined & treated accordingly.

Treatment of severely malnourished children

- Hospitalize all SAM children & all seriously ill children irrespective of their nutritional status & treat them accordingly. For loss of wages of accompanying parent of Children admitted in NRC, provision of Rs. 300/day has been made.

Management of LBW babies

- Provision has been made for warm rooms & KMC for management of LBW babies at PHC.

Training

- Conduct training of all PHC staff, AWWs and honorary doctor s regarding treatment of fever, dehydration, minor ailments and water supply surveillance preferably during second week or May.
- Identify dais in area, train them and get all the ANC services regularized with the help of these trained dais.

4.6 Rashtriya Bal Swasthya Karyakram (RBSK)

The Rashtriya Bal Swasthya Karyakram (RBSK) program is an initiative launched by the Ministry of Health and Family Welfare, Government of India under the National Health Mission.
RBSK aims at early detection and management of the '4Ds' (Defects at Birth, Diseases in Children, Deficiency Conditions and Developmental Delays Including Disabilities) prevalent in children. Health screening of children is a known intervention under School Health Programme. It covers all children from birth to 18 years of age. Thus, it is being expanded up to delivery points and nearest FRUs.

Targeted age group

Sr. No.	Categories	Age Group
1	Babies born at Public Health Facilities and homes	0 to 6 weeks
2	Preschool children	6 weeks to 6 years
3	School going children	6 to 18 years

Responsibilities of ASHA under Child Health Screening and Early Intervention Services-

- Identify birth defects among 0-6 weeks old babies through home visits
- Provide help to mothers for early stimulation of children of 0-6 weeks
- Explain the screening programme to parents/caregivers of children up to 6 years and to mobilize them
- to attend the screening camps by the dedicated mobile health team at local Anganwadi Centers.
- Help parents in referral services, if required.

Referral Services- RBSK Mobile Health Teams screen Anganwadi and School children from 6 weeks to 18 years for identification of '4 Ds'. Diseased children are immediately referred to nearest health facility as per treatment required. Minor illness and deficiencies are treated on the time of screening process where other conditions are referred to the hospital for further investigations and treatment. Some of minor illnesses are being treated at PHC level. Also, children are referred to PHCs for investigations and diagnostic purpose.

Newborn Screening

Rashtriya Bal Swasthya Karyakram (RBSK) is an initiative to protect and promote child health which seeks to put together a systematic approach towards child health screening and early intervention. Defect at birth is one of the major components of 4Ds which may affect quality of life of a child. Defects at birth can be differentiated as visible birth defects, functional defects and metabolic defects. Visible birth defects and functional defects can be identified through simple screening and screening tests eg. ROP, 2D Echo, OAE screening, etc. But metabolic defects need blood investigations to detect the defect followed by early intervention.

Responsibilities of Medical Officer/Staff Nurse under newborn screening and referral services-

- Promote institutional deliveries
- Primary newborn screening of every child delivered in the institute
- Identify & notify visible birth defects
- Refer identified babies to nearest secondary/ tertiary care hospital for early intervention
- Train staff for identification of VBDs
- Follow-up of referred children
- Coordination with RBSK team and DEIC for early intervention of identified children

4.7 Nutrition & Integrated Child Development Scheme

4.7.1 Breast-feeding

Exclusive breastfeeding is a well recognized no cost infant and child survival intervention. Breast fed infants have better nutritional status and lower rates of morbidity and mortality. Breast milk

not only provides essential nutrients for first six months of life, but also protects the child against infections.
World Health Organization recommends exclusive breast-feeding for first 6 months of life. Baby Friendly Hospital Initiative aims at promoting successful breastfeeding in health facilities where deliveries take place.
From 6 months of age, introduction of complementary food is necessary to meet the nutritional needs of infants. However, in majority of children complementary food is delayed and even if introduced at appropriate age, is often insufficient in nutrients.

4.7.2 Strategies

- Promote breastfeeding by involving all healthcare workers including, AWWs, ANMs, village practitioners, male workers etc. Involve panchayats, self help groups, opinion leaders, NGOs & give specific and uniform message (like exclusive breast feeding for 6 months)
- Promote immediate successful breastfeeding in delivered mothers at all facilities, including PHCs and promotion of kangaroo mother care (KMC)
- Train ASHAs, AWWs, ANMs, LHVs, male workers, pada workers, as well as private practitioners in lactation and feeding counselling techniques.
- Inform mothers about harmful effects of breast milk substitutes & feeding bottles.
- Promote appropriate and adequate complementary feeding. Counsel regarding solid foods; emphasize calorie density; promote culturally acceptable, low cost, balanced, locally available infant foods (list locally available infant foods for counselling).
- Promote hand and personal hygiene practices to prevent infections during feeding.

4.7.3 Malnutrition in children

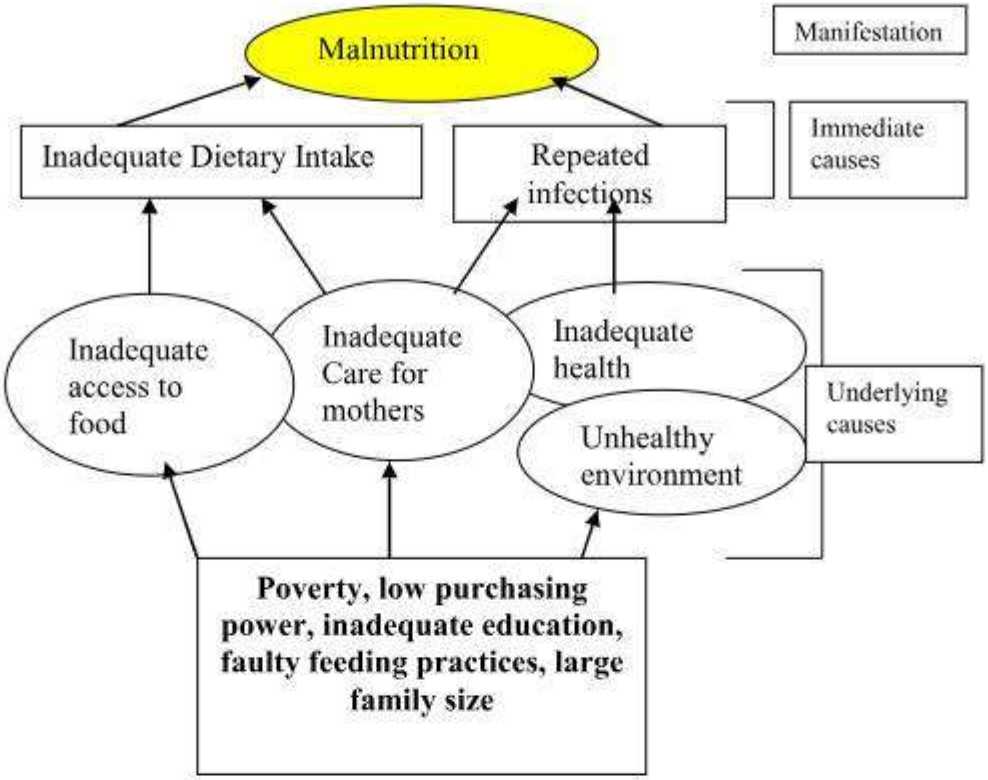
The literal definition of 'malnutrition' includes not only two extremes in terms of weight i.e. under-weight and obesity, but also various clinical conditions resulting from deficiencies and excesses of vitamins and minerals.

However, in the context of rural area, 'malnutrition in children' refers to the clinical complex of 'Protein-Energy Malnutrition' (PEM). PEM in children is never purely calorie or protein deficiency but often is accompanied by other mineral and vitamin deficiencies & is an important public health problem, as well as the commonest clinical condition that a health practitioner comes across. It significantly contributes to individual morbidity and under-five mortality rate. Therefore, MO must know about causation and management of this problem.

Despite improvements in health and well being, malnutrition remains a silent emergency in India, where more than half of all children under the age of five are malnourished, 30 percent of newborns are significantly underweight and 60 percent of women are anaemic.

Causes of malnutrition

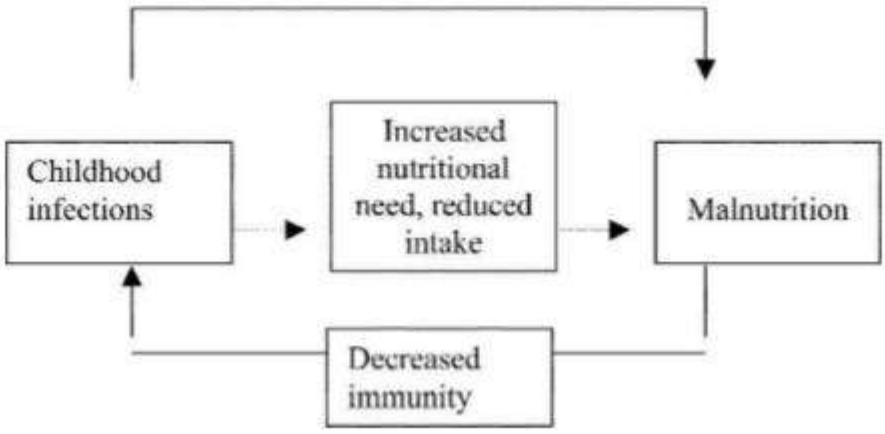
Causation of PEM is a complex phenomenon. Poverty along with inadequate childcare and faulty feeding practices contribute to the problem. Lack of environmental sanitation plays important role in repeated infections among children, which lead to negative energy balance through increased demand combined with reduced intakes. Size of family decides the sharing of food among existing siblings.
Children in age group of six months to two years are extremely vulnerable to develop malnutrition. During this period quantity of breast milk starts becoming inadequate compared to the growth needs. Child starts mouthing any object that it holds increasing exposure to infections. If supplementary solid feeding is not initiated child can easily slip in to PEM.



Malnutrition is the single most important underlying factor in infant and under-five mortality. Risk of death due to common childhood illnesses like diarrhoea and respiratory infections is doubled for mild, tripled for moderate and ten-times more for severely malnourished child. Due to suppressed immunity, incidence, duration and severity of illness increase with associated malnutrition.

Several of these negative factors often coexist and set up vicious-cycle that perpetuates the poor nutritional status in a child. The vicious cycles is-'common childhood infectious diseases leading to increased need combined with reduced intake that cause malnutrition; and malnutrition itself leads to decreased immunity causing repeated infections!'

Vicious cycle of Malnutrition & Infection



Effects of Malnutrition

- Malnourishment significantly lowers cognitive development and learning achievement during preschool and school years and subsequently result in lower productivity.
- Nutritional anaemia is implicated in low physical and mental performance.
- Malnutrition including vitamin and mineral deficiencies leads to reduced productivity, hampering economic growth and the effectiveness of investments in health and education, and deepening poverty.
- Suspected long-term impacts of childhood malnutrition leads to increased incidence of coronary heart disease, diabetes and even lower intelligence quotient and reduced productivity.

Measuring Under nutrition

Measuring weight and height is the most common way of assessing malnutrition in a given population.

Anthropometry is a widely used, inexpensive and non-invasive measure of the general nutritional status of an individual or a population group. The three commonly used anthropometric indices are:

- Weight-for-age (WFA)
- Height/Length-for-age (HFA)
- Weight-for-Height/Length (WFH).

Types of Under nutrition

The three indices - weight-for-age, height/length- for-age, weight-for-height/length are used to identify three nutrition conditions: underweight, stunting and wasting, respectively. Each of the three nutrition indicators is expressed in standard deviation units (Z-scores) from the median of the reference population based on which under nutrition may be further classified as moderate or severe.

Underweight

Underweight, based on weight-for-age, is a composite measure of stunting and wasting and is recommended as the indicator to assess changes in the magnitude of malnutrition over time.

This condition can result from either chronic or acute malnutrition, or both.

An underweight child has a weight-for-age Z score that is at least two standard deviations (-2SD) below the median in the World Health Organization (WHO) Child Growth Standards.

Stunting

Failure to achieve expected height/length as compared to healthy, well-nourished children of the same age is a sign of stunting. Stunting is an indicator of linear growth retardation that results from failure to receive adequate nutrition over a long period or recurrent infections. Stunting often results in delayed mental development, poor school performance and reduced intellectual capacity.

A stunted child has a height-for-age Z score that is at least two standard deviations (-2 SD) below the median for the WHO Child Growth Standards.

Wasting

Wasting indicates current or acute malnutrition resulting from failure to gain weight or actual weight loss, episodes of diarrhoea and other acute illnesses.

A wasted child has a weight-for-height Z score that is at least two standard deviations (-2SD) below the median for the WHO Child Growth Standards.

Severe Acute Malnutrition (SAM)

Severe acute malnutrition is defined by very low weight-for-height/length (Z- score below -3 SD of the median WHO child growth standards), or a mid-upper arm circumference < 11.5 cm, or by the presence of nutritional oedema.

Severe Acute Malnutrition is both a medical and social disorder. Lack of exclusive breast feeding, late introduction of complementary feeds, feeding diluted feeds containing less amount of nutrients, repeated enteric and respiratory tract infections, ignorance, and poverty are some of the factors responsible for Severe Acute Malnutrition (SAM).

Effects of SAM

- Increases the risk of death in children under five years of age.
- Can be a direct or indirect cause of child death by increasing the case fatality rate infections.

Moderate Acute Malnutrition

A child with 70-80% of median weight-for- height (Z score of <-3SD to <-2 SD), or a Mid Upper Arm Circumference of 11.5-12.5 cm and no oedema is classified as a case of Moderate Acute Malnutrition. In addition, the child should have appetite, be alert and clinically well. Children with moderate acute malnutrition can be managed in the Outpatients setting where there is a provision for supplementary feeding.

Case Fatality in children with Severe Acute Malnutrition

The high case fatality has been attributed to various factors related to the management and includes:

- Inability to distinguish between acute and rehabilitation phases
- Excessive use of intravenous (IV) fluids
- Fluid overload due to lack of monitoring during rehydration
- Use of diuretics (for oedema) and albumin
- Not keeping the child warm and euglycaemic (normal blood glucose levels)
- Low index of suspicion for infection
- Early use of diets high in protein, sodium, energy
- Failure to monitor food intake
- Early treatment of anaemia with oral iron

The case fatality can be brought down to approximately 7-10% by standard case management protocol, which the participant will learn in this course.

Identification of children with severe acute malnutrition:

SAM children should be identified at every health contact:

- Primary health centre
- Sub-centre
- health posts
- hospitals
- day-care centres
- Anganwadi centres

Recommended criteria for identifying SAM in infants > 6 months of age

Any child who has following features are treated as severe acute malnutrition:

Weight-for-height less than -3 SD and/or

- Visible severe wasting and/or
- Mid arm circumference (MUAC) < 11.5 cm and/or

- Oedema of both feet

Recommended criteria for identifying SAM in infants < 6 months of age

Any infant more than 49 cm** in length who has following features are treated as severe acute malnutrition:

- Weight-for-height less than -3 SD and/or
- Visible severe wasting and/or
- Oedema of both feet*

* Other causes of oedema e.g. nephrotic syndrome should be excluded.

** For children with length less than 49 cm in length, visible severe wasting can be used as criteria to identify SAM .

Standard Deviation

For identifying a child with severe acute malnutrition standard deviation score (SD-score) based on child's weight and length/height is determined.

An SD-score is a way of comparing a measurement, in this case a child's weight-for-length, to an "average". The "averages" referred to in the manual are WHO Growth Reference values for weight-for-height and weight-for-length.

SD-scores may be loosely interpreted as follows:

- 1 SD approximately corresponds to 90% of the median weight-for-height.
- 2 SD approximately corresponds to 80% of the median weight-for-height.
- 3 SD approximately corresponds to 70% of the median weight-for-height.

To use the reference table

- First find the child's length or height in the middle of the table. If the length or height is between those listed, rounds up or down: If the length/ height is 0.5 or more cm then take the next higher value.
- Look at the top of the column to see what the child's SD-score is. The child's weight may be between two SD-scores. If so, indicate that the weight is between these scores by writing less than (<). For example, if the score is between - 1 SD and -2 SD, write < -1 SD.

Assessment of Severe Acute Malnutrition

Identification of Oedema

- To assess oedema, normal thumb pressure is applied to both feet up to 30 seconds
- If a shallow pit persists on both feet then the child presents oedema
- Only bilateral oedema is recorded as nutritional oedema
- Always test for oedema by thumb pressure and not merely by looking
- Degree of oedema (0 to +++ is assessed each day)

➢ +++ Gross oedema (Generalised, all over body)

➢ ++ Moderate oedema (Upto thigh & hands)

➢ + Mild oedema (dorsum of both feet)

Anthropometry

Measurement of MUAC

- Alternative measure of thinness
- Used for children 6-59 months
- Measured on left upper arm

- Indicates muscle mass and fat reserves
- Is age independent
- Best predictor of mortality

Procedure

- Locate tip of child's shoulder
- Bend child's elbow to make right angle
- Place tape at tip of shoulder at zero
- Pull tape straight down to the tip of elbow
- Read no to nearest 0.1 cm. Divide no by 2 to get mid-point
- Mark midpoint on arm with a pen

Procedure

- Straighten child's arm and wrap tape around the arm at midpoint
- Ensure proper tension of tape – not too tight or too loose
- At correct position with correct tension read measurement to the nearest 0.1cm
- Record measurement immediately

Procedure for measurement of Weight

- Preferably by an electronic scale
- Use Calibrated machine
- Put weighing balance on flat surface
- Each time adjust to zero
- Keep the pan clean
- Weigh child with minimum clothing
- Weigh every day at fixed time of the day
- Record weight to the nearest gram
- Standardize machine regularly
- Explain mother
- Plot daily weight chart

Measurement of Length

- Use length boards
- Put / mount on flat surface
- For children less than 87cm take length
- For children more than 87 cm take height
- If not then subtract 0.7 cm from length
- Clean everyday with disinfectant
- Record closest to 0.1 cm

To measure length

Use a measuring board like infantometer with a headboard and sliding foot piece.

Work with a partner. One person should stand or kneel behind the headboard and:

- Position the child lying on his back on the measuring board, supporting the head and placing it against the headboard.
- Position the crown of the head against the headboard, compressing the hair.
- Hold the head with two hands and tilt upwards until the eyes look straight up, and the line of sight is perpendicular to the measuring board.

- Check that the child lies straight along the centre line of the measuring board and does not change position.

To measure height

Use a Stadiometer with a vertical back board, a fixed base board, and a movable head board.

Work with a partner. One person should kneel or crouch near the child's feet and:

- Help the child stand with back of the head, shoulder blades, buttocks, calves and heels touching the vertical board.
- Hold the child's knees & ankles to keep the legs straight and feet flat.
- Prevent children from standing on their toes.
- Young children may have difficulty standing to full height. If necessary, gently push on the tummy to help the child stand to full height.

The other person should bend to level of the child's face and

- Position the head so that the child is looking straight ahead (line of sight is parallel to the base of the board)
- Place thumb and forefinger over the child's chin to help keep the head in an upright position
- With the other, pull down the head board to rest firmly on top of the head and compress hair.
- Measure the height to the last complete 0.1 cm and record it immediately on the case recording sheet.

How to use growth chart?

World health organization (WHO) growth charts are used most often and considered the standard around the world:

Typical measurements taken for children 0-24 months include:

- Head circumference
- Length
- Weight

Measurement should be taken at regular intervals in order to observe reliable trends. Recommendation for measurement intervals include:

- Infants (0-12 months): every 2 months
- Young children at 15, 18, 24 & 30 months
- Age 3+ every year.

	Age									
Measurement	3-5 days	1 mo.	2 mo.	4 mo.	6 mo.	9 mo.	12 mo.	15 mo.	18 mo.	24 mo.
Weight	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Length	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Head Circumference	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Weight-for-length	✓	✓	✓	✓	✓	✓	✓	✓	✓	*

*At 24 months, many health care professionals recommend using Body Mass Index (BMI) as an indicator instead of weight-for-length

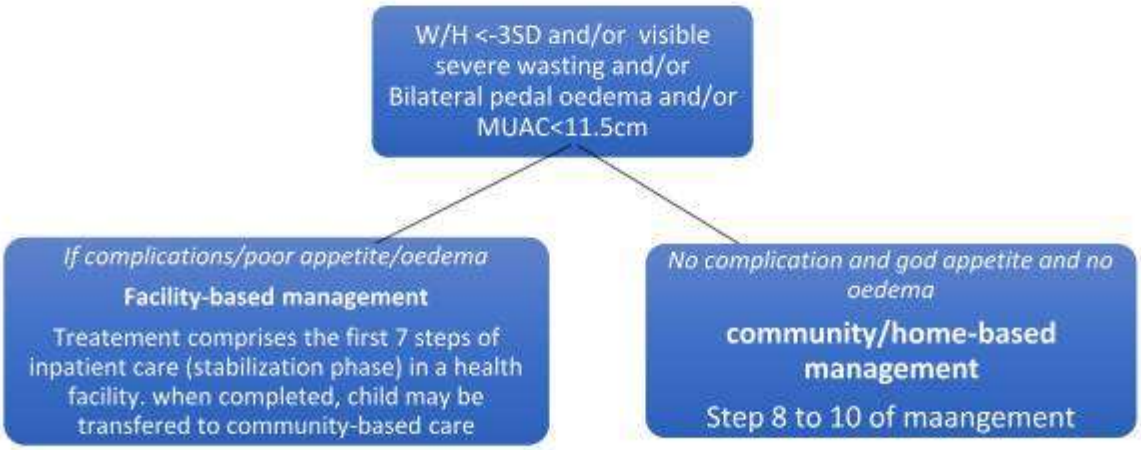
1. Table based on recommendations made by the American Academy of Pediatrics (USA)

The following measurements can be applied to the most commonly used growth chart:

- Head circumference for age
- Length for age
- Weight for age
- Weight for length / weight for height

On the WHO growth charts, there are five curves. The middle curve (labelled 0) is the median on average. This line is also called the 50th percentile, because 50 percent of all children are above the median and 50 percent fall below. A normally growing child will typically have a growth curve that is parallel to the median.

Other lines in the curves, called z-score lines, indicate distance from the median curve. Points far from the median, such as a 3 or -3, typically indicate some find of growth problem. One point on its own does not give an accurate assessment of a child's growth. Instead, a series of points provides insight into a child's growth patterns & tendencies over time.



Appetite test can be conducted poor appetite is a reliable indicator for severity of illness and thus need for hospitalization.

Children with following medical complications should be admitted in a Nutrition Rehabilitation centre or a health facility:

- Presence of any of emergency signs
- Oedema
- Persistent vomiting
- Very weak, apathetic
- Fever (Axillary temperature > 38.5 degree Celsius)
- Children with fast breathing / chest in drawing/ cyanosis

(Fast breathing is said to be present if number of breaths per minute is 60 or more in children up-to 2 months, 50 or more in children 2 months up-to 1 year and 40 or more in children 1 year up-to 5 years)

- Extensive skin lesions, eye lesions, post-measles states
- Diarrhoea with dehydration based on history and clinical signs
- Severe anaemia
- Hypothermia (Axillary temperature <35 degree centigrade)
- Any other general sign which the clinician thinks warrants transfer to in-patient facility for assessment or care

In addition to above criteria if the caregiver is unable to take care of the child at home, the child should be admitted.

- General principles of routine care (the 10 steps)
- Emergency treatment of shock and severe anaemia
- Treatment of associated conditions
- Failure to respond to treatment
- Discharge before recovery is complete

Prepare for Discharge

Criteria for Discharge from in patient care.

Child	• **Achieved weight gain ≥ 15% (See Annex 20 for target weight at 15 % weight gain) and has satisfactory weight gain for 3 consecutive days (>5gm/kg/day)** • **Oedema has resolved** • **Child eating an adequate amount of nutrition food that the mother can prepare at home** • **All infections and other medical complications have been treated** • **Child is provided with micronutrients** • **Immunization is updated**
Mother/caregiver	• Knows how to prepare appropriate foods and to feed the child • Knows how to make appropriate toys and play with the child • Knows how to give home treatment for diarrhoea, fever and acute respiratory infections and how to recognize the signs that/he must seek medical assistance • Follow –up plan is completed

All children with SAM should be followed by the health workers at home or at community centres till she/he reaches weight for-height of -1 SD.

Teaching parents to care for the child and prevent recurring malnutrition

Parents should be educated about:

- Correct breastfeeding and feeding practices (frequent feeding with energy and nutrient dense foods)
- Taking the child for vitamin A supplementation (children aged 9-59 months) 6 monthly
- Taking the child to the health facility for vaccination as per the schedule in Mother and Child Protection card/Immunization card
- Giving structured play therapy to the child.

Follow-up

- Before discharge, make a plan with the parent for a follow-up visit at 1 week after discharge. Regular check-ups should also be made at 2 weeks in first month and then monthly thereafter until WHZ reaches -1 SD or above. If a problem is found, visits should be more frequent until it is resolved.

Give general discharge instructions

In addition to feeding instructions, mothers will need to be taught:

- How to continue any needed medications, vitamins, folic acid (for 2-weeks), and iron (for 2-3 months) at home.
- when to bring the child back for immediate care:
  - Not able to drink or breastfeed. Stops feeding.
  - Develops fever.
  - Has fast or difficult breathing.
  - Has a convulsion.
  - Has diarrhoea for more than a day, or blood in stool.

If early discharge is unavoidable, make special arrangements for follow- up

If a child must be discharged before the discharge criteria are met it is critical to make arrangements for follow-up of the child (for example, special visits by a health worker to the child's home, or outpatient care at a health facility or nutritional rehabilitation centre). Mothers will need special training to prepare feeds and give iron, folic acid, and multivitamins at home.

Principles of management

Treat / prevent hypoglycemia

- If the child is conscious, give 50 ml of bolus of 10% glucose or 10% sucrose solution (1 rounded teaspoon of sugar in 3.5 tablespoons water), orally or by nasogastric tube (Ng tube). Then feed starter F-75 every 30 minutes for 2 hours.
- If child is unconscious, give IV sterile 10% glucose (5 ml/kg), followed by 50 ml of 10% glucose or sucrose by Ng tube. Then give starter F-75 as above. (Details about F-75 are given ahead).

Treat / prevent hypothermia

- If the axillary temperature is $< 35^0$ c or rectal temperature is $< 35.5^0$ c, rewarm the child. Clothe the child including head, cover with a warm blanket & place a heater or lamp nearby (do not use a hot water bottle), or put the child in skin to skin to contact with mother.

Treat / prevent dehydration

- Standard ORS solution contains too much sodium & too little potassium for severely malnourished children. Instead give special Rehydration Solution for Malnutrition (ReSoMal). It is difficult to estimate dehydration status in a severely malnourished child using clinical signs alone. So assume all children with watery diarrhoea may have dehydration.

- Give ReSoMal 5 ml/kg every 30 min. for 2 hours, orally or by Ng tube, then 5-10 ml/kg/hour for next 4-10 hours. Replace it with F-75 if rehydrated.
- In case of signs of over hydration (increasing PR, RR, increasing oedema & puffy eyelids) stop fluid immediately & reassess after one hour.

Correct electrolyte imbalance

All severely malnourished children have excess body sodium. Deficiencies of potassium & magnesium are present & may take at least 2 weeks to correct. Oedema is partly due to these imbalances. Do not treat oedema with a diuretic. Give:

- Potassium 3-4 mmol/kg/day
- Magnesium 0.4-0.6 mmol/kg/day
- When rehydrating, give low sodium rehydration fluid.
- Prepare food without salt

Treat/prevent infection

In severe malnutrition, the usual signs of infection, such as fever are often absent & infections are often hidden. Therefore, give routinely on admission:

- Broad-spectrum antibiotics.
- Measles vaccine if child is not immunized
- If child has no complications give, paediatric Amoxicillin orally for 5 days.
- If the child is severely ill or has complications (hypoglycemia, hypothermia, broken skin, respiratory tract/urinary tract infection) give Ampicillin 50 mg/kg, IM/IV 6 hourly for 2 days, then oral amoxycillin 15 mg/kg 8 hourly for 5 days. If amoxycillin is not available, give ampicillin orally as 50 mg/kg 6 hourly.
- In addition, give gentamycin 7.5 mg/kg, IM/IV once daily for 7 days.

Correct micronutrient deficiencies

- All severely malnourished children have vitamin & mineral deficiencies. Although anemia is common do not give iron initially but wait until child has a good appetite & starts gaining weight. Giving iron can worsen infections.
- Give vitamin A orally on day 1 (Age > 12 months 2 lakh IU, 6-12 months 1 lakh IU & 0-5 months give 50,000 IU). Give at least for 2 weeks.
- Multivitamin supplement:
  - Folic acid 1mg/day (give 5 mg on day1)
  - Zinc 2 mg/kg/day
  - Copper 0.3 mg/kg/day
  - Iron 3mg/kg/day only when gaining weight.
- Combined electrolyte, vitamin, mineral mix is available commercially.

Start cautious feeding

- Feeding should be started as soon as possible after admission to provide just sufficient energy & protein to maintain basic physiological processes. Essential features are as below:
  - Small, frequent feeds of low osmolarity & low lactose
  - Oral or Ng feeds (never give parenteral preparations)
  - 100 kcal/kg/day
  - 1-1.5 gm proteins/kg/day
  - 130 ml/kg/day of fluid (100 ml, if child has severe oedema)

- If child is breastfed, continue breastfeeding, but give prescribed amounts of starter formula to meet child's needs.
- Milk based formulas such as starter F-75 containing 75-kcal/100 ml & 0.9 gm proteins/100 ml is satisfactory for most of the children.
- Volume should be gradually increased & frequency should be gradually decreased.
- Feeding should be given from cup & very weak children may be fed by spoon, dropper or syringe.

Achieve catch up growth

- In the rehabilitation phase catch up formula F-100, which contains 100 kcal & 2.9 gm proteins /100 ml, is given for 48 hours. (details about F-100 is given ahead).
- Increase each successive feed by 10 ml until some feed remains uneaten & unlimited amounts of a catch up formula containing 150-220 kcal/kg/day & 4-6 gm proteins/kg/day is consumed at least 4 hourly.
- Weigh a child each morning before feeding. Child should gain 10gm/kg/day.

Provide sensory stimulation & emotional support

- Provide
  - Tender loving care
  - Cheerful, stimulating environment
  - Structured play therapy
  - Physical activity as soon as child is well enough
  - Maternal involvement

Emergency treatment of shock & severe anaemia

- Shock in severe malnutrition is due to dehydration or sepsis. Children with dehydration will respond to IV fluids.
- Give oxygen, 10% glucose IV, IV fluids & antibiotics.
- For severe anaemia child needs blood transfusion. Therefore, refer the child to a facility where BT facility is available.
- In mild & moderate anaemia, oral iron should be given for 2 months but this should not be given till the child has begun to gain weight.

Treatment of associated conditions

- If the child shows eye signs of vitamin A deficiency, give vitamin A on days 1, 2 & 14 as per age of the child. Give local treatment of corneal ulceration by antibiotics.
- Dermatosis: Skin quickly improves with zinc supplementation. Apply barrier cream to raw areas.
- Parasitic worms: Tablet mebendazole 100 mg orally, twice daily for 3 days is given.
- Treat if child has continuing diarrhoea.

Follow up after recovery

- Follow child regularly.
- Ensure complete immunization & vitamin A supplementation every 6 months.

Home based care (Domiciliary care)

- When the child is being rehabilitated at home, aim is achieving 150 kcal/kg/day & protein intake of 4 gm/kg/day.

- This means child should be fed at least 5 times a day with foods containing 100 kcal & 2-3 gm protein per 100 gm.
- Child should be given high-energy snacks between meals (e.g. milk, banana, jaggery & peanut etc).

WHO recommended various formulas to be used in a child with malnutrition

F-75 starter formula

- Full cream dried milk 35 gm, 100 gm sugar, 20 gm (or ml) oil, 20 ml electrolyte/mineral solution & make up to 1000 ml.
- Full-cream cow milk 300 ml, 100 gm sugar, 20 gm (or ml) oil, 20 ml electrolyte/mineral solution & make up to 1000 ml.

F-100 formula

- Full cream dried milk 110 gm, 50 gm sugar, 30 gm (or ml) oil, 20 ml electrolyte/mineral solution & make up to 1000 ml.
- Full-cream cow milk 880 ml, 75 gm sugar, 20 gm (or ml) oil, 20 ml electrolyte/mineral solution & make up to 1000 ml.

Important aspects of malnutrition management

- Risk of death due to hypothermia is documented in malnourished children. Therefore, it is essential to keep malnourished children warm to prevent death.
- Intake of high protein & calories in first few days of treatment is inappropriate.
- Carefully calculated amounts of protein & energy should be given frequently throughout day & night to avoid overloading the kidney, heart & intestine.
- Malnourished child should be fed at night also.
- Recurrent infections increase the severity of malnutrition & malnutrition predisposes to infection. Therefore, give antibiotics & anti malarial routinely to all malnourished children.
- Give vitamin A to all malnourished children.
- Iron should not be given to malnourished children until recovery.
- Intra venous rehydration of a malnourished child may cause heart failure. Therefore, use of IV fluids should be avoided as far as possible in malnourished children.
- Diuretics like frusemide should be avoided in oedematous malnourished children.
- Malnourished children with pneumonia breathe at a slower rate as compared to well-nourished children to conserve energy. Thus, clinical parameters may underestimate the severity of pneumonia in malnourished children. Therefore, you should be cautious while diagnosing pneumonia in malnourished children.
- Give nutrition education to mother as below:

➢ Use locally available foods.
➢ Give food in adequate quantities. One year old child needs 1000 calories.
➢ Use concentrated calories – low fiber, minimum water
➢ Sufficient protein 1 to 2 gm/kg per day
➢ Gradually increasing quantity of food
➢ Fresh food and clean hands for feeding
➢ Regular follow up and growth monitoring.

Important nutrition education messages to mother for prevention of malnutrition

- Exclusive breastfeeding up to 6 months.
- Start supplementary solid foods at 6 month.

- Continue breast-feeding as long as possible.
- Pure water and clean hands for child feeding.
- Timely treatment of childhood infections & continuing feeding during sickness.
- Give additional feeding during convalescence to overcome inadequate intake during the illness episode.
- Pre-school children need frequent feeds every 3 to 4 hours. Special snacks should be prepared and made accessible to children e.g. puffed rice, popped gram (Chana), Groundnut-Jaggery (good-dani / chikki), malted *Ragi (Nachani-satva).*

4.7.4 Integrated Child Development Scheme

Integrated Child Development Scheme (ICDS) started in 1975 with aim of overall development of preschool children. ICDS is implemented through an integrated approach for covering basic services to improve childcare, early stimulation & learning, improved enrolment & retention, health & nutrition, water & environmental sanitation.

Following beneficiaries are covered under the scheme:

- Children (0-6 years)
- Pregnant women
- Lactating mothers
- All women (15-45 yrs.)
- Adolescent girls

Objectives of the scheme

- To improve nutritional & health status of pre school children in 0-6 years age group.
- To lay the foundation of proper psychological development of the child.
- To reduce incidence of mortality, morbidity, malnutrition & school drop out.
- To achieve effective co-ordination of policy & implementation amongst the various departments to promote child development.
- To enhance the capability of mother to look after the normal health & nutritional needs of the child through proper nutrition & health education.

Services given under ICDS

Six services are given to the various beneficiaries under ICDS as below:

Sr.	Services	Beneficiaries
1	Supplementary nutrition	ANC, PNC, children below 6 yrs
2	Immunization	ANC, children below 6 yrs.
3	Health check up	ANC, children below 6 yrs.
4	Referral services	High Risk ANC/PNC, severely malnourished and seriously ill children.
5	Health education & nutrition education	Women between 15 to 45 yrs age, especially ANC and PNC, adolescent girls
6	Informal pre school education	Children 3-6 years

Infrastructure

There is one Anganwadi for 1000 population in non-tribal rural area & for 700 population in tribal area. For each Anganwadi there is one Anganwadi worker & one helper. Service delivery in ICDS is joint responsibility of ICDS and health department. ICDS scheme is developed to facilitate the coordination between health and ICDS department.

The district organogram for ICDS in our state is as follows:

Level	ICDS staff	Health staff
District	Dy CEO (ICDS)	Zonal Advisor (DHO)
Block	CDPO	Project Advisor (Block Medical Officer)
PHC	-	Sector Advisor (PHC MO)
	Mukhya Sevika (MS) (For 17-20 AWW)	HA (F)
SC	-	ANM
Village	AWW	ASHA

Responsibilities of health functionaries under ICDS scheme

- Out of six services covered under ICDS, four services viz. immunization, health checkup, referral services and nutrition and health education are provided by PHC staff in coordination with AWW. All these services are provided during *Arogya Seva Satra* and Anganwadi visit. MO and PHC staff should keep in mind that *Arogya Seva Satra* should be organized in Anganwadi. Hence there should be good coordination between PHC and Anganwadi for timely health care delivery to community.

Role of health functionaries in ICDS implementation are as follows:

Medical Officer PHC (Sector Advisor)

Planning of visits

- Make fixed programme (for one year) of visits to Anganwadi's in your area as per the guidelines given by DHO in such a way that you should visit each AW once in three months.
- Divide number of AW by three. This will give you the number of AWs you should visit per month.
- Programme for visit of five AW is shown as example below. Prepare programme of AW visit for your PHC.
- Inform CDPO of your block about fixed programme with request for joint visits. Insist Mukhya Sevika to remain present at the time of your visit. This will help in coordination of services.

Health care delivery

- Plan for Arogya Seva Satra in Anganwadi's.
- Carry out health check up of all 0-6 years children in Anganwadi quarterly in tribal area & six monthly in non-tribal area.
- Carefully examine seriously ill & severely malnourished children as & when required, start treatment immediately and refer if necessary.
- Examine all SAM, MAM children every month till their weight is normal.
- Examine, treat & advise all ill children referred by AWW on priority. Do not prescribe outside medicines to these children.
- Identify growth faltering in children earliest and give health and nutrition advice so that child will not develop malnutrition.
- Examine all children in SUW, MUW (growth faltering) for preventing them in going in SAM, MAM

Supervision

- Ensure that all beneficiaries registered by AWW are correct according to the population norm.

- Ensure that weight is correctly taken, correctly recorded on road to health chart & gradation of malnutrition is appropriately done by AWW. Ask AWW to weigh few children in front of you and observe the weighing, recording and grading. Explain the procedure if necessary.
- Check the records for correctness & completeness

Monthly meeting

- Arrange monthly meeting as per AAA Gr. of all AWWs in PHC area along with ANM, ASHA, HA (F) & concerned Mukhya Sevika. Take review of work done. See that for the same area & population reporting of ANM, ASHA & AWW is similar.
- Review critical indicators from the monthly report of AWW like
  - Infant deaths
  - SAM & MAM children
  - Improvement in nutritional status of SAM & MAM children since last month.
- Prepare yearly calendar for CME. Discus one important topic concerned with day-to-day working during monthly meeting of ASHA, AWWs & ANMs. Subjects selected should be according to the problem prevalent e.g. before rainy season training about diarrhoea, during November, December Polio eradication etc.
- Check immunization record of both AWW and ANM and correct the discrepancies.

Role of HA (F)

- HA (F) should visit each AW in her area once a month on the day of Arogya Seva Satra.
- Supervise & guide AWW for all the services to be given to beneficiaries.
- Check medicine kit of AW and revise the instructions for use of each medicine.
- Co-ordinate between MPW (F) & AWW.
- Arrange joint visit with Mukhya Sevika for better co-ordination.

Role of MPW (F)

- Visit each AW once in 15 days
- Supervise & help AWW in correct recording of weight of a child & accurate monitoring on growth chart to decide grade of malnutrition.
- Plan & implement immunization services in AW area.
- Distribute vitamin A to children below 3 yrs & IFA small tablets to children in 1-5 years age group.
- Check medicine kit of AW & record related to treatment given.
- Check hygiene of cooked food & care taken while cooking & handling the food.
- Ensure food supplementation to SAM & MAM children.
- Provide health & nutrition education to antenatal, postnatal & lactating mothers.

Responsibilities of AWW

Enumeration of beneficiaries

- Survey of the area once a year for recording all beneficiaries & updating of beneficiaries.

Early diagnosis of malnutrition

- Early diagnosis of malnutrition in under five children by 2 methods:
  - Growth monitoring by Road to Health chart
  - Use of Mid Arm Circumference
- For Growth monitoring from Road to Health chart weight of children between 0 - 5 years is recorded every month against the age & accordingly gradation of malnutrition is decided by AWW.
- Monthly weight is recorded of following children -

- Children between 0-5 yrs.
- Malnourished children till the weight is as per expected weight for age
- Children with repeated illnesses

Responsibilities of ASHA

Enumeration of beneficiaries

- Survey of the area for recording all beneficiaries & updating of beneficiaries.

Early diagnosis of malnutrition

- Early diagnosis of malnutrition in under five children

Follow-up of SAM & MAM Children

- Regular follow-up of SAM & MAM Children after discharged from VCDC/CTC/NRC/SNCU.

Supplementary nutrition

- Supplementary nutrition for children & mothers is one of the important jobs of AWW. Two types of feeding are provided under ICDS Scheme –
- Wheat based supplementary food prepared from wheat
- Local feeding from cereals & pulses produced locally (Khichadi)

Supplementary nutrition is given as below to the beneficiaries:

Beneficiaries	Supplementary nutrition		
	Weight	**Calories**	**Proteins in gm**
Severely malnourished children	200 gm.	600-800	20
Other Children <6 yrs	100 gm	300-400	10-12
Pregnant &nursing mothers BPL	200 gm	600-800	20-24

Treatment & referral

- Treatment of minor ailments: Each Anganwadi is provided with a medicine kit. This kit contains some essential medicines, dressing material, anti diarrhoea drugs etc.
- Refer SAM & MAM children to PHC.
- Help ANM in planning & implementation of Arogya Seva Satra.

Reporting under ICDS

- Reporting meeting should be on fixed day each month preferably at PHC headquarter.
- Monthly reports should be prepared by ANM & AWW together, so that there is no discrepancy in the figures reported by them.
- Mukhya Sevika should check report of AWW.
- Consolidated report is sent to Block Medical Officer.
- Block Medical Officer sends reports to DHO from all PHCs after compilation.

4.8 Activities to Reduce Neonatal/Infant/ Child Deaths:

Govt. has implemented several measures during last few years to overcome the problem of malnutrition. Provision of supplementary nutritive diet and in-time health services are both important issues to overcome the malnutrition. Indeed, this problem can be solved if and only if supplementary nutritive diet and in-time health services are provided together and with mutual coordination. Conscious measures should be implemented on each malnourished child. Govt. has found that one should implement these measures at various levels such as Anganwadi centre, primary health centre, district health hospital. Since July 2010 the decision of Central Govt. regarding classification of malnutrition of children according to new criteria of World Health Organization is being implemented.

Diagnosis of SAM

In children between the ages of 6 and 60 months, SAM may be diagnosed on the basis of any of the following criteria (3):

i. Weight/height or Weight/length < -3z score, using the WHO Growth Charts
ii. Visible severe wasting
iii. Bipedal oedema of nutritional origin
iv. Mid- upper arm circumference (MUAC) < 115 mm.*

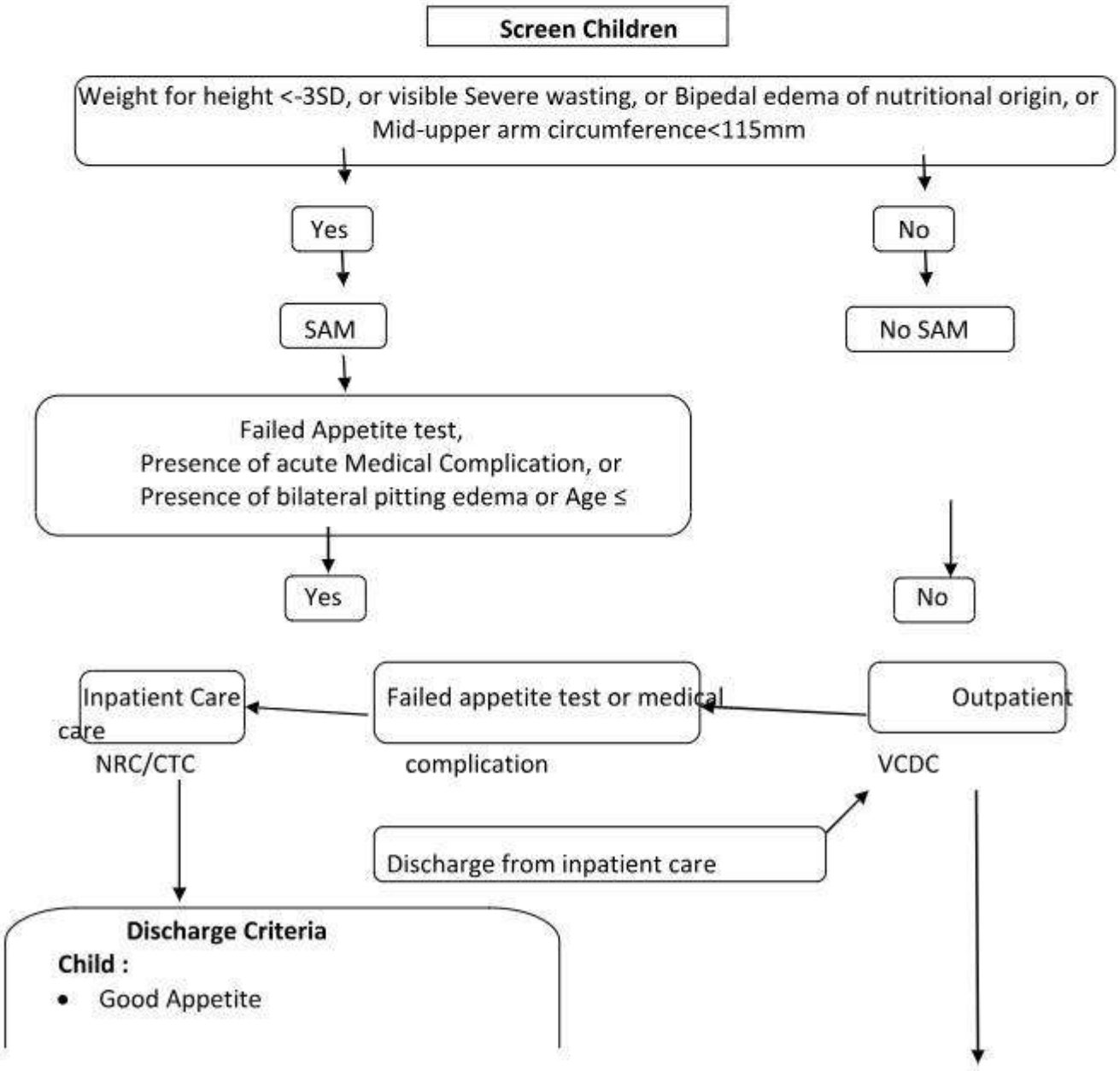
*For infants below 6 months, Criteria (i) or (ii) or (iii) above should be used.

Diagnosis of MAM

In children between the ages of 6 and 60 months, SAM may be diagnosed on the basis of any of the following criteria (3):

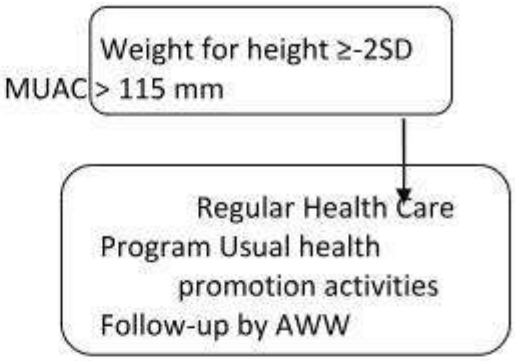
i. Weight/height or Weight/length < -3z to -2z score, using the WHO Growth Charts
ii. Visible wasting
iii. Bipedal oedema of nutritional origin
iv. Mid- upper arm circumference (MUAC) < 115 to 125 mm.*

*For infants below 6 months, Criteria (i) or (ii) or (iii) above should be used.



- No edema
- Consistent weight gain (>5gm/kg/d for 3 consecutive days)
- Completed appropriate anti-microbial Treatment appropriate immunization Initiated.

Care giver:
Trained, motivated & skilled to provide Care



Health Protocols:

Sr. No.	Name of drug	Dose	Time
1	Albendazole drug	1-2 yrs. 200mg – (5ml) 2-3 yrs.400mg - (10ml) 3-6 yrs.400mg – (1 Tab)	Once time before VCDC
2	Vitamin – A (confirm not given last 6 month)	1 ml below 1 yr child 2 ml above 1 yr child	Once time before VCD
3	Tab. Folic acid	1mg, 1 Tab every day	In morning 1st 7 days
4	Amoxicillin Antibiotics (8 yrs.)	25 mg/kg/ day	Morning/ Afternoon/ Evening for 7 days all SAM & infected children
5	Syrup Hovite RB/ Visyneral – Z/ containing medicine	1 to 2 yr – 2 ml 2 to 6 yr – 4ml	Afternoon
6	Mecalvit Plus/ containing medicine	1 ml/ kg/ day	Morning
7	Orofer – XT/ containing medicine	3 mg Iron/ kg/ day	Evening - which child have increasing weight gain and free from infection start medicine after 7 days

(Adapted from WHO Growth Standards and identification of Severe Acute Malnutrition in infants and children. A joint statement of WHO and UNICEF. 2009)

4.8.1 Facility Based Care of Severely Malnourished Child:

Facility Based Severely Malnourished Child at RH/SDH/DH level: Child Treatment Centre / Nutrition Rehabilitation Centre: (Refer Annexure 4.3 (Vol. II))
Special New Born Care Unit (SNCU) for sick Neonates: (Refer Annexure 4.3(Vol. II))
New Born Stabilization units (NBSUs): (Refer Annexure 4.3(Vol. II))
New Born Care Corners (NBCCs):
These are special corners within the labour room where support for optimal management of a newborn is provided. The services include resuscitation, provision of warmth / KMC, and prevention of infection and cord care and early initiation of breast feeding. The equipments at

newborn care corners include Weighing Scale, radiant warmer, suction machine and mucus sucker.

Child Death Audit (CDA):
Infant and Child Death Audit is conducted by medical Officer Primary Health Centre. This gives information on the cause of the child death. Children in the age group 0-5 years will be included in the review (Verbal autopsy format provided in Child Death Review, Operational Guidelines, August 2014 to be used for all deaths). All deaths in this age group will be reported irrespective of the place it takes place: at home, in health facility or in transit.

Child Death Review will be of two types: i) Community Based Child Death Review (CBCDR) ii) Facility Based Child Death Review (FBCDR)

Community based reviews are undertaken for deaths that occur in the specified geographical area, irrespective of the place it takes place: at home, in health facility or in transit. Facility based reviews will be taken up in all government teaching, referral hospitals and First Referral Units (District, Sub district, Area Hospitals/Taluka Hospitals) that conduct more than 500 deliveries per year (excluding institutions below block level).

4.9 Vitamin 'A' Supplementation and De-Worming

4.9.1 Vitamin A deficiency: A Public Health Problem:

Vitamin A deficiency (VAD) is a major nutritional concern in poor societies, especially in lower income countries. The main underlying cause of VAD as a public health problem is diet that is chronically deficient in Vitamin A, which leads to lower body stores, and fails to meet the physiological needs of the body (eg. support tissue growth, normal metabolism, and resistance to infections). Deficiency of Vitamin A for sufficient duration or severity can lead to Xeropthalmia (Xeros-dryness and opthalmia-pertaining to eye) the leading cause of preventable childhood blindness, anaemia and weakened host resistance to infections increasing the severity of infection and risk of death.

4.9.2 Defining Vitamin A deficiency:

In the population Vitamin A deficiency can be defined and assessed by 2 methods:

- Clinical VAD: By assessing the eye signs ranging from night blindness to presence of Bitot's spots, corneal xerosis, corneal ulceration to keratomalacia.
- Sub clinical or Biochemical VAD: where the serum or plasma retinol levels are measured using capillary, venous or umbilical cord blood.
- The serum retinol threshold of <0.7µmol/l or <20 mcg/dl is used to classify subclinical or biochemical VAD.

4.9.3 History of Vitamin A supplementation (VAS) in Maharashtra:

VAS has made it onto Maharashtra's agenda a number of times. In 1975-76, the State Family Welfare Bureau included the nationally recommended five doses of Vitamin A, beginning at 9 months into its Expanded Programme of Immunization (EPI) with a recommended 9 doses in tribal regions. The first dose was linked with measles dose at 9 months and the second with DPT booster at 18 months, and the remaining doses at 6 months intervals. In 1985-86, the Universal

Immunization Programme (UIP) introduced more systematic delivery of services. The inception of India's Child Survival and Safe Motherhood (CSSM) programme in 1992 renewed attention to immunization services and the role of Vitamin A in decreasing diarrhea. Over the years reports of Vitamin A coverage shows progressive and significant decline after the second dose.

Recognizing this GoM with UNICEF has worked to develop biannual VAS programme for children under 5 years of age. In 2003, UNICEF conducted the first biannual VAS rounds in Nandurbar district raising the coverage levels from 32% to 70 % at a cost of Rs. 2 per child. The objectives of the biannual special efforts were to improve VAS coverage of children under 5 by at least 30% in rural areas and 50% in urban areas, while simultaneously improving overall immunization coverage. Today, Maharashtra is the only state in India with a statewide biannual VAS and deworming programme in place.

4.9.4 Addition of Deworming: 2006

In June 2006, the GoM introduced deworming in five tribal districts funded through the Tribal Development Department. Under this new programme the deworming drug Albendazole, was provided to children between one and six years old and Vitamin a was given to children between 9 months to 5 years of age. In January 2007 the coverage was expanded to 15 tribal districts. In May 2007 deworming coupled with VAS was expanded statewide.

4.9.5 Objectives

By implementing a biannual Deworming-VAS programme, Maharashtra is setting an example for the rest of the country highlighting the importance of these interventions in improving health indicators.

The immediate objectives of the VAS programme are to:

- Improve body stores of Vitamin A and thus the nutrition status of children up to 5 years of age.
- Reduce incidence of diarrhoea, ARI and measles complications
- Improve Haemoglobin levels
- Decrease rate of infections and morbidity and mortality in children
- Prevent childhood blindness due to Vitamin A deficiency.

Also, by decreasing the rates of infections and morbidity and mortality in children, direct advancements are made towards reaching at least 5 of 8 MDGs, and extending efforts to include pregnant and lactating women as well as Adolescent girls would further progress towards achieving the Goal 5: Improved Maternal health, of the MDGs.

4.9.6 Target Population

Currently, the biannual VAS is aimed at children between 9 months and 5 years, while deworming is aimed at children between 1year to 6 years of age. In corporation areas children in slum pockets are targeted.

4.9.7 Planning, Procurement and distribution of the medicines (Albendazole , Vitamin A)

The planning and procurement process for June rounds begin in month of January of that year. Each PHC submit their drug requirement to the DHO and RHs to CS, which in turn is submitted to DHO. At DHO office all micro plans are compiled and total beneficiaries for the district are calculated. At state level, the estimated number of beneficiaries is calculated using the birth rate and assuming 100% coverage. The unexpired stock is subtracted from the requests and 10% wastage added before the procurement is done.

In Maharashtra, the Vitamin A syrup and Albendazole syrup and tablets are delivered directly to the storage facilities within each district. These storage facilities (District stores) stock all the medicines for the district before distribution to PHCs. Vitamin A and albendazole are received by the PHCs one week to one month before respective drives.

4.9.8 Drug dosage and administration

Vitamin A and Albendazole are administered as per WHO guidelines. Albendazole is given in tablet form to all beneficiaries from 1to19 years of age

National Deworming Day Guideline for Albendazole administration:

Age in years	Dosage	Form
1-2 (12-24 months)	200 mg (half tablet)	Tablet
2 -19 Years	400mg	Tablet

WHO recommendation for Vitamin A administration:

Age	Dosage	Form
9 months to 12 months	1 ml (1 lack IU)	Syrup
1year (13 months) t0 5 years	2 ml (2 lack IU)	Syrup

4.9.9 Village Health, Nutrition and Sanitation Day (VHNSD) sessions

VHNSD sessions are also referred to as *Immunization sessions or Health sessions or Arogya Seva Satra*. These sessions are held on one day of each month and follow a fixed day, fixed time and fixed place schedule. A team of health workers who provide a variety of health care services to the mothers, children and adolescent girls serves the villages. These sessions may be organized at AWCs, Schools, Government or Private Health institutions or Village panchayats. Immunizations' including deworming and VAS are administered by a designated ANM and is assisted by AWW. Prior to the session, the expected beneficiaries are noted and the ANM, AWW, AWH, ASHA or a volunteer remind mothers of the day of session. Care givers bring the beneficiaries along with their immunization cards to the session. At the session ANM administers the treatment and the AWW, AWH, LHV and MPW work together to record the date, name, age and immunization in the register and immunization card. One portion of the card remains with the caregiver and the other portion is kept by the ANM.

The months of February and October are designated for deworming and VAS. Efforts focus on reaching all eligible children during sessions. ANMs are expected to make house visits, where they can administer Albendazole and Vitamin A to the beneficiaries who do not attend the session. In corporation areas, private hospitals and clinics have partnered with government facilities for the biannual drive. In each district the programme is supervised and monitored by DRCHO and RMO (OR).

4.9.10 IEC for the activity

IEC for the drive is done at local level and may include loudspeaker, advertising, newspaper ads, posters and cinema slides. In many rural and tribal areas, IEC is limited to the word of mouth relying on AWWs and volunteers.

HBNC (Home Based New Born Care):

The major objective is to decrease neonatal mortality and morbidity through the provision of care of the newborn baby and mother by ASHA through regular home visits on 1st, 3rd, 7th,

14th, 21st, 28 and 42nd day for home deliveries, AND 3rd, 7th, 14th, 21st, 28 and 42nd day for institutional deliveries.

Service offered:
Essential care of newborn, examination of the newborn, Early recognition of danger signs, stabilization and referral, counselling of mother for Breastfeeding, Warmth, Care of the baby, immunization, Post Partum Care and use of Family Planning Methods.

Support to the ASHA:
The ASHA is to be paid Rs. 250 for conducting home visits for care of the newborn and post partum mother.

Monitoring:
ASHA have to fill the home visit form during every visit.
ANM should verify and review the performance of all ASHA.
MO should review the performance and should release the payment to ASHA.

HBYC (Home Based Care for Young Child):
The objective is to reduce child mortality and morbidity and improve nutrition status, growth, early childhood development of young children through structured, focused, and effective home visits by ASHAs.
Specific Actions:

- Exclusive breastfeeding for six months
- Adequate complementary feeding from and continue breastfeeding up to two years of age.
- Iron and folic acid (IFA) supplementation.
- Promote use of fortified food
- Full immunization for children
- Regular growth monitoring
- Appropriate use of ORS during diarrhoea episodes.
- Early care seeking during sickness
- Age appropriate play and communication for children
- Appropriate hand washing practices.
- Home visits: At 3rd, 6th, 9th, 12th, and 15th months.

Incentives:
Each ASHA will be entitled for a sum total of Rs.250 for completion of 5 additional home visits for each young child as per recommended schedules.
Supportive Supervision:
ANM should undertake joint home visits with ASHA to at least 10% newborns in her sub center area. She should review the HBYC forms filled by ASHA. This activity of ANM should be monitor by Medical Officer and reviewed at district level.
Monthly review meetings at PHC level are to be held for problem solving and building the linkages for referral support.

4.10 Emergency Management Process of the Sick Child (0- 5 Years)

The first step in assessing children referred to a hospital should be triage– the process of rapid screening to decide to which of the following group(s) a sick child belongs:

- First assess every child for emergency signs. Those with emergency signs require immediate emergency treatment.
- If emergency signs are not present, look for priority signs. Those with priority signs should alert you to a patient who is seriously ill and needs immediate assessment and treatment.
- Children with no emergency or priority signs are treated as non-urgent cases.

4.10.1 How to Triage

All sick children are assessed for **A**irway, **B**reathing, **c**irculation, **c**oma, **c**onvulsions and severe **D**ehydration **(ABCD)**.

Efforts should be made to maintain euglycemia and euthermia while managing ABCD. Thus, Blood sugars should be done for every sick Newborn, Infant and older child.

4.10.2 How to Keep baby warm

- Keep the infant dry and well wrapped.
- Cap, gloves and stockings are helpful to reduce heat loss.
- Keep the room warm (at least 25ºC) making sure that there is no heat source directed straight at the newborn.
- Keep the baby under a radiant warmer and re-warm so as to bring the child's temperature to 36.5ºC. Pay special attention to avoiding chilling the infant during examination or investigation.
- Monitor temperature every half hourly for first 2 hrs and then every 2 hourly.

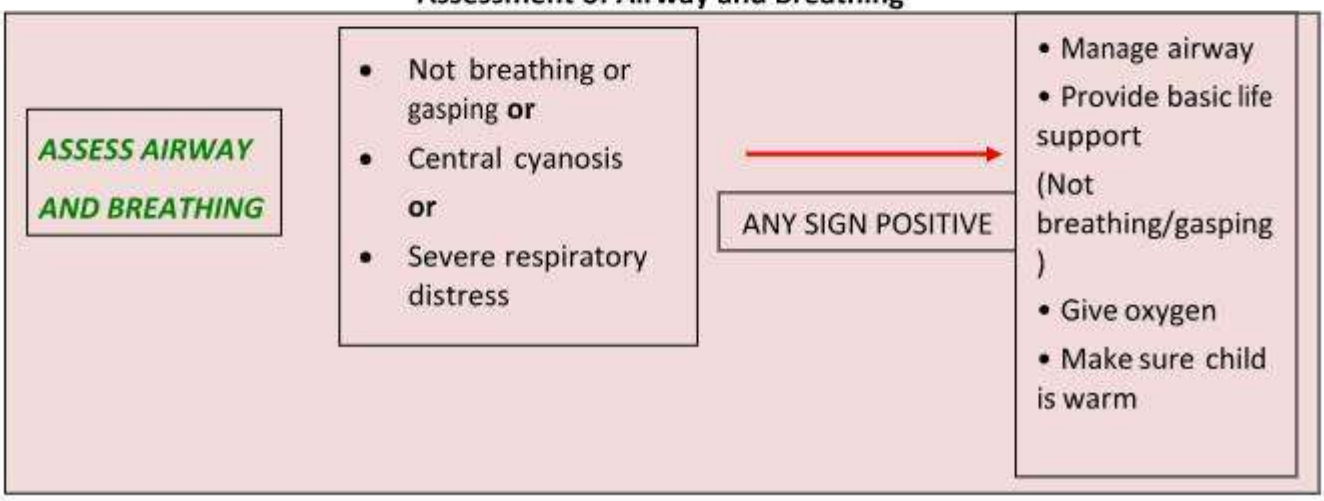
4.10.3 How to Treat Hypoglycaemia

Check for blood glucose in all children presenting with emergency sign, those with severe acute malnutrition and all sick young infants (0-2 months):

- If hypoglycaemia detected defined as
  - < 45 mg/dl for young infants and < 54 mg/dl in older sick children beyond 2 months),
  - give I/V bolus dose of 10% dextrose, in the dose of 2 ml/kg for young infants, and 5 ml/kg for older children.
- If you cannot measure blood glucose, give bolus dose as above. Refer the case to higher centres like RH/SDH IF Paediatrician is present or to DH.

4.10.4 Airway and Breathing:

Assessment of Airway and Breathing



Signs of severe respiratory distress

- Respiratory rate in
  - 0 -2 months > 60,
  - 2 months – 1 year > 50 &
  - >1 year – 5 years > 40.
- Severe lower chest in-drawing
- Head nodding
- Grunting
- Apnoeic spells
- Unable to feed due to respiratory distress
- Stridor in a calm child.

Basic Life Support:

Basic Life Support for a young infant is different from that of an older child because of differences in anatomy and physiology. The following sections refer to children older than 2 months. For young infants, refer to **Annexure 4.1**(Vol. II)

Management of airway in a child with gasping or who has just stopped breathing.
Positioning to Improve the Airway when no neck trauma suspected.

Child Conscious	Child Unconscious
• **Inspect mouth and remove foreign body, if present.** • **Clear secretions from throat using suction catheter.** • **Let child assume position of maximal comfort.** • **Give Oxygen.** • **Continue with further assessment.**	• Open the airway by Head tilt and Chin lift method. (Fig. 1) • Inspect mouth and remove foreign body, if present • Clear secretions from throat • Check the airway by looking for chest movements, listening for breath sounds and feeling for breath.

Head tilt-chin lift manoeuvre

The neck is slightly extended and the head is tilted by placing one hand on to the child's forehead. Lift the mandible up and outward by placing the fingertips of other hand under the chin.



Fig. Position for opening airway

Positioning to improve the Airway when neck trauma suspected

To limit the risk of aggravating a potential cervical spine injury, open the airway with a jaw thrust while you immobilize the cervical spine. It is safe to use in cases of trauma for children of all ages.

Neck trauma suspected (possible cervical spine injury)

- Stabilize the neck, as shown in figure 2.
- Inspect mouth and remove foreign body, if present
- Clear secretions from throat by suction catheter
- Check the airway by looking for chest movements, listening for breath sounds, and feeling for breath

Jaw thrust manoeuvre

The jaw thrust is achieved by placing two or three fingers under the angle of the jaw on both sides, and lifting the jaw upwards and outward. The jaw thrust maneuver is also used to open the airway

when bag-mask ventilation is performed.



Fig. Using Jaw thrust without head tilt

If after any of these manoeuvres the child starts breathing, an oropharyngeal airway should be put and start oxygen.

If the child is not breathing even after the above manoeuvres or spontaneous ventilation is inadequate (as judged by insufficient chest movements and inadequate breath sounds), ventilate with a self-inflating bag and mask.

Ventilation with Bag and mask

- **Positioning**
  - A "sniffing" position (padding under the shoulder to prevent excessive flexion of the neck that occurs when their prominent occiput rests on the surface on which the child lies without hyper-extension of the neck) is usually appropriate for children less then 2 years old. In correct sniffing position, the opening of the external ear canal should be in line with or in front of (anterior to) the anterior aspect of the shoulder. Extreme hyperextension of the infant neck can produce airway obstruction.
  - In children older than 2 years you may need to give padding under the occiput to obtain optimal airway position.





Fig. Difference in padding for an infant and older child

- Bags **and masks should be available in sizes for the entire paediatric range (size 0, 1 and 2).**

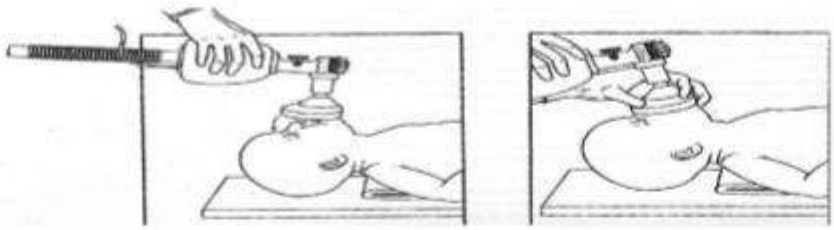
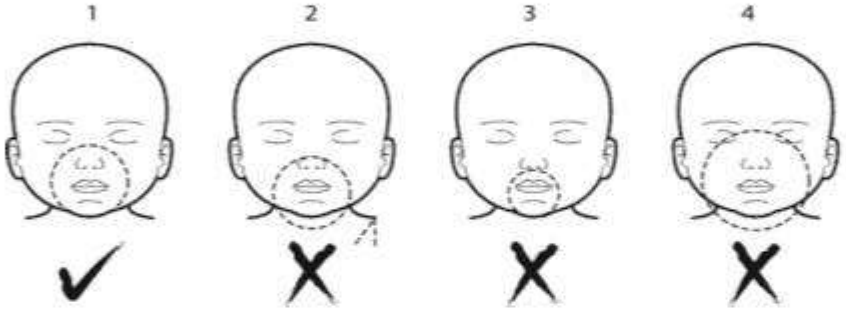


Fig. Bag and mask ventilation

- It is important for the mask to be the correct size for the child; it must completely cover the mouth and nose without covering the eyes or overlapping the chin. The correct size and position are shown in the figure.



1. Correct size and position
2. Mask too large, overlaps the chin
3. Mask too small, nostrils not covered
4. Mask too large, overlap with eyes

Fig. Choosing the correct mask size

- Self-inflating bags of minimum volume 450-500ml should be used. Use force and tidal volume just enough to cause the chest to rise visibly.
- Reservoir and oxygen (5-6 L/min) should be connected to the self inflating bag during resuscitation.
- **After two effective ventilations, check the pulse (femoral, brachial or carotid) for no more than ten seconds. If pulse is absent, the second person should start chest compression.**

4.10.5 Chest compressions:

The techniques for chest compression vary for a child under 1 year and those between 1-8 years and are detailed below:

Chest compression in the infant (less than 1 year of age)

There are two techniques for performing chest compression. These techniques are:

- **Thumb technique,** where the 2 thumbs are used to depress the sternum, while the hands encircle the torso and the fingers support the spine.

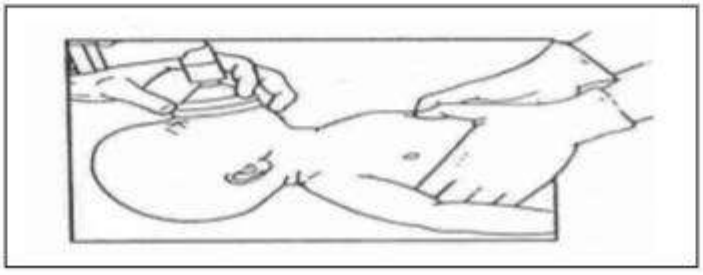


Fig. Thumb technique

- **2-finger technique**, where the tips of the middle finger and either the index finger or ring finger of one hand are used to compress the sternum, while the other hand is used to support the baby's back (unless the baby is on a very firm surface).
- Using either method to give chest compressions, compress the lower half of the sternum but do not compress over the xiphoid. After each compression allow the chest to recoil fully because complete chest re-expansion improves blood flow into the heart.
- "Push hard": push with sufficient force to depress the chest approximately one third to one half the anterior- posterior diameter of the chest.
- "Push fast": push at a rate of approximately 100 compressions per minute.
- Release completely to allow a complete recoil of the chest by completely releasing the pressure but maintaining contact with the compression site.
- Minimize interruptions in chest compressions.
- During cardiopulmonary resuscitation, chest compressions must always be accompanied by positive-pressure ventilation.
- Avoid giving a compression and ventilation simultaneously, because one will decrease the efficacy of the other.
- Therefore, the 2 activities must be coordinated, with one ventilation interposed after every third compression (3 compressions followed by one ventilation), for a total of 30 breaths and 90 compressions per minute

Chest compressions for the child (1 to 8 years of age)

- Place the heel of one hand over the lower half of the sternum. Lift your fingers to avoid pressing on the ribs.



Fig. Chest compression for the child

- Depress the sternum 1/3 to 1/2 of the depth of the chest. This corresponds to a 1 to 1-½ inches.
- Compress at the rate of approximately 100 times per minute.
- The ratio of chest compressions and ventilation should be 15:2, (Fifteen compressions followed by two ventilation).
- Bag and mask ventilation is a very effective way of ventilation if done correctly.
- Setup an intravenous or an intraosseous line for use of any drugs, where needed.

Use of Adrenaline

Adrenaline 0.1 ml /kg (1:10,000) intravenous can be used in a child who does not respond to initial ventilation and chest compressions and his pulses are absent. Two such doses can be used 3-5 minutes apart.

Giving Oxygen to a child with respiratory distress

- With a Head box (8-10 L/min) or a Face mask (5-6 L/min).
- Should be allowed to take a comfortable position of his choice and should be given oxygen.
- Continue giving oxygen continuously until the child is able to maintain a SaO2>92% in room air. When the child is stable and improving, take the child off oxygen for a few minutes. If the SaO2 remains above 92%, discontinue oxygen, but check again ½ hour later, and 3 hourly thereafter

on the first day off oxygen to ensure the child is stable. Where pulse oximetry is not available, the duration of oxygen therapy is guided by clinical signs, which are less reliable.

- Any child who has been successfully resuscitated or any unconscious child who is breathing and keeping the airway open should be placed in the recovery position. This position helps to reduce the risk of vomit entering the child's lungs. It should only be used in children who have not been subjected to trauma. A child with cyanosis or severe respiratory distress should be allowed to take a comfortable position of his choice.
- Organize Urgent Transfer to higher centres in 108 Ambulance

4.10.6 Circulation

After the Airway has opened, assess if a child has a circulation problem you need to know:.

The letter **C** in "**ABCD**" stands for **Circulation, Coma and Convulsions.**

Assess the circulation for signs of shock

The most common cause of shock in children is due to loss of fluid from circulation, either through loss from the body as in severe diarrhoea or when the child is bleeding or through capillary leak in a disease such as severe Dengue fever. In all cases, it is important to replace this fluid quickly. An intravenous line must be inserted and fluids given rapidly in shocked children without severe malnutrition.

Capillary Refill Time: To assess the circulation, take the child's hand and feet in your own. If it feels warm, the child has no circulation problem and you do not need to assess capillary refill or pulse. If the child's hands and feet feel cold, you need to assess the capillary refill.



a. Applying pressure to the nail bed for 3 seconds (Fig.8)
b. Check the time to return of the pink colour after releasing the pressure
c. The capillary refill time is the time from release of pressure to complete return of the pink color. If it is more than 3 seconds the child may be in shock. Lift the limb slightly above heart level to assess arteriolar capillary refill and not venous stasis.

Weak & Fast Pulse: Evaluation of pulse is critical to the assessment of systemic perfusion. The radial pulse should be felt. If it is strong and not obviously fast the pulse is adequate; no further assessment is needed.

Weak and fast pulse is defined :

In Infants : > 160/min

In Children : > 140/min.

Thus, if the child has cold extremities, a capillary refill time more than 3 seconds, and a fast weak pulse, then he or she is in shock.

Treatment of Shock :

- If the child has any bleeding, apply pressure to stop the bleeding. Do not use a tourniquet.
- Give oxygen.
- Give fluids and other treatment for shock.

Young Infants :

- Fluid bolus of 20ml/kg of normal saline over 20-30 minutes e.g. in a baby weighing 3 kg, 60 ml of normal saline should be infused over 20-30 minutes. If no or partial improvement (i.e. tachycardia and CRT still prolonged), repeat a bolus of 20 ml/kg of normal saline.
- If the signs of poor perfusion persist despite 2 fluid boluses, start vasopressor support, except in infants with severe dehydration who should be treated as per Plan C of diarrhoea management.

4.10.7 Coma and Convulsion

C also represents "**Coma and Convulsion**".

Assess the child for coma and convulsion

Coma

For assessment of the conscious level of a child is, a simple scale (AVPU) is used:

A Is the child Alert? If not,

V Is the child responding to Voice? If not,
P Is the child responding to Pain?
U The child who is Unresponsive to voice (or being shaken) AND to pain is Unconscious.

A child who is not alert, but responds to voice, is lethargic.

An unconscious child may or may not respond to pain.

A child with a coma scale of "P" or "U" will receive emergency treatment for coma as described below.

Convulsions

- The child must be seen to have a convulsion during the triage process for emergency treatment for convulsion.
- Convulsion are recognized by the sudden loss of consciousness associated with uncontrolled jerky movements of the limbs and/or the face. There is stiffening of the child's arms and legs and uncontrolled movements of the limbs. The child may lose control of the bladder, and is unconscious during and after the convulsion.
- Sometimes, in infants, the jerky movements may be absent, but there may be twitching (abnormal facial movements) and abnormal movements of the eyes, hands or feet.

Treatment of Coma & Convulsions are similar and is as follows:

Manage the Airway

Coma

Managing the airway is done in the same way as treating any child with an airway or breathing problem. Give oxygen in emergency setting.

Convulsion

- To manage the airway of a convulsing child gentle suction of oropharyngeal secretions should be done & child put in recovery position and oxygen started.
- Do not try to insert anything in the mouth to keep it open.

Put the child in Recovery Position

Any unconscious child who is breathing and keeping the airway open should be placed in the

recovery position.

This position helps to reduce the risk of vomit entering the child's lungs.

- **If neck trauma is not suspected**
  - Turn the child on the side to reduce risk of aspiration
  - Keep the neck slightly extended and stabilize by placing the cheek on one hand
  - Bend one leg to sta

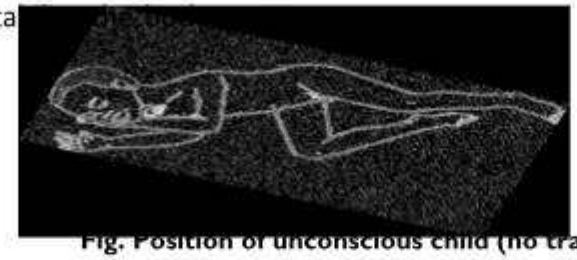


Fig. Position of unconscious child (no trauma)

- **If trauma is suspected**
  - Stabilize the child while lying on the back.
  - When the patient is not being moved, a sandbag placed on each side or a cervical collar can splint the neck.
  - Use bottles or rolled towels in case sandbags are not available as shown in the figure.



Fig. Position of unconscious child (trauma suspected)

- Use the "log roll" technique to turn the child on the side if the child is vomiting.



Fig. Log roll

- **Insertion of an oropharyngeal (Guedel) airway.**
  - The oropharyngeal or Guedel airway can be used in an unconscious patient to improve airway opening.
  - It may not be tolerated in a patient who is awake and may induce choking or vomiting.
  - Guedel airways come in different sizes (Guedel size 000 to 4). An appropriate sized airway goes from the centre of the teeth (incisors) to the angle of the jaw when laid on the face with the convex side up.

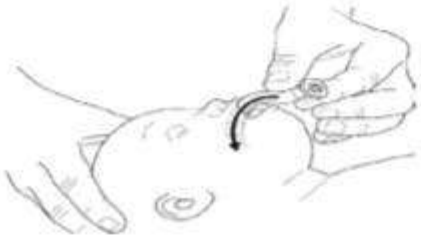


Fig. Inserting an oropharyngeal airway in an infant: convex side up

- Select an appropriate size of airway
- Position the child to open the airway as described above, taking care not to move the neck if trauma suspected.
- Using a tongue depressor, insert the oropharyngeal airway the convex side up.
- Re-check airway opening.
- Use a different sized airway or reposition if necessary.
- Give oxygen

- **Management of Convulsions in infant up to 2 weeks of age:**
  - Secure IV access
  - If blood sugar < 45 mg/dl, give 2 ml/kg 10% dextrose
  - If seizures continue: IV 10% Calcium gluconate 2ml/kg to be diluted in distilled water in proportion 1:1 over 10 minutes to be diluted in while monitoring heart rate (in young infants).
  - If seizures continue: IV phenobarbitone 20 mg/kg in 20ml of 5% dextrose or saline over 20 min
  - If no control: Repeat phenobarbitone 10 mg/kg till a total of 40 mg/kg
  - If seizures continue: Give phenytoin 20 mg/kg in 20 ml of normal saline over 20 min

Dose of Phenobarbitone for young infants

Inj. Phenobarbitone intravenous dose (200mg/ml)		
Weight of Infant	Initial dose	Repeat dose
2 kg or less	0.2 ml	0.1 ml
2 to 4 kg	0.3 ml	0.15 ml

CAUTION: DO NOT USE DIAZEPAM FOR CONTROL OF CONVULSIONS IN NEONATES < 2 WEEKS

- Managing convulsions more than 2 weeks of age:
  - Diazepam is the first drug used to stop convulsions (anticonvulsant), if the child is convulsing in front of you. No drug should be given if the convulsion has stopped.
  - Diazepam can be given by the rectal or intravenous route.
  - Rectal diazepam dose is 0.5mg/kg (0.1ml/kg) by tuberculin syringe or a catheter and acts within 2 to 4 minutes. Hold the buttocks together for a few minutes.
- Intravenous dose is 0.25mg/kg (0.05 ml/kg) over 1 minute. Diazepam can affect the child's breathing, so it is important to reassess the airway and breathing regularly.

Dose of Diazepam

Age / weight	Diazepam given rectally 10 mg / 2 ml solution	Diazepam given IV 10 mg / 2 ml solution
	Dose 0.1 ml/kg	**Dose 0.05 ml/kg**
2 weeks to 2 months (<4	0.3 ml	0.15 ml

2 - <4 months (4 - <6 kg)	0.5 ml	0.25 ml
4 - <12 months (6 - <10	1.0 ml	0.5 ml
1 - <3 years (10 - <14 kg)	1.25 ml	0.6ml
3 - <5 years (14 – 19 kg)	1.5 ml	0.7ml

- If convulsions do not stop after 10 minutes of second dose of diazepam then start with Inj. Phenytoin.
- Inj. Phenytoin can be given intravenously if access has been achieved. 15 - 20 mg/kg Phenytoin is diluted in about 20 ml of saline and given slowly (not more than 1 mg/kg Phenytoin per minute).
- Alternatively, Inj. Phenytoin phenobarbitone can be used in a dose of 15- 20mg/kg IV (in 20 ml 5% dextrose or saline) or IM.

At this stage, seek help of a senior or more experienced person at RH/SDH/DH if available.

If there is high fever:

- Sponge the child with room-temperature water to reduce the fever.
- Do not give oral medication until the convulsion has been controlled (danger of aspiration)

4.10.8 Dehydration

The letter **D** in the ABCD formula stands for **Dehydration**.

Assess for severe dehydration

- To assess if the child is severely dehydrated ask for:
  - Lethargic
  - Child have sunken eyes
  - Skin pinch take longer than 2 seconds to go back

If child has diarrhoea with any two of the above signs he is classified to have severe dehydration.

Treatment of severe dehydration in an emergency setting

Severe dehydration (without severe acute malnutrition)

- Start IV fluid immediately. If the child can drink, give ORS by mouth while the drip is set up. Give 100 ml/kg Ringer's lactate solution (or, if not available, normal saline), divided as follows:
-

IV fluids for severe dehydration

AGE	First give 30	Then give 70 ml/kg in
Infants (Under 12 months)	1 hour*	5 hours
Children (12 months up to 5 years)	30 minutes*	21/2 hours

* Repeat once if radial pulse is still very weak or not detectable.

- Reassess the child every 15-30 minutes. If hydration status is not improving, give the IV drip more rapidly.
- Also give ORS (about 5 ml/kg/hour) as soon as the child can drink: usually after 3-4 hours (infants) or 1-2 hours (children).

Volume of ORS

Weig	Volume of ORS solution per hour
<4	15
4 - <6	25
6 - <10	40
10 - <14	60
14 – 19	85

If IV treatment not possible, give ORS 20 ml/kg/hour for 6 hours (120 ml/kg/day) by NG tube

- Reassess an infant after 6 hours and a child after 3 hours. Classify dehydration. Then choose the appropriate plan (A, B, or C) to continue treatment.
- Give oral antibiotic for cholera if child is 2 years or older.
- If possible, observe the child for at least 6 hours after rehydration to be sure that the mother can maintain hydration by giving the child ORS solution by mouth.

Section 5

RCH (Child Health) Immunization Programme

Immunization is one of the most cost-effective public health interventions to reduce morbidity and mortality due to vaccine preventable diseases. Immunization is important component of RCH programme.

Important landmarks in immunization program

Year	Milestone Description
1978	Expanded Programme on Immunization (DPT, OPV, BCG, TT)
1985	Universal Immunization Programme (Measles added)
1992	Child survival and safe motherhood programme
1995	Polio eradication activities started
1997	Reproductive and child health programme
2017	MR Vaccine introduced, PCV (Phased launch), Use of adrenaline IM by ANM in AEFI
2021	PCV introduced into UPI

5.1 National Immunization Schedule

National Immunization Schedule for infant children & Pregnant Women				
Vaccine	When to give	Dose	Route	Site
For Pregnant Women				
Td -1	Early in pregnancy	0.5 ml	Intramuscular	Upper arm
Td -2	4 weeks after Td-1*	0.5 ml	Intramuscular	Upper arm
Td booster	If received 2 Td doses in a pregnancy within last 3 years *	0.5 ml	Intramuscular	Upper arm
Infants				
BCG	At birth or as early as possible till one year of age	0.1ml (0.05ml till 1 month age)	Intra-dermal	Left upper arm (deltoid area)
Hep-B zero dose	At birth or as early as possible within 24 hours	0.5ml	Intra-muscular	Antero-lateral side of Right mid-thigh
OPV- 'Zero' dose	At birth or as early as possible within first 15 days	2 drops	Oral	Oral

OPV 1,2&3	At 6 weeks,10 weeks & 14 weeks	2 drops	Oral	Oral
Pentavalent-1,2 & 3	At 6 weeks 10 weeks & 14 weeks	0.5 ml	Intra-muscular	Antero-lateral side of Left mid-thigh
Rota virus	At 6 weeks 10 weeks & 14 weeks	2ml	oral	oral
PCV	At 6 weeks,14weeks and 9 months	0.5 ml	Intra-muscular	Antero-lateral side of Right mid-thigh
Fractional Inactivated Polio Vaccine (f IPV)#	At 6 weeks,14weeks	0.1 ml	Intra dermal	Right upper arm
	9 months	0.1 ml	Intra dermal	Left upper arm
MR-1	9 completed months-11 months	0.5ml	Sub-cutaneous	Right upper Arm
JE-1 **	9 completed months-11 months	0.5ml	Intramuscular	anterolateral aspect of right mid thigh
Vitamin-A (1st dose)	At 9 months with MR 1st vaccine	1 ml (1 lakh IU)	Oral	Oral
For Children				
DPT booster-1	16-23 months	0.5ml	Intra-muscular	Antero-lateral side of Left mid-thigh
MR 2nd dose	16-23 months	0.5ml	Sub-cutaneous	Right upper Arm
OPV Booster	16-23 months	2 drops	Oral	Oral
JE-2 **	16-23 months	0.5ml	Intramuscular	anterolateral aspect of right Mid thigh
Vitamin-A* (2nd**	16 months. Then, one dose every 6 months up to the	2ml (2 lakh IU)	Oral	Oral

to 9th dose)	age of 5 years			
DPT Booster-2	5-6 years	0.5ml	Intra-muscular	Upper Arm
Td	10 years & 16 years	0.5ml	Intra-muscular	Upper Arm

Give Td-2 or booster doses before 36 weeks of pregnancy. However, give these even if more than 36 weeks have passed. Give Td to a woman in labour, if she has not previously received Td

** JE vaccine, in select endemic districts after the campaign.

*** The 2nd to 9th doses of vitamin A can be administered to children 1-5 years old during biannual rounds in collaboration with ICDS.

5.1.1 Points to remember:

- BCG/Pentavalent/IPV/PCV/RVV can be given till 1 yr. of age.
- DPT vaccine can be given up to 7 yrs. of age.
- MR and OPV vaccines can be given up to 5 yrs. of age.
- JE vaccine is introduced in selected endemic districts after the campaign. It can be given up to 3 years of age.

5.2 Planning of immunization services

5.2.1 Estimation of beneficiaries

- House hold survey twice in a year
- Last 3 years coverage report
- Estimation based on birth rate & population

Based on above 3 methods it is essential for MO to estimate the no. of beneficiaries of each age group to judge the completeness of reporting of sub centre and also to plan the immunization activities in the PHC. Compare the number of estimated beneficiaries with actual registration in R-15 (ANC register), R-16 (0-2 years) and R-17 (2-16 years) registers (now RCH register). Population of village/Sub-centre and birth rate are required for estimation of beneficiaries of each age group. Considering the birth rate as 16.5/1000 population, estimated figures of various beneficiaries for sub centre of 5000 population are given below

Antenatal registration

This is most important indicator as it is entry point for Mother and child services.

Expected number of ANCs in one year = (Birth rate × Population / 1000) X 1.1

Example: Estimated number of ANC for 5000 population

= (16.5 × 5000 / 1000) X 1.1 = 83X 1.1 = 91 ANC per 5000 population

At any given point of time the MPW(F) should have in hand 50% of annual expected numbers of pregnancies in her area, because pregnancy is a 9-month event & most women acknowledge their pregnancy only around third month.

Infant (0-1 year)

No. of estimated children (0-1years) = Birth rate × Population / 1000.

Example: 16.5 × 5000 / 1000 = 83

There are estimated 83 children of 0-1year age group in 5000 population.

Children 1-2 years (13-24 months) age group

No. of estimated children 1-2 years = No. of estimated children 0-1 years × (1- IMR)

Example: 83 × (1- 16/1000) = 83 × (1 – 0.016) = 83 × 0.984 = 81.67 i.e. = 82 children

There are estimated 82 children in 1-2 years age group. The 2% deduction is due to infant mortality.

Children of 5 years age group

Number of estimated children at 5 years = No. of estimated children 0-1 years × (1-Underfive mortality rate).

Example: 83 × (1- 18/1000) = 83 × (1 – 0.018) = 83 × 0.982 =81.51= 82 children

There are estimated 82 children at 5 years of age. The 2% reduction is due, to under-five mortality.

Children 0-5 years age group

As birth rate and IMR of population changes, estimated figures will also change accordingly. There can be variation of10% in estimations and actual beneficiaries due to differences of age and sex structure in particular population. If variation is more than 10%, MO should discuss with concerned staff about reasons for difference. If reasons are not appropriate, house-to house survey needs to be carried out to enlist escaped beneficiaries.

No. of estimated children 0-5 years = (No. of estimated children 0-1 years × 5) - 5% of 0 to 5 yrs. children.

Example: 83 × 5 = 415 - 21 = 394 children

There are estimated 394 children in 0-5 age group. The 5% reduction is due to mortality of the children during each year of age.

If the birth rate and IMR of the population changes, the estimated figures will also change accordingly. There can be variation of 10% in estimations and actual beneficiaries due to differences of age and sex structure in the population. In case of more than 10% variation, medical officer should discuss with concerned staff about the reasons for difference. If reasons are not appropriate, house-to-house survey needs to be carried out to enlist escaped beneficiaries.

5.2.2 Planning of Immunization sessions

Steps in micro-planning

For rural areas:

At sub-centre level:

- List all villages, hamlets, vadis/vastis/padas/tolas including high risk areas, nomadic sites, brick kilns, riverine areas etc.
- Estimation of beneficiaries based on actual headcount
- Estimation of vaccines and logistics as per the formulas given.
- Preparation of work-plan having following information; name of vaccinator, names of supporting workers, mobilizers session site name and time

At sub-centre/PHC level:

- An area map mentioning all villages, hamlets, hard to reach areas, high risk areas like nomadic site, brick kilns, slums, construction Sites riverine areas etc. Also show vaccine delivery route, Anganwadi centres etc.

At PHC level:

- Supervision plan
- A budget that includes the costs of transport, meetings, social mobilization and other activities
- IEC and training plans

For urban areas:

- Map all administrative zones and wards, with clear demarcation of catchment areas of various public health service providers (Municipal or health department)
- Include all slums and underserved areas, nomadic sites, construction sites etc.

Criteria for deciding frequency of immunization sessions:
Outreach sites (SC, AWC, etc. without vaccine storage facility) with an injection load of:
Calculation for injection load per month= {(total no of ANCs at any point of time*2 +total no of 0-2 years children) *17}/12

1-25 injection = 1 session every alternate month
26 – 50 injections = 1 session per month
51–100 injections = 2 sessions per month, etc

Fixed sites (PHC, CHC, District hospital or others where vaccine is stored) with an injection load of:

1-39 injection = 1 session every alternate month
40-70 injections = 1 session per month
71-140 injections = 2 sessions per month, etc

For a busy CHC/RH, plan daily sessions.

Other points to remember:

- Immunization session should be carried out on fixed day & time even if the day is holiday. Health staff engaged in the session on that day should be permitted to avail that holiday.
- Place of immunization session should be preferably Anganwadi. If there is no Anganwadi in the area, other suitable place where people of all castes and social strata can come freely should be identified for session.
- Once the number of sessions is fixed for each area, prepare chart indicating the workers, supervisor, MO supervising & other workers e.g. ASHA, AWW, Dai etc. for each session.
- Display the day, place and time of session on boards, one at Gram Panchayat or central public place and other at the place of session like sub-centre, Anganwadi centre etc.

5.2.3 Identify high-risk areas

Areas with low coverage due to drop out/missed children resulting into possibility of getting cases of vaccine-preventable-diseases (VPD) are classified as high-risk areas.

Criteria for identification of high risk areas:

- Villages/areas where a case or outbreak of any VPD has occurred in last 3 years.
- Areas with continuously low coverage of immunization due to high drop out because of migration and other reasons.
- Villages/areas with high risk groups like nomads, sugarcane cutters, brick kilns, construction sites, riverine areas, temporary slums, etc.
- Remote villages not accessible for more than 1 month in a year.
- Areas with vacant post of ANM/MPW (F) for more than 3 months
- Areas physically inaccessible because of river, dam, backwater of dam etc.

Plan the activities for high risk areas

There is possibility of low service coverage in areas mentioned above. Medical Officer must identify the areas, which fulfil above-mentioned criteria and plan the activities as follows -

- Make one HA specifically responsible for the area.
- Check the record of concerned ANM/MPW (M/F) and examine whether the beneficiaries are registered as per estimation.
- Always take review of these areas on priority, during weekly meeting of HAs and monthly review meetings.
- Calculate vital indicators of high-risk areas and check whether they tally with the other areas. If vital indicators are under reported or partially reported, arrange for special surveys.
- Personally visit the place at least once a month during session and check the service coverage by house-to-house visit.
- Take help of Self Help groups, opinion leaders, Mahila Mandals, GP and other important persons to increase the coverage. It is universal experience that these organizations from remote areas are usually very cooperative.
- Arrange immunization sessions with flexible timing as per the population working schedule i.e. either early morning or late evening.

Involve private practitioners

Encourage private practitioners from PHC area to give preventive services to community. Private practitioners may be requested to provide their clinic space on specific days of the month to conduct RI session by Govt. Functionary. If private practitioner independently conducts routine immunization session, then they should be encouraged to report their routine immunization coverage on new HMIS portal.

If session held in government institution, Health Officials should report on HMIS, RCH and U-VIN. Vaccine and syringes expenditure should be noted on E-VIN app.

5.2.4 Calculate the logistic support

Vaccine requirement

Vaccine requirement depends upon number of beneficiaries to be vaccinated, number of doses to be given and wastage. Formula to calculate vaccine requirement is:

Total number of infants × Number of doses of vaccine × wastage multiplication factor (WMF)

Total number of infants can be estimated on the basis of recent birth rate as given in the section on 'Estimation of Beneficiaries'. Number of doses of vaccine is decided by doses required to protect the child as per National Immunization Schedule.

Vaccine wastage:

- The Wastage rate (%) is the proportion of vaccine (and other injection items) that are wasted due to variety of reasons to that which was appropriately used (i.e. number of infants vaccinated) The **wastage multiplication factor** is a mathematical derivative used to account for the correct amount needed for an immunization session, taking into account the existing wastage rate. E.g. If the Wastage rate 10%, the WMF is 100/ (100 – 10) = 1.11
- The existing open vial policy (OVP) guidelines will be applicable to significantly reduce vaccine wastage. All efforts should be made to minimize vaccine wastage at all levels.
- The maximum acceptable wastage for vaccines eligible for reuse under the OVP (such as pentavalent vaccine, oral polio vaccine (OPV), inactivated poliovirus vaccine (IPV), Hep B, DPT, and Td) is 10%.

Vaccine	Maximum acceptable wastage
BCG	50% and WMF is 2
Measles Rubella	25% and WMF is 1.33
IPV, OPV, Pentavalent, Hep B, DPT, Td, PCV, JE	10% and WMF is 1.11

Example: Calculate the requirement of DPT vaccine for year.
Total doses given in DPT are 2 (booster) = 2, WMF is 1.11. Thus, for a village with 30 estimated infants, the DPT requirement will be:
Total number of infants × no. of doses of vaccine × WMF
30 × 2 × 1.11 = 67 doses. Vial of DPT contains 10 doses/vial. Thus, this village will require 17 vials in 12 months.
Prepare the chart of vaccine requirement of each **Arogya Seva Satra**, monthly and yearly. Total of requirement for all the Arogya Seva Satra plus 25% buffer stock will be the requirement of the PHC. Hence while calculating PHC stock requirement multiply total requirement with 1.25.
Remember, vaccine requirement can change year-to-year or place-to-place depending on population and birth rate for the year of planning.

Auto Disable Syringes (ADS) Requirement

Types of syringes to be used

- For BCG & IPV vaccine (intra-dermal route) 0.1 ml. syringe.
- For all other vaccines (intra-muscular and subcutaneous route) 0.5ml syringe
- For reconstitution of vaccine 5ml syringe.

Calculate yearly requirement of syringes
A wastage rate of 10% (or a WMF of 1.11) is allowed for all ADS and reconstitution syringes. Multiply the beneficiaries per year for each vaccine by the WMF of 1.11. Individually for each logistic, the formula is thus:

- 0.1 ml ADS = Beneficiaries for BCG & IPV x 1.1
- 0.5 ml ADS = (Beneficiaries for Td, DPT, Hep B, Pentavalent, IPV, MR and JE) x 1.1
- Reconstitution Syringes = [sum of no. of vials of BCG, and MR vials] x 1.1

Requirement of MCH cards

All the services related to pregnancy, childbirth and childhood immunization should be registered in MCH card. The MCH card should be issued at the time of ANC registration and continued up to preschool age. Therefore, yearly requirement for immunization card will be:
MCH cards requirement of village = Number of estimated ANCs in the village + 10% pregnancy wastage. Dividing one-year requirement by 12 (months) gives MCH card monthly requirement.
MPW (F) should expect 2-3 new ANCs per month for session and carry 3 new cards for every session.

RI Formats

A set of formats have been developed to collect and collage data to prepare RI micro plan for an area. The table below enlists these formats and the information they collect.

Table: RI micro planning formats and utility

Level of use	RI Form	Utility
PLANNING FORMS to be filled by ANM	1	• Master list of all the villages in sub centre area • Plan for conduction of survey
	2	Sub centre map
SURVEY FORMS Used In the Survey by ASHA / assessor area	3	Enlists all houses and occupants with focus on pregnant women and children in the age group of 0 to 2 years
	4	Enlists details of identified pregnant women
	5	Enlists details of infants / children identified
SUB CENTRE FORMS To be filled by ANM	6	RI Session beneficiary due list (to be made after SC microplan is approved by MO)
	7	RI session plan
	8	RI Session injection load and vaccine distribution plan
	9	Per session estimation of vaccines & logistics
	10	ANM work plan / roster
	11	Communication plan for SC
PHC FORMS	12	SC workload and Sessions plan
	13	PHC vaccine delivery plan including alternate vaccine delivery plan
	14	PHC vaccine and logistics per sub centre
	15	PHC – RI session supervision plan
	16	Emergency plan for vaccine storage
	17	Bio-medical waste management plan
	18	Communication plan for PHC/UHC

(For detailed micro planning formats kindly refer to Immunization Handbook for Medical Officers - Reprint 2017. For Immunization Handbook Refer Annexure 5.1(Vol. II))

Some of important RI formats (Refer Annexure 5.2(Vol. II))

Cold chain

All the vaccines should be kept between 2-8^{0}C to keep potent till the time of use. Keeping the vaccines within desired temperature (2-8^{0}C) from manufacturer to the point of use is called cold chain. Thus, maintenance of cold chain is the key activity in immunization program. The cold chain includes:

- Personnel who handle & manage vaccine distribution
- Cold chain equipment & their maintenance
- Transport facilities

For PHC, cold chain includes following components

- Training of health staff related to cold chain, importance of cold chain, use of cold chain equipment and action to be taken if there is failure of cold chain equipment.
- Storing the vaccines at recommended temperature (2-80C) after receiving from District Vaccine Store (DVS).
- Twice daily temperature recording of ILR and deep freezer including on sunday and holidays.

- Transporting vaccine for session in vaccine carrier with conditioned ice packs. Ensure periodic preventive maintenance of cold chain equipment through District Cold Chain Technician.

5.2.5 Open Vial Policy (OVP)

- Implementation of open vial policy allows reuse of partially used multi dose vials of applicable vaccines under UIP in subsequent session (both fixed and outreach) up to four weeks (28 days) subject to meeting certain conditions and thus reduces vaccine wastage.
- It is applicable on OPV, DPT, Td, Hep B, Pentavalent, JE, PCV and IPV and **not applicable for BCG, MR and RVV**

Conditions that must be fulfilled for the use of OVP

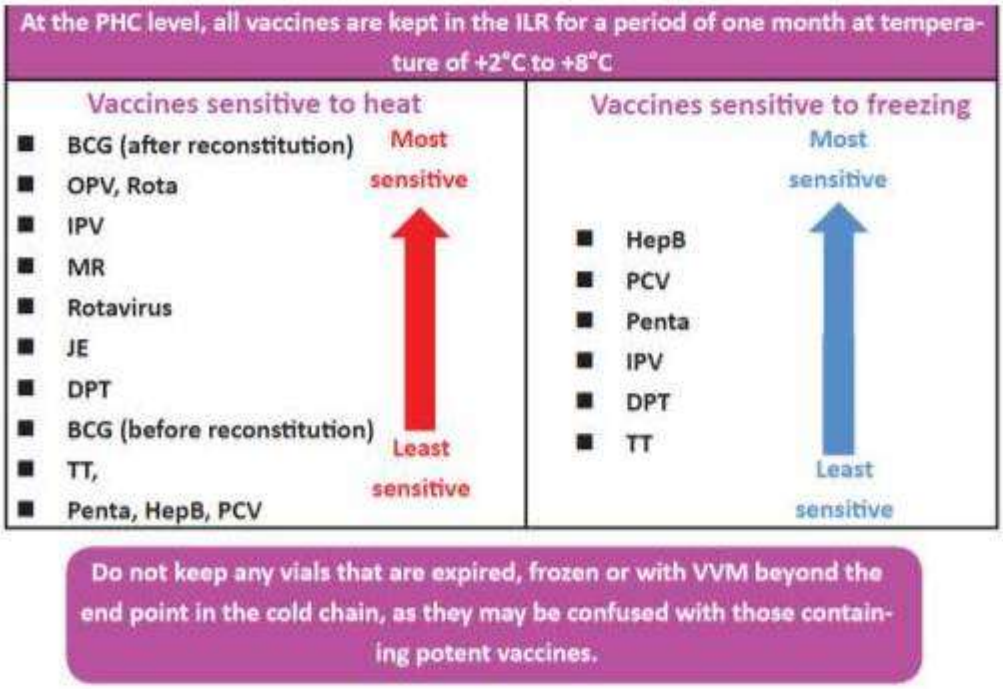
- The expiry date has not passed.
- All vaccine vials must be marked with date and time of opening at first use.
- The vaccines are stored under appropriate cold chain conditions both during transportation and storage in cold chain storage point.
- The vaccine vial septum has not been submerged in water or contaminated in any way.
- Aseptic technique has been used to withdraw vaccine doses.
- VVM has not reached/crossed the discard point.

Discard vaccine vial if any of the following conditions is met:

- Expiry date has passed.
- VVM reached/crossed discard point or vaccine vials without VVM or disfigured VVM.
- No label or partially torn label and/or writing on label not legible.
- Any vial thought to be exposed to non sterile procedure for withdrawal.
- Open vials that have been under water or vials removed from vaccine carrier that has water.
- If vaccine vial is frozen or contains floccules or any foreign particle.
- If there is breakage in the continuity of the vials (crack/leaks).
- If there is any reported AEFI following use of any of the vaccine vial, do not use it, and retain it safely. Inform medical officer and/or supervisor.

5.2.6 Sensitivity of vaccine to heat & freezing

All vaccines are not equally sensitive to heat. Spectrum of heat sensitivity to vaccine is given below which shows reconstituted BCG is most sensitive and Hepatitis B is least sensitive to heat.



5.2.7 Cold chain equipment maintenance:

Ice Lined Refrigerators (ILR) 140 lit. capacity

Capacity - 25,000 doses of all types and 18,000 doses of OPV

Temperature - 2^0 - 8^0C

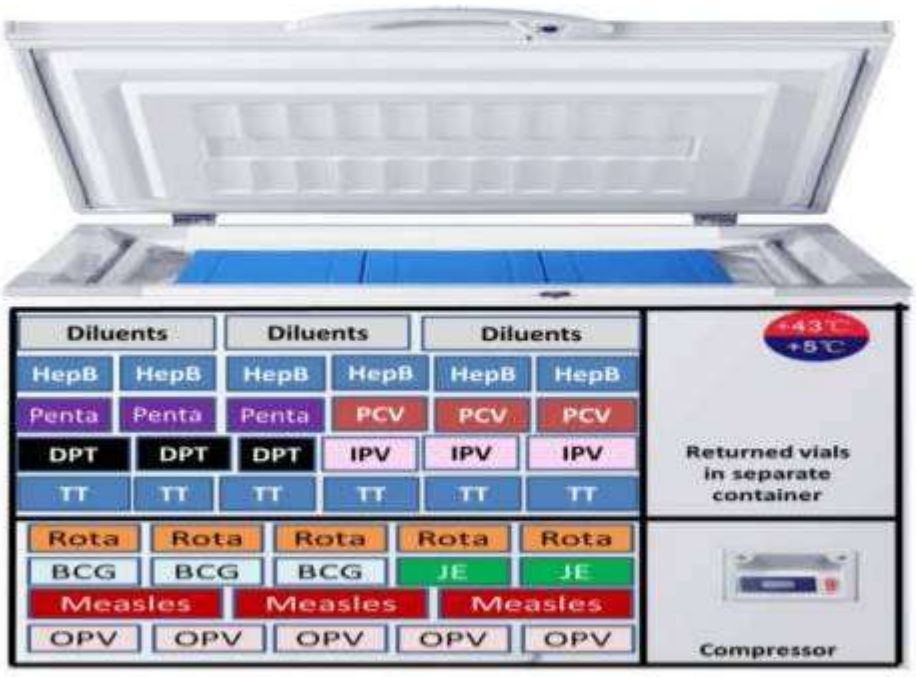
- Use - Storage of all vaccine supplied to PHC (BCG, OPV, DPT, Measles, Hepatitis B, and Td)
- Hold over time - Hold over time of ILR depends upon outside temperature. Inside temperature of ILR is maintained below 8^0C for 78 hours when outside temperature is 32^0C and 20 hours when outside temperature is 43^0C. In case of electricity failure, do not open the ILR to record temperature for first 48 hours. After that, arrange for shifting of vaccine to cold box if still there is uncertainty about duration of electricity failure.
- Thermostat - Thermostat is provided to keep inside temperature of ILR at desired level. At a particular level of thermostat, there is slight fluctuation of inside temperature of ILR depending upon outside room temperature. Because of this, level of thermostat needs to be adjusted periodically taking into consideration the room temperature at that time. Keep the thermostat at minimum during winter season so that temperature inside ILR should not fall below 2^0C. Start adjusting thermostat towards maximum depending upon increase in room temperature from end of winter till the summer is over. Thermostat should again be adjusted towards minimum depending upon outside temperature during rainy season. Adjustment of thermostat should be carried out when the daily temperature reading indicates the inside temperature has reached either at lowest (2-3^0C) or highest (7-8^0C) level. Remember, thermostat should be adjusted in such a way that temperature inside ILR should remain between 2-8^0C.
- Checking proper closer of upper lid of ILR
  In order to maintain the correct temperature ILR should get closed tightly without any gape. To check whether the lid is closed tightly or not, keep a paper on the edge of ILR & close the lid. Try to pull the paper outside. If resistance is felt while pulling the paper then it indicates that lid is tight. If there is no resistance while pulling the paper then lid is not getting tightly closed. Repeat this test for all sides of ILR. Improper closer of upper lid

causes escape of cold air leading to overload on compressor. Temperature of such ILR rises rapidly in case there is electricity failure. If the lid is not closing properly, inform the DRCHO immediately for sending cold chain technician.

- Vaccine storage

Guidelines to be followed for vaccine storage in ILR

- ILR has two sections - top section with trays and floor section at the bottom.
- Bottom is the coolest part & therefore only OPV and Measles vaccine should be kept on floor. In the top section of ILR, DPT, Pentavalent, IPV, Td, Hepatitis B and BCG vaccines should be stored. Never keep DPT, Pentavalent, IPV, Td, Hepatitis B vaccine on the floor as they can freeze & get damaged.
- Keep each type of vaccine in a separate labelled box. Make holes to the box so that cold air can move freely through the box.
- In addition to this, keep a separate box & label it as a "returned vaccine box". After finishing the immunization session, when the vaccine carriers are returned to PHC , for vaccines to which Open Vial policy is applicable. Check VVM of all returned vaccines (both unopened and partially used), if inner square of VVM is lighter than outer circle, keep the unopened vials in 'returned vaccine box'. While issuing vaccine to next session, first issue these vials. The returned vials should be first used during immunization session.
- Observe early expiry first out (EEFO) policy for issuing vaccines. If the vaccines are of same expiry date, the partially used vaccine vials should be re-issued. The vial opened earlier, as recorded on the label of the vial, should be issued first.



- **Defrosting**

  When we open the ILR, humidity in air enters inside it. This humidity is converted into ice in cold air and accumulates in the form of ice layers on sides and floor of ILR. When ice layer becomes thick, it overloads the compressors of ILR so it should be removed periodically. Removing the ice layer is called defrosting. The defrosting should be done every month or when ice layer is more than 5 mm thick. Defrosting is regular activity and responsibility of defrosting is of HA (F)/MPW (F) who records daily temperature and looks after the vaccine.

Method of defrosting

- Transfer all the vaccine kept in ILR to cold box with conditioned ice packs at bottom and sides of cold box.
- Switch off power supply & remove plug.
- Open defrost outlet plug, which is at the bottom, & keep one tray under the drain.
- Keep the lid of ILR open & allow ice to melt. Let the ice melt on its own. Do not use sharp instruments to scrub the ice.
- When total ice is melted, wash the sides and floor of ILR with warm water & mild detergent. Wipe & dry with cloth. Keep open till the inside is completely dry.

Restarting the ILR after defrosting

- Close the drain outlet, close lid & connect power supply plug and switch on.
- Turn thermostat knob to maximum and wait till the inside temperature reaches to 70C.
- Set the thermostat knob to original level (position before defrosting) and record the inside temperature.
- Shift all the vaccines at recommended places.

Deep Freezer (DF)

- Capacity: 140 litres (25 - 30 ice packs can be frozen in one day).
- Temperature: 15^0C to -25^0C
  - *Use* - For preparation of frozen ice packs. Do not store vaccine in DF.
  - *Hold over time* - In case of electricity failure, DF can maintain temperature at -15^0C for 26 hours when outside temperature is 32^0C 2 hours 30 mins when outside temperature is 43^0C.

Preparation of ice packs

- Fill the ice packs with water up to the mark shown near neck and close the cap tightly.
- Check for leakages by holding the icepack upside down, if water leaks out from cap, do not use the icepack. Leakage of ice pack inside deep freezer forms into hard ice, which leads to fixation of icepacks to floor or walls of deep freezer that may cause damage to equipment.
- Dry the outer surface of icepacks before keeping inside the deep freezer, otherwise when frozen; it will be difficult to separate.
- Keep ice packs on the floor of DF on the edge horizontally, allowing 1-2 cm space between two ice packs.

Defrosting - Same as ILR



Figure: Brick layered ice packs in deep freezer

Cold box

Capacity - 5 litres, 1500 doses & 20 ice packs.

Use

- Transportation of vaccine
- Used for storage of vaccine in case of power failure or during defrosting of ILR.

Hold over time - 90 hrs at 43^0C if cold box is not opened.

Vaccine storage

- Place conditioned ice packs inside cold box covering walls & floor.
- Keep the vaccine in cartons or plastic boxes & then place these in cold box.
- Cover the vaccine cartons at the top with two layers of conditioned ice packs. Place as plastic sheet to cover ice packs. Close the cold box and keep in cool dry place.

Maintenance

- Clean & dry after every use
- Examine for cracks.
- Check rubber seal if it is broken
- Lubricate hinges & locks routinely.



Figure: Packing a cold box

Vaccine carrier

- **Capacity** - 1.7literes, 15 - 20 vials & 4 ice packs.
- **Use** - To transport vaccine from PHC to Arogya Seva Satra.
- **Hold over time** -. 24 hrs.
- **How to pack**
  - Place 4 conditioned ice packs against the sides of vaccine carriers (Conditioning of ice packs: Remove frozen ice packs from deep freezer. Allow it to melt for some time outside till you hear little water sound on shaking.) Keep the plastic bag containing all vaccines and diluents in the centre of the carrier.
  - Do not drop or sit on the vaccine carrier.
  - Do not leave in sunlight.
  - Do not leave the lid opened once packed.
  - Keep diluents of BCG & Measles vaccine in vaccine carrier.
  - Keep dropper of OPV in vaccine carrier.

- **Maintenance**
  - Clean & dry inside after every use.

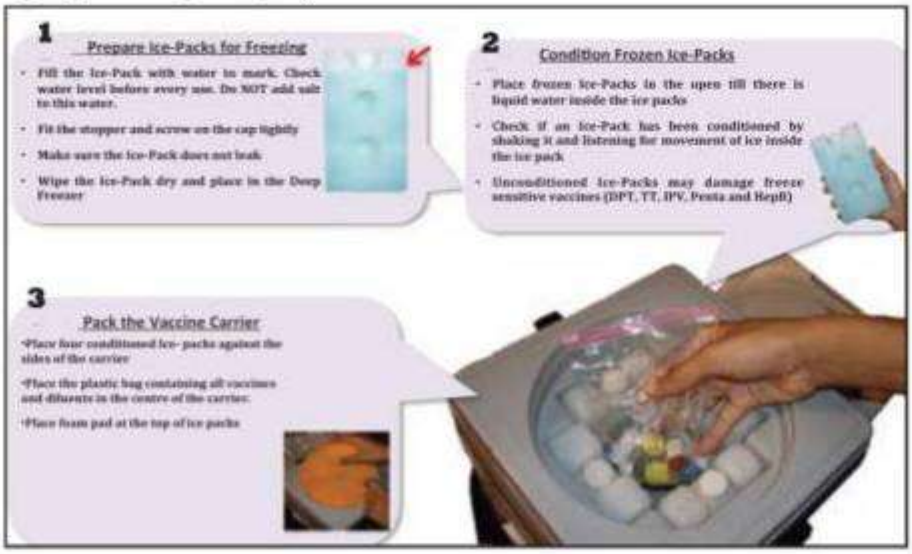


Figure: Correct packing of a vaccine carrier

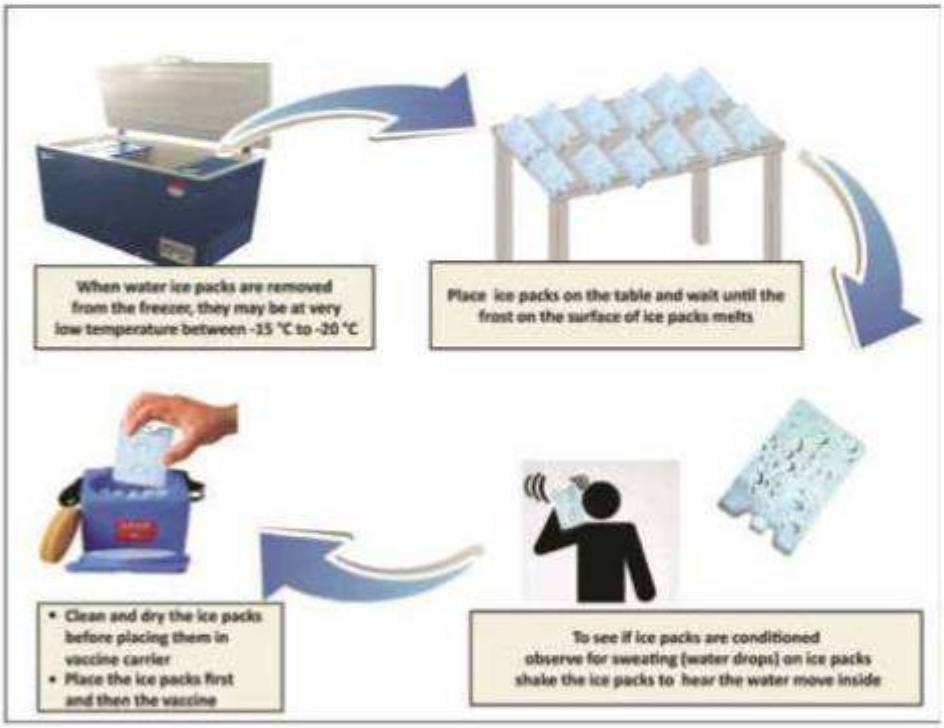


Figure: Ice pack conditioning

- **Thermometers**

  For recording temperature of ILR & DF one dial/alcohol stem thermometer has to be kept in each equipment. Alcohol stem thermometers are also provided which are much sensitive & accurate than dial thermometers.

5.2.8 Cold chain store

- Keep ILR and DF in one room, preferably the Medical Officer`s or LHV's room. This room should be well ventilated avoiding direct sunlight on equipments. Keep Cold Box and Ice packs in one room.
- Leave minimum 10 cm space from all sides of equipments (ILR, DF).
- Display alternate emergency plan indicating what to do in case of electricity failure or equipment breakdown (contingency plan).
- Display one small black board above the ILR and DF and to note down daily stock of all vaccines and available frozen ice packs on this board. This should be updated daily.
- Room should be properly cross ventilated, protected from rain or flooding.
- Plug points of 15 amps permanently fixed to power socket, labelled 'do not unplug'.
- It should be properly connected to voltage stabilizers, with at least one stabilizer of 1 KV (90 to 280 V) per equipment.
- Equipment should be locked and keys accessible to designated personnel.
- Ready reckoners are properly displayed near equipment.

Assessment of cold chain *

Cold chain assessment is made by two methods. One is by recording the temperature of ILR and Deep freezer daily and second is Vaccine Vial Monitor.

Temperature recording

- For recording of temperature of ILR & DF, a prescribed format has been given to all PHCs.
- It is a small booklet, which contains 12 monthly temperature-recording forms.
- For each month, day-wise temperature has to be recorded twice a day (10 am & 4 pm)
- Responsibility for daily temperature record has to be fixed with one of the HA (F) or headquarter ANM.
- MO should monitor temperature recording by HA (F) and actual temperature in ILR and DF. It is good practice for MO to check daily inside temperature of equipment and recorded temperature on register before starting OPD.
- If there is power failure it has to be mentioned in remarks column.

Electronic Data Logger

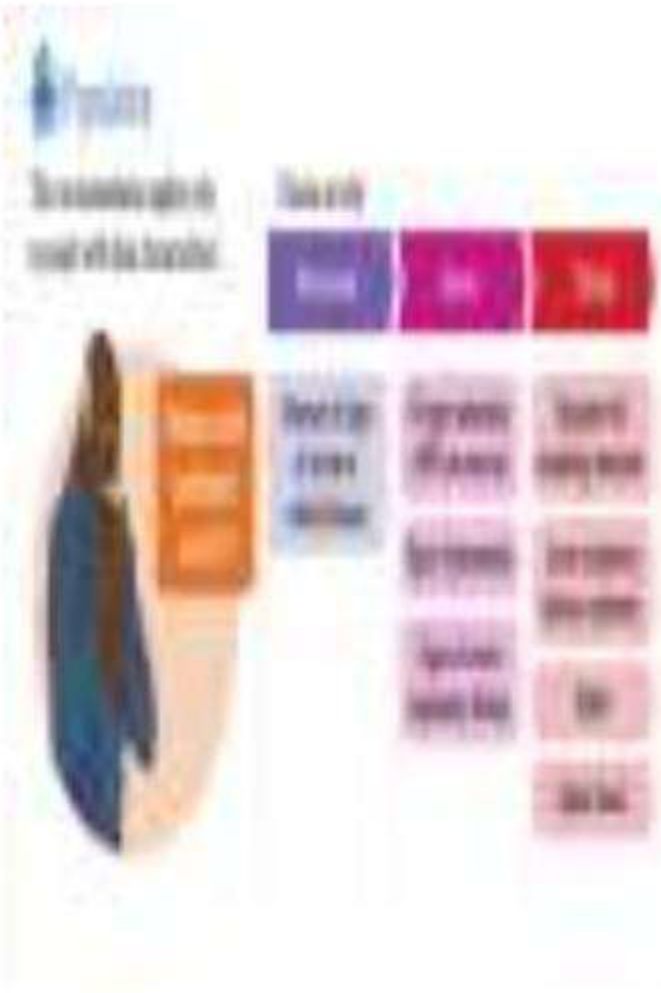
- Electronic Data logger is being introduced to monitor the temperature of ILR. Electronic logger is device placed with vaccine. It has an alarm that alerts the handlers as soon as temperature of ILR crosses the range.

5.2.9 Vaccine vial Monitor (VVM)

Vaccine vial monitor indicates cumulative effect of temperature on the monitor since it is fixed on the label of all vaccines. It is in the form of a greyish circle with square inside and it contains temperature sensitive material. In ambient temperature these square changes its colour depending on time of exposure to ambient temperature. Colour changes of VVM are classified into four stages.

- **Points to be remembered**
  - ILR if getting shift from electricity to solar/generator or solar/generator to electricity plug power supply, it is important to note shifting time, date. Responsibility of temperature record maintenance should be fixed on Saturday, Sunday and holidays (when OPD is kept off)
  - MO should cross check conditioning of ice pack process when vaccine carriers is getting ready for RI sessions.

Stages of VVM



UNUSABLE STAGES



Discard Point:

The color of the innersquare matches that of the outer circle: *DO NOT* use the vaccine If the color of the inner square is darker than the outer circle, DO NOT use the vaccine

Shake test

This test is performed to check whether the vaccine was frozen any time during storage. DPT vaccine vial kept for longer time shows transparent liquid in upper part & whitish, solid in lower part. Shaking the vial mixes these two layers uniformly very well. However, if vaccine was frozen any time, it will not mix up & the floccules will be seen in the vaccine. Vial with positive shake test i.e. showing floccules after shake test should be discarded.

Shake test - Test vial

- Take a vaccine vial you suspect that may have been frozen – This is "TEST" vial.

Shake test - Control vial

- Take a vaccine vial of the same antigen, same manufacturer, and same batch number
- as the suspect vaccine vial, you want to test.
- Freeze solid this vial at -20°C overnight in the DF, and this is the 'CONTROL' vial and
- label accordingly to avoid its usage.
- Let it thaw. Do NOT heat it.

- Hold the Control and the Test vials together between thumb and forefinger, and
- vigorously shake the vials for 10-15 seconds.
- Place both vials to rest on a flat surface, side-by-side and observe them for 30 minutes.
- Compare for rate of sedimentation.
- If the sedimentation rate in the 'Test vial" is slower than in the "Frozen vial", the vaccine has not been damaged, it has passed the shake test. Use the vaccine batch – it is not damaged.
- If the sedimentation rate is similar in both vials or if sedimentation is faster in the "Test" vial than in the "Frozen" vial, the vaccine is damaged, it failed in shake test. Do NOT use. Notify your supervisor.

Fig. 4.10: Shake Test Passed - Vaccine usable

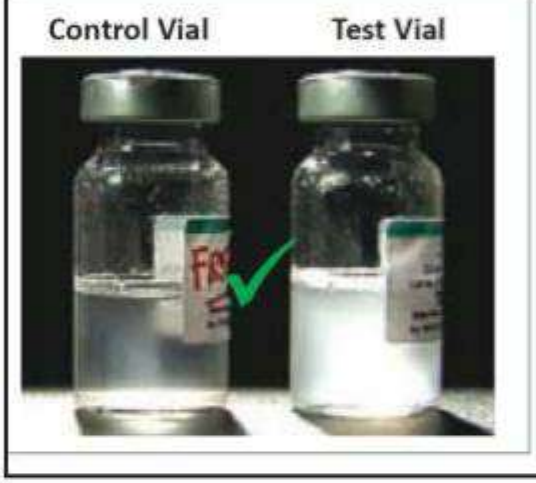
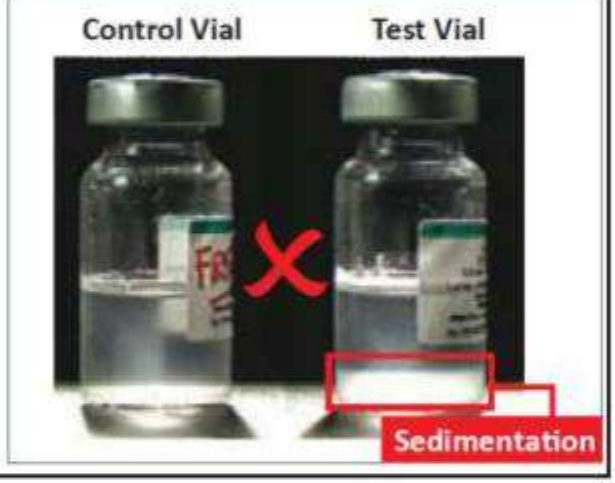


Fig. 4.11: Shake Test Failed - Do not use Vaccine



5.2.10 Breakdown of cold chain

In case of breakdown of cold chain equipment inform immediately to DHO / RCHO/ Dist. Cold Chain Technician/ THO. Every district has one cold chain technician, who visits PHC & make minor repairs of cold chain equipment. For major repair cold chain equipment has to be sent to State Health Transport Department, Pune. Repair of ILR, DF should never be done from private mechanic or company.

5.2.11 Power supply arrangement

- No electrical cold chain equipment should be installed without a voltage stabilizer.
- Function of voltage stabilizer is to reduce the range of fluctuations to 220 +/- 10 volts.

5.2.12 Emergency alternative plan

- For each PHC emergency alternative plan for vaccine storage must be prepared in case of electricity failure or breakdown of cold chain equipment.
- This plan should be displayed in the room where cold chain equipment is kept. MO should ensure that all the health staff knows that the plan is displayed & actions have to be taken accordingly.
- Always keep ready frozen ice packs in DF. For one cold box 20 frozen ice packs are required.
- If problem of cold chain failure persists for more than 3 days then vaccine should be shifted to near by PHC in cold box, which has ILR with capacity of 1500 doses. Never keep vaccine in domestic refrigerator.

No.	Problem	Actions to be taken by HA/ANM
1	Electricity failure	➢ Inform the MSEB immediately about electricity failure. ➢ Do not open ILR for 48 hours. If power failure still persists, make arrangements for vaccine transfer. ▪ Shift vaccine to cold box with conditioned ice packs. OR ▪ Shift vaccine to PHC (Name of nearby PHC)_____
2	ILR Breakdown	➢ If repair is possible within 2 weeks and DF is working - ▪ Shift vaccine to cold box with frozen ice packs. ▪ Change icepacks every 3-4 days till ILR is repaired If repair not possible and DF is not working properly ▪ Shift vaccine to PHC (Name of nearby PHC) ▪ Inform immediately to the technician at district health office

5.3 Planning and Monitoring of immunization services

Important components under planning and monitoring of immunization services are:

- Vaccine stock inventory and distribution of vaccine to Arogya Seva Satra
- Vaccine transportation in cold chain
- Immunization through Arogya Seva Satra
- IEC and follow up action

5.3.1 Vaccine stock and distribution of vaccine

- It is responsibility of HA (F) to receive, store & distribute vaccines through eVIN portal. If this post is vacant then HQ ANM should be made responsible for vaccine management.
- **Do not store vaccine in PHC for more than one month.**
- Two registers should be maintained for monitoring the stock of vaccine. First is Vaccine Stock Book and second is Vaccine Distribution Register.
- Daily monitor vaccine stock on eVIN portal and take action accordingly.
- Physically count vaccine stock of each vaccine and match with register to see any discrepancy in vaccine stock.
  Follow First In First Out rule (FIFO) i.e. vaccine received first should be used first. In addition to this you must see expiry date & in that case First to Expire First to Out (FEFO) principle must be used

5.3.2 Vaccine transportation in cold chain

- Vaccine needs to be kept between +2 to +8^{0}C temperatures from PHC till the point of use. Vaccine carriers with conditioned IEC packs should be used for transportation of vaccine from PHC to village. Following points are important while transporting of vaccine through cold chain –
- Use the session wise vaccine requirement chart for vaccine distribution. Do not give more than one day's requirement in vaccine carrier.
- Ensure ice packs are conditioned before placing in the vaccine carrier and wait for few minutes for temperature to fall to less than 80 Celsius in the carrier.
- See VVM on all vaccine vials before putting vaccine in vaccine carrier.

- Wrap vaccine vials and ampoules in thick paper (newspaper) before putting in polythene bag so as to prevent them from touching ice packs. Place the polythene bag in the centre of vaccine carrier.
- Place foam pad at the top of ice packs.
- Ensure that some ice is present in the ice packs while conducting immunization session.
- Secure the lid tightly.
- Do not sit on the vaccine carrier.
- Do not leave in sunlight.
- Do not leave the lid open once packed.
- Store diluents in ILR at least 24 hours before use.
- Vaccine carrier maintains the inside temperature between +2 and +8 for 12 hours with conditioned ice packs, if not opened frequently and it allows to carry vaccines (16-20 vials) and diluents from PHC/CCP to session site and to bring back the open vials (under the open vial policy) from session site to the PHC/CCP on the same day after the session for storage and subsequent use.

5.3.3 Arogya Seva Satra (Immunization Session)

Medical Officer of PHC is responsible for monitoring & supervision of Arogya Seva Satra in his/her PHC area. When there are two MOs in PHCs, all the sessions should be attended by MO. For PHCs where only one MO is posted, at least 50% sessions (on alternate times) should be attended by MO. MO should visit all the villages at least once in two months.

- For each session there should be fixed day, fixed place & fixed time.
- Responsibility of each activity under Arogya Seva Satra should be clearly mentioned and given to related health staff for smooth implementation. Responsibility chart should include activities like listing of beneficiaries, vaccine transportation, vaccination, monitoring adverse events following immunization, etc.
- It is responsibility of MO to ensure that no Arogya Seva Satra should be cancelled & sessions are held as per fixed date.
- For each Arogya seva satra ANM should prepare list of due beneficiaries to be vaccinated along with dose to be given. MO and HA to ensure that no ANM organizes session without list of beneficiaries.
- Before start of immunization session ANM should ensure following things:
  - Check vaccine labels
  - Check vaccine and diluents
  - Check expiry date of vaccine
  - Check the VVM
  - Shake the T-series and Hep B vials to rule out freezing and floccules.
  - Note down the batch number of each vaccine and diluents.
  - Enter the received vaccines details in the Vaccinator's logistic diary

  Vaccinator's logistic diary (Refer Annexure 5.3(Vol. II))

- Steps in conducting immunization session
  - Plan and conduct all RI sessions on U-WIN portal.
  - Welcome beneficiaries and verify their records for age and due vaccine
  - Screen for contraindications
  - Wash hands before reconstituting vaccine and conducting session

- Use only the diluents supplied with the vaccine as it is specifically designed by the manufacturer for the needs of the vaccine, with respect to volume, PH level and chemical properties
- Write the time of reconstitution on the vials
- Maintain aseptic technique throughout
- Position child correctly and clean the injection site if dirty with clean water swab
- Do not massage the injection site after giving the injection
- Do not touch the injection site with finger/cotton swab
- Cut the hub of the syringe with hub cutter
- Fully document each immunization in the immunization card, counterfoil, tally sheet and immunization register
- Retain counter foil in the tracking bag
- Ensure disinfection of needles and syringes followed by their disposal as per guidelines
- Leave the list of children vaccinated in the session with the ASHA/AWW and request them to be alert and report AEFIs. Share contact details of self and PHC
- If there would be the need to apply cotton swab to the injection site due to bleeding, ensure that the used cotton swab should be disposed in the yellow plastic/bin.

5.3.4 IEC activities and follow up

While giving any vaccine see that health worker is giving following key messages

- Msg. 1: What vaccine was given and what disease it prevents
- Msg. 2: When to come for the next visit
- Msg. 3: What are the minor side-effects and how to deal with them
- Msg. 4: To keep the immunization card safe and to bring it along for the next visit)

  Additionally, State has recommended following messages:
- Msg. 5: Hand washing
- Msg. 6: Exclusive Breast feeding up to 6 months & weaning after 6 months
- Msg. 7: Vaccinate the child if he/she is having minor fever or minor illness Mother should attend PHC or inform the MPW if child gets high fever, convulsions, swelling at the site of injection, rashes or any serious reaction or adverse events following immunization (AEFI).

5.3.5 Record keeping

MO should observe that:

- All RI sessions are planned & conducted on U-VIN portal.
- Vaccines and syringes record should be updated daily on e-VIN app.
- MCP card is given to each beneficiary.
- Date & number of doses correctly written.
- R 15, R 16 / RCH registers are completed on the same day.
- Enter the data in RCH portal software.

5.4 Adverse Events Following Immunization (AEFI)

It is extremely important to monitor AEFI to maintain credibility and accountability of health services. Major reasons for AEFI are unsafe procedures or faulty techniques reflecting poor quality of service delivery.

5.4.1 Definition

An adverse event following immunization (AEFI) is any untoward medical occurrence which follows immunization and which does not necessarily have a causal relationship with the usage of the vaccine

The adverse event may be any unfavourable or unintended sign, abnormal laboratory finding, symptom or disease

5.4.2 AEFI classification

- **Vaccine product related reaction**: caused or precipitated by a vaccine due to one or more of the inherent properties of the vaccine product e.g. extensive limb swelling following DPT vaccination.
- **Vaccine quality defect related reaction**: caused or precipitated by a vaccine due to one or more quality defects of the vaccine product including its administration device as provided by the manufacturer e.g. failure by manufacturer to completely inactivate a lot of inactivated polio vaccine.
- **Immunization error related reaction**: cause by inappropriate vaccine handling, prescribing or administration
- **Immunization anxiety related reaction**: arising from anxiety about the immunization
- **Coincidental event**: caused by something other than vaccine product, immunization error or immunization anxiety

AEFI are rare events. Benefits of immunization outweigh the risk of AEFI; therefore, careful health education campaign should be carried out in case of AEFI incidences

5.4.3 Steps Following AEFI Case Detection

- Immediate AEFI case notification by the health worker in person or phone & on U-WIN SAFE-VAC portal.
- AEFI register should be maintain at PHC. Record all minor, severe and serious AEFI.
- Case visit for confirmation and reporting by the medical officer
- Decision on investigation by the district
- Preliminary AEFI case investigation, report submission and action at the local level
- Final AEFI case investigation and report submission
- For more details, kindly refer to AEFI surveillance guidelines book 2024.
- Collect the information about:
  - MCP session: Date, time, place of session (particularly floor of session should be observed), MPW, HA attending the session.
  - Vaccine: Batch number, manufacturing date, expiry date, cold chain
  - Technique of vaccine administration
  - Confirm the reported diagnosis of AEFI and collect the details and outcome
  - Determine whether unimmunized persons are experiencing the same medical event(s)
  - Investigate the link between the vaccine given and the AEFI
  - Determine the contribution of operational aspects of the program to the reported AEFI
  - Determine whether a reported event was isolated or part of a cluster
  - Determine the cause of the AEFI and take further actions deemed necessary.

Formats for reporting and investigating serious/severe AEFIs

Case Reporting Form (CRF): To be filled by MO within 24 hours of notification of serious / sever AEFI.

Case Investigation Form (CIF) – To be filled by DIO within 21 days of notification with all documents.

*A **verbal autopsy form** should also be filled to capture additional information in case of Sudden Unexplained Deaths following vaccination*

- Send the report to DHO immediately.

5.4.4 Treatment & management of AEFI

Medical Officer must treat AEFI as medical emergency and rush to the place. MO has to manage & treat AEFI which are treatable at PHC.

- Start treatment in the village. First priority is to treat all the suffering children and then start investigating the event. If there is large number of cases and it is difficult to transport the patients, convert one Gram-panchayat room or convenient place into temporary treatment facility and start treatment. Transfer the patient to PHC or appropriate referral centre if required.
- Keep one health worker in the village till all the patients become OK.

AEFI treatment kit contents

- Injection adrenaline (1:1000) solution – 2 ampoules
- Injection hydrocortisone (100mg)- 1 vial
- Disposable syringe (insulin type) having 0.01 ml graduations and 26G IM needle – 2 sets
- Disposable syringe (5ml) and 24/26 G IM needle- 2sets
- Scalp vein set – 2sets
- Syr. Paracetamol.
- I/V fluids (ringer lactate/Normal saline): 1 unit in plastic bottle
- I/V fluids (5% dextrose): 1 unit in plastic bottle
- I/V drip set: 1 set
- Cotton wool + adhesive tape: 1 each
- AEFI reporting form Case Reporting Form (CRF)
- Label showing date of inspection, expiry date of inj. Adrenaline and shortest expiry date of any of the components
- Drug dosage tables for inj. Adrenaline and Hydrocortisone
- At hospital setting, oxygen support, airway intubation facility should be available

5.4.5 Immunization CIF and CRF Forms (Refer Annexure 5.4(Vol. II))

5.5 Monitoring of Vaccine preventable disease surveillance activities

A single case or death due to VPDs is considered as outbreak and action should be taken accordingly.

5.5.1 Role of MO

Ensure regular & complete reporting

- Make all HA and MPW/ANM aware about case definitions of Vaccine Preventable Diseases (VPDs) during monthly meetings.
- Take regular review of VPD surveillance. Encourage the health workers to report immediately any suspected case of VPDs.
- Ensure that all sub centres submit their surveillance reports timely & completely.

5.5.2 Important aspects of VPDs for MO

Diphtheria

Diphtheria is caused by toxin of Corynebacterium diphtheria.

HW should suspect diphtheria case if

- Mild fever
- Sore throat & greyish white membrane in throat with or without difficulty in breathing.
- Exposure to a suspect case of diphtheria in previous 1 week.
- Epidemic of diphtheria in area.

Pertussis (Whooping cough)

Disease caused by Bordetella pertussis

HW should suspect case if

- Cough persists for 2 weeks or more with typical whoop.
- Bouts of coughing followed by vomiting
- Exposure to suspect case in previous 2 weeks or epidemic in area.

Neonatal tetanus

Disease caused by toxin of Clostridium tetani, which has high case fatality rate.

HW should suspect if:

- Newborn with normal sucking for first 2 days is unable to suck between 3 - 28 days
- Stiffness or convulsion.

Measles

HW should suspect case if following symptoms are present

- Generalized blotchy rash lasting for 3 or more days
- Fever
- Running nose & red eyes.
- If exposure to measles case in previous 2 weeks
- Epidemic of measles in area.

5.6 Measles Outbreak Surveillance

5.6.1 Measles Outbreak

Measles outbreak flag is raised whenever either or both of the following conditions are met:

- Five or more suspected measles cases are reported from one block/planning area or contiguous blocks/ planning area in a month or consecutive four weeks
- One or more suspected measles death is reported from one block/planning area in a month/consecutive four weeks.

5.6.2 Outbreak investigation

For operational purposes measles outbreak investigations are done in two steps:

- Preliminary case search: Includes a desk-based data review by the MO and a field visit with interview of community members, HWs and link workers (ASHA/AWW).

And

- Detailed Outbreak Investigation: Is conducted for potentially large outbreaks (minimum 5 suspected measles cases clustered in one contiguous/adjacent areas, rural villages / urban wards) involves a house-to-house case search and line-listing of suspected measles cases with a unique-ID to each suspected case and collection of samples from minimum 5 suspected cases.

5.6.3 Conducting measles case search

Role of the Health Worker

Each worker should conduct house-to-house searches to find clinical measles cases in the designated area. All houses should be included in the active case search. The idea is to list all the clinical cases of measles that have occurred in the last 3 months. All such cases identified during the case search should fit the standard clinical case definition of measles.

For detailed VPD outbreak investigation, treatment and preventive measures kindly follow VPD surveillance of state and GOI.

5.7 Acute Flaccid Paralysis (AFP) surveillance

This is the third important activity in polio eradication, which includes searching of all cases of paralysis with acute onset, so that not a single case of paralysis due to polio is missed. It should be kept in mind that we are searching for cases of paralysis due to all of causes and not only due to polio. Clinical examination and stool sample collection for virus isolation will confirm whether the paralysis is due to polio or any other reason.

5.7.1 AFP case detection

AFP case definition: A child with acute paralysis (duration between onset of symptom to development of paralysis should be less than 4 weeks) below the age of 15 years.

Following steps should be carried out for early detection of AFP case -

- List all the hospitals; private practitioners and traditional healers in your area where there is possibility that AFP case will go for treatment.
- Call a meeting of these practitioners and orient them about importance of AFP surveillance, case definition of AFP and mode of reporting. Discuss if any AFP case is identified by the hospital/practitioner.
- If your PHC is reporting unit, inform the district level authority (usually DIO) every Monday about number of AFP cases reported in your area from last Monday to Sunday. Weekly calendar is fixed for the year. Quote the week number for each weekly report. Report should be sent even if there is nil report during the week.
- If your PHC is informant then you need not convey the AFP surveillance report weekly but report nearest reporting unit (RH) and DHO when you find case of AFP in your area.
- Carefully record the address of AFP case as DIO will need to examine the case immediately after your reporting. This is important particularly for the nomads, labourers etc.

For more details kindly refer to AFP Surveillance Guidelines of State and GOI.

5.8 Immunization Performance Monitoring

5.8.1 Immunization Performance Monitoring tools

Performance of immunization can be monitored by

- U-WIN portal to know about coverage and due list.
- eVIN portal to know vaccine stock position.
- Reviewing monthly reports.
- By checking the record. (R-15, R-16, R-17 registers)
- By actually visiting & interviewing beneficiaries.

5.8.2 Immunization Performance Monitoring During monthly meeting

During monthly meeting monitor the performance based on

- U-WIN and e-VIN.

- Number of adverse events following immunization (e.g. abscess, swellings)
- Number of cases due to VPDs.

5.8.3 Electronic Vaccine Intelligence Network (eVIN)

eVIN, an initiative of the Ministry of Health and Family Welfare, Government of India, has been implemented in Maharashtra since 2018.

Integrating innovation with health care, eVIN aims to strengthen the vaccine supply chain to ensure equity in vaccine availability by real time tracking of vaccine availability and ensure vaccine potency.

eVIN aims to support the Universal Immunization Programme (UIP) by strengthening the evidence base for improved policymaking in vaccine delivery by answering three fundamental questions-

- Where are my vaccines?
- Are they in adequate quantities?
- Are they stored in the recommended temperatures?

eVIN can be broadly categorized into three components

People (Human Resources) – Dedicated Vaccine cold chain manager (VCCM) at every district to support in Vaccine logistics management.

Processes (Standardization of the recording formats) – introducing new Stock Registers and Immunization Registers

Product (Technology) – eVIN Software comprising of mobile application for real time vaccine stock visibility, remote temperature loggers for all Cold Chain Equipment

Utility of eVIN in Vaccine Management:

Output Indicators:

- Real time vaccine stock availability at all levels.
- Monthly Vaccine consumption data.
- Individualized mapping of min-max vaccine requirement of each vaccine store / CCP for each antigen.
- Consumption based rationalized allocation of vaccines to cold chain points.
- Near expiry vaccine stock status to ensure FEFO.
- Quantum of vaccine wastage due to different reasons. (Broken, VVM un-usable, Frozen, Expired, contamination etc.
- Adherence to open vial policy.
- Facilitate vaccine supply during campaigns and new vaccine introductions.
- Estimation of the cold chain capacity of the districts. (CCP, CCE, storage volumes)

Process Indicators:

- eVIN activity rate for all material tags- RI Vaccines, Syringes and Open Vials
- Order management and timely indent fulfilment.
- eVIN – As a real time monitoring tool. (My eVIN app for the RCHOs and CCTs)

5.8.4 U-WIN

- A platform to digitize Universal Immunization Programme (UIP) for registering and recording every pregnancy and its outcome, birth vaccination and vaccination of infants & children.
- U-WIN has following key modules at present.
- Admin Module, Session Planning module,

- Vaccinator Module,
- Delivery point Module
- Mobiliser Module and
- Self-Registration Module.

Currently U-WIN report has 8 sections

- UWIN Report
- Registration
- Health Facility
- Session Sites
- Session Status
- Coverage
- Delivery Point
- Users

Key information from various tabs

- Service Delivery Points related – UWIN report, Health Facility, Session Sites
- UIP Vaccination sessions tracking – Session status, Coverage
- Staff information – UWIN report, Users
- Beneficiary Registrations – Registration, Delivery Point
- Coverage data – Coverage, Delivery Point

Option to get data of following duration – Today (present date), Cumulative (from initiation to present date), Date Range (max 1 month)
The planning unit managers / medical officers at the PHC have the rights and responsibility to schedule the routine immunization sessions as per the micro plans. Advance session planning for the upcoming three months can be done by MOs on U-WIN.
Medical officers should ensure that sessions scheduled by them are conducted by vaccinators on U-WIN regularly.

Benefits of U-WIN

Online Self Registration: All Pregnant women can self-register on U-WIN Vaccination Platform to create one time registration. If already registered on CoWIN, need to use same mobile number to access U-WIN wherein woman can tag herself as Pregnant women and new registration of child can also be done using existing guardian's account. Registration can be also done through walk-in/on-site mode at nearest vaccination center.
Generation of ABHA: Registered Newborns & Children can also have an ABHA based on their parent's Aadhaar Number.
Search Vaccination Centers: The beneficiary can search nearby vaccination center using State/District filter in order to get vaccination at desired center.
Scheduling of appointment for vaccination: The beneficiary can take online appointment for desired vaccination session & vaccination center as per his/her choice. All vaccines are available at all sessions.
Digitalizing Vaccination Record: Each vaccine dose is administered to an identifiable individual only, after due verification. Digital Vaccination Record of all Pregnant women & children gets created real time.
Digital Acknowledgement: Beneficiary will get digital acknowledgement for vaccination every time dose would be administered and receive digital e-Vaccination certificate. Beneficiary can

download & save the certificate in Mobile Phone applications which would be easily available for future use.

Notifications and Reminders: Beneficiaries will get Text SMS notifications and reminders with next due dates of their subsequent vaccination.

Ensuring dose intervals: Adherence will be further strengthened with minimum dose interval between two doses through U-WIN system.

Provision to get vaccinated across country: With digitalization of vaccination system, vaccination services can be availed " Anywhere " in the country at scheduled vaccination sessions.

5.9 Vaccine information

5.9.1 BCG vaccine

Types:

Live attenuated freeze-dried vaccine. BCG is reconstituted with normal saline.

Normal reaction

Small elevation (5mm) appears at vaccination site immediately after injection that disappears within 30-90 minutes. After 3-4 weeks, in duration is formed followed by papule of 5-8 mm diameter. Papule ulcerates and scar is formed within 10-12 weeks.

Contraindication

HIV positive children with symptoms & signs of AIDS

Temperature sensitivity

It is highly sensitive when reconstituted and moderately sensitive when in powder form. Reconstituted vaccine should be used within 4 hours & should never be used after 4 hours.

Remarks

Protection against Tuberculosis especially miliary tuberculosis.

Side effects

Sometimes axillary lymph node enlargement that may lead to development of abscess. This is due to higher dose or wrong route (subcutaneously or intramuscularly) or because of faulty technique of vaccination.

5.10 Responsibilities of PHC staff in immunization programme

Sr.No.	Activity	Responsibility of PHC staff	
		Designation	Responsibility
1	**Planning immunization session**	**ANM**	Enumeration of beneficiaries
		HA (F)	Verify enumeration for correctness, assess requirement of logistics
		MO	Assess adequacy of sessions as per population covering all wadis, wastis, identify high risk area & plan for that, ensure adequacy of logistic supply, involve private practitioners
2	**Monitor cold**	**ANM**	Check VVM before each use

	chain	**HA (F)**	Daily temperature recording, maintenance of cold chain equipments, regular defrosting, implement emergency plan of shifting vaccines in case of cold chain breakdown, prepare ice packs.
		MO	Monitor recording of daily temperature, implementation of emergency plan in case of cold chain failure, ensure correct storage of vaccine
3	**Monitor immunization services**	**ANM**	Use of AD syringes, correct packing of vaccine in vaccine carrier, record maintenance, IEC
		HA (F)	Distribution of vaccine for session, maintain stock books, attend all arogya seva satra from area
		MO	Monitor stock registers, monitor transport of vaccines
4	**Monitor AEFI**	**ANM / MPW (M)**	Visit the villages next day after immunization session, report to HA/MO immediately in case of any AEFI
		HA (M & F)	Take preventive measures, review regularly, preserve the vaccine sample in case of AEFI
		MO	Regular review during monthly meeting. Treat, manage & investigate AEFI.
5	**Vaccine Preventable Diseases surveillance**	**ANM / MPW (M)**	Collect information about a case/death due to any VPD, inform HA/MO, give primary management, IEC
		HA (M & F)	Visit the place immediately
		MO	Regular monitoring of VPDs, ensure weekly reports submission, in case of reporting of any VPD immediately visit the village, investigate, treat the cases, report to DHO
6	**Polio eradication**	**ANM / MPW (M)**	Enumeration of all beneficiaries, distribution of slips, search for AFP case & immediate reporting to MO, perform ORI in case of AFP cases
		HA	Ensure completeness of enumeration, planning of PPI, IPPI, logistics, plan IEC
		MO	Inter departmental meetings, training, examine AFP case, report to DHO, arrange for adequate stool sample, timely supply of logistics

7	**Monitor performance**	**ANM**	Prepare immunisation monitoring chart
		HA (F)	Monitor sessions, coverage, drop out
		MO	Investigate low performance, planning for low performance

For FAQ'S: (Refer Annexure 5.5 (Vol. II)**)**

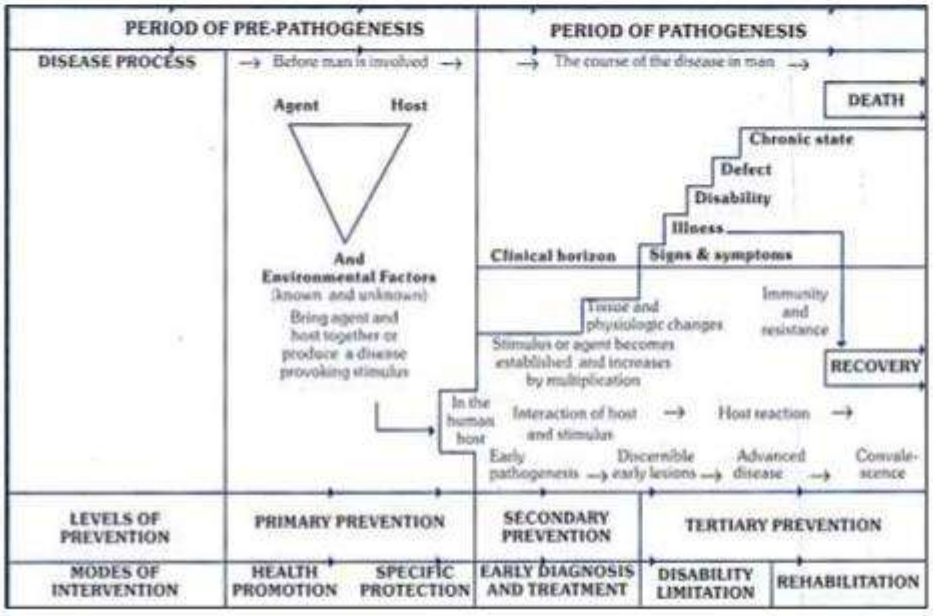
6.1 Control of Communicable Diseases

Communicable diseases, account for majority of illnesses and deaths in rural areas and therefore MO PHC should give high priority to these diseases. Different types of microorganisms, which are transmitted directly or indirectly, from infected person or animal to a susceptible host, cause these Diseases.

Important communicable diseases:

Water borne diseases:	Cholera, Gastroenteritis, Dysentery, Enteric fever, Viral hepatitis, Poliomyelitis.
Vector borne diseases:	Malaria, Dengue, KFD, Chandipura Encephalitis, Japanese Encephalitis, Filariasis, Chikungunya, Zika, Scrub Typhus
Airborne diseases:	Tuberculosis, Leprosy, influenza, Measles, Mumps, Pertussis, chickenpox, Covid 19.
Sexually transmitted diseases:	RTI/STI including HIV / AIDS
Zoonotic diseases:	Leptospirosis, Plague, Rabies.
Helminthic infections:	Ascariasis, Ancylostomiasis, etc.
Emerging- Reemerging Diseases:	Covid 19, Zika, Nipah, Ebola, SARS, etc.

Natural History of Disease:



Ref: K Park Text book of PSM 25th edition

Number of factors decide establishment of disease (infection) in host, e.g., body resistance, health and nutritional status of host, virulence and toxicity of pathogenic organism, measures adopted in prevention of spread of disease, etc. In order to control and prevent infectious diseases, we should know source of infection, mode of spread of disease and susceptible at-risk persons of acquiring the disease. Based on this knowledge, following control measures are universally recommended.

Measures directed at source

These measures include detection of source of infection and methods for keeping pathogenic organisms confined to source or destroying pathogen, so that no harm results from them.

6.1.1 Early detection and prompt treatment (EDPT)

This is most important activity which reduces the spread of disease in epidemic form. Majority of infectious diseases originate from infected person (person who harbours pathogenic organisms). This person may be in incubation period, may have mild or severe illness, or may be carrier who is outwardly healthy. It is difficult to identify person in incubation period and healthy carriers, but those who are ill can be detected at earliest by efficient disease surveillance system. Such cases are detected when they attend hospital for treatment (passive surveillance) or during house-to-house survey by MPW (active surveillance). Prompt treatment of detected cases kills organisms which helps to prevent spread of infection to others in community.

Elimination of zoonotic source:

Some diseases originate from animals, which are called as zoonotic diseases. Such animals can be identified and treated, immunized (e.g., dogs in rabies, cattle in leptospirosis).

Isolation of infectious cases

Isolation of patients of infectious disease is another method for controlling source of infection. This is because patient of infectious disease discharge microorganisms through gastrointestinal or respiratory route or through direct contact including sexual contact. Isolation is effective if patient is isolated during entire infectious period.

6.1.2 Measures for prevention of transmission

Microorganisms can be transmitted from source Microorganisms can be transmitted from source of infection to susceptible host in many ways.

- Some diseases spread through respiratory route via droplets (air borne infection).
- In some diseases microorganisms are excreted in stools or urine.
- Disease causing organisms from stool or urine contaminate soil and enter susceptible host through broken skin or mucus membrane (e.g., worm infestations, leptospirosis)
- Some infections spread through sexual contact and are called as sexually transmitted infections (STIs)
- Medical instruments, syringes, needles, etc. Get contaminated with microorganisms. If not properly sterilized they may lead to transmission of serious diseases like hepatitis B, hepatitis C and HIV/AIDS.
- Diseases like malaria, dengue fever, filariasis, JE are transmitted by insects.

Transmission of microorganism from source to susceptible host can be prevented by –

- Personal hygiene including safe handling of water, hand washing, cleanliness.
- Daily chlorination of water

- Use of sanitary latrine, sanitary disposal of excreta and solid waste.
- Protecting food from flies and dust, avoid touching food without washing hands
- Control of houseflies, mosquitoes and other insects by keeping surrounding clean and preventing accumulation of water
- Other vector control measures like anti-adult/anti-larval measures and use of personal protective devices.
- Disinfection of contaminated articles of patients.
- Safe sex
- Good ventilation
- Covid appropriate behaviour.

Measures to protect susceptible person

Every individual has natural defence mechanism and resistance against microorganisms. Resistance against infection can be further enhanced by:

- Enhancing immunity of body by good nutrition, exercise and better living conditions.

- Immunization of susceptible host at right age, with appropriate doses. Temporary protection can be provided by injecting antiserum specific to infection e.g., rabies, viral hepatitis, tetanus, diphtheria, etc.
- Chemoprophylaxis for endemic diseases as per National and State guidelines.

6.2 Disease Surveillance

Communicable diseases contribute to a significant disease burden and are a major cause of morbidity and mortality in the state. Many of these diseases are epidemic prone. Communicable disease surveillance is a basic tool for assessing the problem of communicable diseases. It can define the behavior of disease in populations. On this basis the magnitude of the public health problem caused by particular disease can be assessed and an effective strategy can be developed.

The importance of communicable disease surveillance is evident with surveillance of acute flaccid paralysis during Polio eradication drive

6.2.1 Definition

Surveillance is defined as the ongoing systematic collection, collation, analysis, and interpretation of data and dissemination of information to those for taking necessary action.

Uses of Disease Surveillance:

- Identify patients and their contacts for treatment and intervention
- Identify outbreaks, health problems and high risk population
- Estimate magnitude and scope of health problems
- Measure trends (frequency, distribution and determinants) and characterize disease
- Monitor changes in infectious and environmental agents
- Assess effectiveness of programs and control measures.
- Develop hypotheses and stimulate research.

6.2.2 Diseases included for surveillance

Diseases, which have potential of causing outbreaks and diseases with high morbidity/mortality, are included in surveillance activity. For PHCs, following diseases have been included for routine surveillance in our state.

List of syndromes included for surveillance (to be reported under IHIP Portal):

Table: List of syndromes included for surveillance (to be reported under IHIP Portal)

1	**Anthrax**	**20**	**Fever with Rash**
2	Chickenpox	21	Fever with Bleeding
3	Chikungunya	22	Fever with Altered sensorium
4	Congo Crimean Haemorrhagic Fever	23	Cough <= 2 weeks with fever
5	Dengue	24	Cough <= 2 weeks without fever
6	Diphtheria	25	Cough > 2 weeks with fever
7	Human Rabies	26	Cough > 2 weeks without fever
8	Kyasanur Forest Disease	27	Jaundice < 4 weeks
9	Leptospirosis	28	Acute Flaccid Paralysis
10	Malaria	29	Animal Bite - Snake Bite
11	Measles	30	Animal Bite - Dog Bite
12	Meningitis	31	Animal Bite - Others
13	Mumps	32	Acute Diarrhoeal Disease
14	Pertussis	33	Acute Encephalitic Syndrome
15	Scrub Typhus	34	Acute Hepatitis
16	Typhoid	35	ARI/Influenza Like Illness (ILI)
17	**Other-** Ebola, MERS Cov, Nipah Virus, West Nile Fever, Yellow Fever, Zika Virus	36	ARI/Severe Acute Respiratory Infection (SARI)
18	Only Fever >= 7 days	37	Dysentery
19	Only Fever < 7 days		

6.2.3 Disease surveillance activities in PHC:

Following aspects are important for smooth and effective implementation of disease surveillance activities in PHC:

- Knowledge about standard case definitions of all the diseases under surveillance.
- Early detection of cases through effective surveillance.
- Compilation and analysis of surveillance data.
- Timely and appropriate action taken to prevent the impending epidemic.

Standard case definitions

Standard case definitions are important to ensure identification of all cases by village level workers, paramedical staff, Medical Officer, Private Practitioners, etc. so that there is uniformity in reporting and all reporting units use the same criteria for reporting cases. Each case identified under Integrated disease surveillance programme are classified in one of the three groups as follows

- **Suspect -** Diagnosis on the basis of history and symptoms by paramedical personnel.
- **Probable-** Diagnosis on typical history and clinical examination by a Doctor (MO).
- **Confirmed -** Confirmed laboratory diagnosis.

For Standard case definitions to be used by PHC for disease surveillance as per IHIP portal- P form (2019): (Refer Annexure 6.1 (Vol. II))

For Reporting formats of S-form, P-form & L-form (Refer Annexure 6.2 (Vol. II))

Laboratory Criteria for confirmation of the Disease - L form (Refer Annexure 6.3 (Vol. II))

Important Methods of disease surveillance used at PHC

- Passive surveillance.
- Active surveillance,
- Laboratory surveillance and
- Vector surveillance.

Passive surveillance

Passive surveillance means recording the cases on when they are diagnosed while attending OPD or IPD for treatment. As MO PHC diagnoses these cases, they are classified as probable or confirmed cases depending upon clinical examination and laboratory results.

All the Patients diagnosed as having any of the diseases under surveillance must be separately reported in the IHIP portal daily

Online Format for Passive Surveillance on IHIP-IDSP Portal: (Refer Annexure 6.4 (Vol. II))

Active surveillance:

Active surveillance is the responsibility of Health Care Workers (CHO, ANM, MPW and ASHA). He has to identify cases of diseases under surveillance during his/ her regular home visits, collect information in prescribed format on real time basis using android application of IHIP-IDSP and inform HA or Medical Officer. They should also report cases of diseases under surveillance if they identify during their regular home visit or during Arogya seva satra (VHND). During active surveillance, Health Care Workers should collect correct information of symptoms like fever, diarrhoea, cough with expectoration, skin rash, skin patch etc., and arrive to suspected case diagnosis with the help of disease definition chart. All such suspected cases must be reported in **'S' Form** on mobile app daily and **event alert** should be raised if needed.

Laboratory surveillance

Laboratory surveillance is important to confirm the diagnosis in suspected cases for e.g., water samples- waterborne outbreaks, Peripheral blood smear (PBS)- malaria, stool/serum- Viral Hepatitis

Vector surveillance

Vector surveillance is important to monitor the presence and density of vectors of public health importance e.g. Anopheles, Aedes and Culex mosquitoes, Rat flea, etc. Increase in density of insects (e.g. mosquito, flea) should be taken as early warning signals for vector borne disease out breaks. Following steps should be taken for vector surveillance.

- Periodically check for breeding in breeding places.
- When leakages from canal, pipelines are noticed, they should be checked for anopheles breeding.
- Water storage facilities in village like Cement tanks, buried earthen pots (Ranjan), barrels and discarded tins/bottles/tyres should be checked for Aedes breeding.

Compilation of surveillance data

Disease surveillance data will be collected from multiple sources as follows:

Method	Source of Data
Passive Surveillance	Passive Surveillance registers, OPD and IPD registers, reports from private practitioners.
Active Surveillance	MPW (M/F) diary, HA (M/F) Diary
Laboratory	Public and Private laboratory report,
Surveillance report.	District Public Health laboratory

Frequency of compilation / reporting

Disease surveillance data is collected daily on IHIP-IDSP Portal. It is the responsibility of Medical officer to develop system for regular reporting.

Following steps are to be taken to ensure smooth reporting.

- Give responsibility of disease surveillance reporting of Form P under IHIP-IDSP to Pharmacy Officer, Form L to Laboratory Scientific Officer and other surveillance related work to one HA in PHC.
- HA should monitor timely submission of daily, reports from all reporting units in PHC. In case report is not received on given day or date, this should be promptly brought to the notice of MO.

Reporting units should include, Public Health Institution, Private practitioners, Private laboratory, etc.

Actions to be taken for regular reporting.

- Develop system for receiving reports of all the field staff and private practitioners on on daily basis.
- Enter disease wise figures for all reporting units in register. Give separate page for each disease. Addition of figures from all reports will generate the PHC daily/weekly report.
- Analyse the disease wise figures; compare them with reporting of previous week and same week of last year. If you find more than expected figures, locate the area where rise in cases has occurred.
- Visit the place where increase in number of cases is indicated in daily/weekly report. Investigate the reason for rise in cases. If this is indication of impending epidemic, start control measures and prevent the disease to spread in new areas. Inform DHO in detail. Remember main aim of weekly disease surveillance is to recognize the epidemic in early stage.
- Communicate the compiled DAILY/weekly report to DHO by IHIP-IDSP portal as well as Mobile communication Daily/Monthly reporting should be done through computerised HMIS system.

Analysis of surveillance data

On IHIP-IDSP Portal once the daily disease wise surveillance data is filled. On portal report section we have to click on suspected/presumptive/laboratory case form summary as well as consolidated disease summary status. Even view Map option can able us to visualise Heat Maps of communicable diseases.

Action on surveillance data

On IHIP-IDSP Portal as well as Android Mobile app Event alert option is used for occurrence of/clustering of cases in area. The health care worker as well as Medical Officer of PHC can create the event. There is threshold marker for each communicable disease reported under IDSP. once the threshold cross the automatic event is generated at facility level which gives alerts to District surveillance unit (DSU) as well as State Surveillance Unit (SSU). The confirmation of generated event needs to be done by Medical Officer and if consistent rise in cases needs to convert it to Outbreak.

6.3 Outbreak/Epidemic Investigation

Outbreak/Epidemic is public health emergency. When information of Outbreak/epidemic is received, PHC staff should rush to affected village This is because delay by few hours may result into increase in the number of cases and possibly deaths that could have been prevented with quick action by PHC staff.

The data collected during outbreak must be utilized for improving programme activities and the surveillance system. This helps to strengthen the surveillance system by filling the gaps. The results should be documented on IHIP Portal in prescribed formats for Primary and final reporting.

Two major areas of Outbreak/epidemic investigation and control

- Diagnosis, investigation and management of patients
- Outbreak/Epidemic investigation leading to identification of the cause and extent of epidemic and to start control measures on the basis of findings of investigations.

Activities related to both the areas should be carried out simultaneously and in coordination. MO should divide the PHC staff in two groups.

First group will help MO in treatment of patients and collection of laboratory material for diagnosis by opening the isolation ward.

Second group will assist medical officer in Outbreak/epidemic investigation and control measures.

Why to Investigate the Outbreak/ epidemic?

- To ascertain its Etiology
- To know high-risk areas and groups
- The data collected is used for taking control measures.
- To prevent occurrence of Outbreak/epidemics in future

Epidemiology of each disease is different. Keep this fact in mind while investigating outbreaks. Symptoms of patient, environmental factors and laboratory report will help in decision making. Do not wait for confirmed diagnosis to start control measures.

6.3.1 Steps in investigation of Outbreak/epidemic

Take following steps in a given sequence for effective investigation and control of any epidemic.

Information of Outbreak/epidemic

Information of outbreak is responsibility of local Gram Panchayat (*RDD GR. No 1096/1280/07 dated 28 November1996*). Early information of Outbreak / epidemic is very important and has many advantages -

- Patients will get treatment at early stage, due to which there will be less morbidity and mortality.
- Early starting of control measures will slow / stop progress of epidemic to adjacent areas leading to further reduction in morbidity and mortality.

- As Outbreak/epidemic is confined to small area in early stage, it is easier to investigate the epidemic and start control activities in small area.
- Medical officer is expected to do following activities for early information of epidemic:
  - Whenever you are visiting the village, always remind the Sarpanch, Gramsevak and prominent leaders of village about informing either to PHC or to health worker, in case of increase in number of cases in the village.
  - Try to develop at least two to three informers from each village / wadi / pada to give immediate event/Outbreak/epidemic information to PHC. Give more attention to remote and small villages. Take the help of ASHA, Anganwadi worker, etc.
  - Patient himself is most important and early source of information regarding Outbreak/epidemic. When any patient of epidemic prone disease attends the OPD, always enquire whether there are more cases of similar symptoms in the village.
  - Request private practitioners in area to inform PHC if they notice unusually increase in number of cases of similar symptoms attending their health facility.
  - Inform Gram Panchayat in writing about its responsibility regarding information and control measures of Outbreak/epidemic.

Verification of diagnosis

- On arrival in the village, the first step should be to examine the cases and arrive at probable diagnosis with the help of Standard Case Definition.
- If it is known disease, examination of few cases will help in diagnosis. However, for unknown disease, large number of cases may have to be examined to clearly understand the syndrome complex and actual disease.
- Take the help of laboratory facilities. For example, you can immediately examine PBS for malaria in fever outbreak. You should send the samples to District/State Laboratory for diagnosis of other diseases.

Confirmation of existence of epidemic

- Once the diagnosis of patient is verified, confirmation of existence of epidemic is essential. Compare the number of reported cases of this disease with the normally expected cases for that village during the same period of last year. Normal expectation is decided with the help of weekly disease surveillance record of the disease in same week of last five years or monthly cases for the same month of last five years.
- If this information is not available then following working definition should be used for confirmation of epidemic-
  - Single case of disease, which is eliminated from the state e.g. Guinea worm, Plague, etc.
  - Single case of disease, which is not common in area, e.g. Japanese Encephalitis, Dengue Haemorrhagic Fever, etc.
  - A single case of vaccine preventable disease, e.g. Measles-Rubella, Polio, Diphtheria, Tetanus etc.
  - For commonly occurring water-borne diseases, if number of cases are more than 5 per 1000 population within one incubation period time.
  - Any single death due to any of the diseases under surveillance.

6.3.2 Reporting to DHO

Immediate report

After confirmation of Outbreak/epidemic immediate report has to be sent to the DHO by Event alert on IHIP-IDSP Portal as well as email/what's app message/telephonic call.

Following information should be included in first report.

- Name of the village, population, PHC and Taluka.
- Date and time of receiving the information of epidemic.
- Mode of information.
- Date and time of visit of Medical Officer to the village
- Name or symptom complex of disease (provisional diagnosis)
- Cause of epidemic (if possible)
- Number of cases and deaths.
- Details of each death including name, age, sex, symptom complex, treatment history and cause of death.
- Control measures initiated.

Assistance required from District Health Officer:

- Expert advice (Visit of RRT)
- Medicines
- Manpower

Daily report of epidemic

Daily report has to be sent from the day of first report. It should include number of attacks and deaths on the day of reporting and progressive attacks and deaths. If there is death then name of the death case and probable cause of death. Detailed death investigation report should be dispatched on the same day by special messenger and email.

The daily report should be sent email/whats app message/telephonic call. Continue to send the daily report till the epidemic is officially declared as over.

Primary report of epidemic

Primary report should be submitted to DHO immediately of starting of outbreak/epidemic. There is prescribed form for the primary epidemic reporting (*given in Chapter 13. Miscellaneous 13.5: Reports/Formats Related to Epidemics*) It includes information regarding date of starting outbreak/epidemic, date of report received, visit by MO after reporting, visits of district level officers during epidemic, details about previous visits by health staff and MO, information about water samples during last 3 months, laboratory samples taken and probable cause of epidemic.

6.3.3 Establishment of treatment facility

Early and correct treatment is important to save the life of patient. This will also help in controlling the epidemic by making the patient Non-Infectious and preventing transmission of disease.

Following activities should be carried out for treatment facility:

- Select suitable place to establish treatment centre and isolation ward (e.g. Angawadi, School, Samaj mandir etc). Always admit all the cases with severe diarrhoea irrespective of their dehydration status and keep under observation as such cases may go into severe dehydration any time. For diseases like Malaria, Viral hepatitis, Dengue fever etc. treat the patients on OPD basis; admit or refer to higher centre like Rural Hospital /Sub-District hospital if any complications are noticed.
- Keep all the required medicines in sufficient stock. If needed, request the DHO for more medicines. Do not prescribe medicines from outside Medical Stores during epidemic period.

- Give the responsibility of all the medicines required in isolation ward and keeping inventory of stock to one HA (F). If the epidemic is large, then depute pharmacist to affected village for smooth supply of medicines.
- Keep the isolation ward clean. Provide mattresses, mackintosh, etc. to admitted patients. Request the Gram Panchayat for help.
- During the outbreak/epidemic of diarrhoeal disease, keep one weighing machine ready in isolation ward. Weighing of patient is essential to calculate dose of Ringers lactate for patients with severe dehydration.
- Display charts of symptomatology and treatment schedule of disease of epidemic in isolation ward and temporary OPD, indicating symptoms, laboratory sample collection and standard management for ready reference to health staff.
- Assign round the clock duties to health care worker and other required staff.
- MO should personally monitor the situation till the outbreak/epidemic is under control.

In addition to providing treatment, health education to the community is important, indicating actions required by community. Give information during home visits, organize Gram Sabha, and display health education material available at major places.

6.3.4 House to House survey

Once the treatment facility is established, house-to-house survey of affected village and surrounding villages is essential. This will help to get correct idea of extent of outbreak/epidemic. Health worker should identify patients during house-to-house survey and refer them to temporary treatment facility. Opportunity of house-to-house survey should be utilized to give important health education messages to community.

Planning of house-to-house survey is essential to carry out quick and useful survey. Call quick meeting of all health workers to brief on survey. Follow the steps given below to plan the survey during epidemic.

- Use suspect case definition for the survey. Discuss this definition with the health workers during briefing. Simple and objective criteria should be used in defining the case. Make sure that all the workers have understood the definition.
- Develop survey format. Make Copies of the format and give to the health workers.
- Use IHIP-IDSP android application for survey
- List all the areas of the village including surrounding hamlets. Make map of village which should include all the areas mentioned in list.
- Allot the area among all health workers selected for survey. One health worker can survey up to 500 population in one day. Survey should be finished within two days. Show the area of each health worker in the map. If the survey cannot be completed within two days through available PHC staff, request THO/DHO for additional staff.
- Make one HA responsible for collection of reports and immediate compilation daily in the evening.
- Prepare daily report of epidemic on the basis of survey findings and OPD. Cross check the patients, as there may be duplication. Send report to DHO

Form A & B (survey & Patient information) can be used as guideline for the survey:
(Refer Annexure 6.5 (Vol. II))

6.3.5 Laboratory investigations

Laboratory investigations depend upon nature of disease, epidemiology and laboratory facilities available in the area. Laboratory samples are to be collected from active patients, carriers, vectors and zoonotic reservoirs.

Following are the general guidelines for Laboratory investigations:

- Specimen should be collected before administration of specific treatment or antibiotics.
- All aseptic precautions should be taken while collecting blood sample, container should be sterile, and no contamination should occur while transporting specimen.
- Proper labelling of the sample, which includes name of the patient, age, sex, address is essential for sample identification.
- Samples collected should be sent to laboratory immediately.
- The samples collected should be in adequate quantity e.g. blood or serum sample should be minimum 5 ml and stool sample 8-10 grams or properly stained rectal swab in CB medium.
- In large outbreaks collecting samples from all patients and sending them to laboratory places puts unnecessary burden on laboratory facilities and it is also not necessary for management of cases and epidemic control. Except PBS for malaria, do not collect serum/stool or other samples from all patients during the epidemic. Samples from 5 -10% of cases are sufficient to know cause of epidemic. However, in case of small outbreak, send adequate number of samples to confirm the diagnosis ((Not less than 10)
- Sometimes immunological studies are necessary to detect antibody title in sera. In many cases, especially viral diseases, paired sera are required to study four fold rising antibody title. Keep photocopy of first list of samples sent to laboratory. After about 10 days, collect second samples of these cases. Mention these samples as second samples in laboratory form.
- Control activities and treatment should not be delayed till the laboratory results are received. Action should be based on clinical, epidemiological and entomological findings.
- Always submit information of patient along with sample (laboratory form) to laboratory. This should include specimen number, name of patient, date of onset of symptoms, nature of symptoms, provisional diagnosis, date of sample collection and condition of patient at the time of sample collection. Forward this information along with the specimen to laboratory.
- Different types of samples (stool, blood, sputum etc.) are required to diagnose the diseases under investigation. Samples required to be collected for common diseases are given in the table below

Table: Laboratory samples required for diagnosing particular causative agent

Sr. no.	Suspected disease	Specimen	How to transport	Where to send	Remarks
1	Cholera, Gastroenteritis	Stool for isolation/culture	In CB media at room temperature	District Public health Laboratory (DPHL)	Collect in early stage.
2	Viral hepatitis	Stool for isolation of viral agent	Plain bulb in cold chain(8-10gm)	Referral Lab under IDSP National Institute of Virology (NIV), Pune	
		5 ml blood for serum antibody titre	Plain bulb in cold chain	National Institute of Virology, Pune	
3	Enteric fever	5ml. blood for culture and antimicrobial sensitivity	Enriched media at room temperature	District Public health Laboratory (DPHL)	Media available in DPHL
		5 ml. blood for serology	Plain, sterile bulb	District Hospital / RH laboratory	Paired samples required
4	Malaria	PBS	Slide box at room temperature	Malaria testing is available at PHC/ RH/malaria clinic	
5	Dengue fever	5 ml. blood sample for antibody titre	Plain, sterile bulb. Maintain cold chain	Sentinel surveillance lab/ NIV Pune. DH/RH laboratory for haematology tests and	Paired samples required

				platelet count	
		Aedes mosquitoes	In test tube at room temperature	NIV Pune	Contact DMO
6	Meningococcal meningitis	5 ml. blood for culture. CSF for serology and microscopy	Sterile, plain bulb at room temp./blood in/blood culture broth	Nearest Medical College Hospital	Contact HOD of Microbiology department of Medical College
7	Plague	Bubo fluid. Blood for Medical College culture and serology. Sputum for staining/culture	Sterile container Plain bulb, plain sterile container		

Other epidemiological data

Additional relevant information like source of water supply, large movement of people like yatra, presence of Aedes larva in household water collection, flies in village, etc. should also be collected during the survey.

6.3.6 Description of epidemic and analysis of data

Information collected during house-to-house survey should be utilized to know the extent and cause of outbreak/epidemic, age and sex distribution. Analyse the data by age and sex distribution of cases. This indicates which age group or sex is maximum affected.

6.3.7 Development of epidemic curve

Following steps should be carried out to develop the epidemic curve.

- Tabulate the date wise distribution of cases according to the date of onset (and not the date of reporting). You will know the index case.
- Case first reported may not be the index case.
- With the help of IHIP or excel, generate epidemic curve Epidemic curve will give idea whether the epidemic is in rising trend or declining. It will also give idea about probable day(s) of contamination if we subtract one incubation period days from first case.

6.3.8 Preparation of spot map of the epidemic

- Enquiry of village map should be first made with Gram Panchayat. If map is not available prepare the village map.
- To prepare village map, go to centre of village. Stand at the centre facing towards north. First mark the place you are standing at centre of paper, then roads starting from the place to all directions. Indicate temple, school, Anganwadi, Gram Panchayat etc. in relation to roads. Mark houses on map. If epidemic is waterborne, mark the water supply system (pipeline, wells, hand pumps) & if vector borne then breeding places on the map.
- Put approximate M numbers/number of houses in each area on map.

- With the help of survey tables given above in which number of cases in each household along with M number is mentioned, put one dot per case on the houses shown in the map. Now the spot map is ready.
- Spot Map will indicate most affected area in the village. You should now concentrate on these areas to know the causes of epidemic.
- Prepare 5-6 serial spot maps showing situation of disease on each day, starting from first day of epidemic. Interval between two serial spot maps will depend on the incubation period of disease under investigation. It should be per day for diseases like gastroenteritis, cholera, measles, DF etc. and weekly or biweekly for diseases like hepatitis, enteric fever etc. These spot maps will indicate where the epidemic started and how it is spreading to other areas of village.
- Serial spot maps will indicate direction of spread of the epidemic.

6.3.9 Identification of the cause of epidemic

- You have identified the time of introduction of disease in community with the help of epidemic curve and area first affected with the help of serial spot map. Concentrate on the indicated time period and area from where the epidemic has started as indicated in spot map for further investigations.
- If it is water borne epidemic, identify the place of contamination. (Details of how to identify area of contamination is given in water borne epidemic chapter)
- For vector borne epidemics, search for breeding places. Breeding places are different for each type of mosquito.

For example, anopheles mosquitoes breed in clean and large water sources like, wells, seepages from irrigation fields, canals, irrigation tanks, etc;
Aedes mosquito breed in small artificial water collections like water collected in tyres, broken bottles, house hold water collections (barrels, earthen pots), etc. Detailed enquiry with the help of these tools will provide enough information about the nature, origin and cause of epidemic.

6.3.10 Control of epidemic

Medical Officer should immediately start control measures on the basis of information available through primary investigations and should not wait for confirmation of diagnosis. Inform the Gram Panchayat in writing about control measures to be taken. Medical Officer should personally meet the Sarpanch and other leaders and inform them about cause of outbreak/epidemic and important actions necessary by Gram Panchayat and community. If the Gram Panchayat has not responded within 24 hours, inform BDO and DHO. Daily review the progress of measures taken by village till the epidemic is over.
Detailed control measures are mentioned in the chapter of specific epidemics.

6.3.11 End of Epidemic Declaration

Surveillance activities should be continued for double the incubation period of the particular disease from occurrence of last case. If there is no case during that period then it is declared that the epidemic is over.

6.3.12 Final report of epidemic

This is the detailed report of epidemic to be submitted by MO **within 10 days** after the epidemic is over. Final reporting should be in prescribed format. There are six separate formats of final report, which give detail information about following components –

- General information of epidemic.

- Date wise line listing of cases
- Details of water /stool/blood samples taken during epidemic period
- Water supply and chlorination
- Investigation of death if occurred during the epidemic
- Control measures

6.3.13 Record Related to Water Supply:

- टिसीएल नमुने तपासणी नोंदवही
- पाणी पुरवठा योजना सर्वेक्षण नोंदवही
- पाणी नमुने तपासणी नोंदवही - ओटी टेस्ट नोंद
- पाणी नमुने तपासणी नोंदवही - पाणी नमुने निषकर्ष
- ग्रामपंचायतनिहाय पाणी स्त्रोतांची नोंद (अ)
- ग्रामपंचायतनिहाय पाणी स्त्रोतांची नोंद (अ)
- ग्रामपंचायतनिहाय पाणी स्त्रोतांची नोंद (ब)
- (वैद्यकिय अधिकारी, प्राथमिक आरोग्य केंद्र यांनी सुरक्षित पिण्याच्या पाण्याबाबत द्यावयाच्या प्रमाणपत्र नमुना)

(Refer Annexure 6.6 (Vol. II))

6.3.14 Reports/Formats Related to Epidemics:

- साथीचा प्राथमिक अहवाल
- साथीचा अंतिम अहवाल
- साथीबाबत सविस्तर माहिती नमुना
- प्रयोगशाळेतील तपासण्या नमुना
- रुग्णशोध व उपचार नमुना
- मृत्यू संशोधन अहवाल नमुना

(Refer Annexure 6.7 (Vol. II))

6.4 Water Borne Diseases

6.4.1. Diarrhoeal Diseases

Diarrhoeal diseases include acute diarrhoea, persistent diarrhoea (diarrhoea duration two weeks or more) and dysentery (blood-stained stools). Diarrhoeal diseases are one of the most common causes of epidemic in our state.

Most of the deaths in diarrhoeal diseases are due to dehydration which is preventable by timely and adequate replacement of fluids.

Following are important causes of diarrhoeal diseases in rural areas

- Acute diarrhoea – Cholera, Rota virus, Food poisoning, gastrointestinal disorders and medications (rare)
- Persistent diarrhoea – Chronic bacterial infections, inflammatory bowel disorders, malabsorption syndrome
- Dysentery–Amoebiasis, Giardiasis, Shigellosis

Important diseases causing diarrhoea or dysentery in adults

A) Cholera

Cholera is the most important diarrhoeal disease which leads to rapid dehydration. Epidemics of Cholera are observed in all parts of Maharashtra state.

Etiological agent

Cholera is caused by bacteria Vibrio cholerae which exists in two biotypes, Classical and

El-Tor. Each biotype is further divided into two subgroups Inaba and Ogawa.

Epidemiology

V. cholerae can survive in water for three weeks and on soiled linen up to one week. Transmission occurs by faeco-oral route through contaminated water. Epidemics of cholera are usually single source, explosive type & spread rapidly.

Clinical manifestations

Cholera is an acute infection of small intestine manifested as watery diarrhoea and vomiting. Clinical spectrum of cholera is broad, ranging from inapparent infection to cholera gravis, which may be fatal in few hours. Incubation period of 24 to 48 hours is followed by abrupt onset of painless, profuse and watery diarrhoea associated with vomiting.

Symptoms and signs of cholera are entirely due to loss of large volume of isotonic fluid and resultant depletion of intravascular and extravascular fluid leading to severe dehydration, metabolic acidosis and hypokalemia. Patient develops thirst, cramps, and anxiety due to depleting isotonic fluid.

Diagnosis

Suspect cholera when patient has severe watery diarrhoea and vomiting. Collect stool sample of suspected cases in Cary Blair media (CB media) and transport to District Public Health Laboratory. However, treatment and control measures should be started immediately on the basis of clinical symptomatology without waiting for laboratory confirmation.

Treatment

Carefully examine patient for signs of dehydration and treat as per dehydration status. Most important treatment of cholera is rehydration of patient with ORS and Ringer's Lactate. In addition to this, start one of the following antibiotics to patient-

- Cap. Doxycycline 6 mg/kg/ day as a single dose for 3 days
  OR
- Cap. Tetracycline 50mg/kg/day in 4 divided doses for days OR
- Tab. Erythromycin 30mg/kg/day in 3 divided doses for 3days.

Prevention

Disinfection of water is an important preventive measure. Vibrio Cholera is sensitive to chlorine. Daily water chlorination, personal and environmental hygiene and food safety measures prevent cholera.

B) Amoebiasis

Human infection with entamoeba is called as amoebiasis.

Etiological agent

Amoebiasis is contracted by ingestion of cyst form of Entamoeba hystolytica. After entering the bowel, cysts develop into trophozoites which colonize in colon. Large numbers of cysts are developed from trophozoites which pass through stools completing life cycle.

Epidemiology

Man is the major reservoir of amoebiasis. Untreated water and contaminated food are important source of infection. Chlorination has little or no effect on amoebic cysts. Intestinal amoebiasis may occur within two weeks of infection or may be delayed for months.

Clinical features

More than ninety percent individuals infected with E hystolytica are asymptomatic. Many infected persons have nonspecific gastrointestinal symptoms such as abdominal pain, bloating or watery diarrhoea. Few patients develop amoebic dysentery and manifest as abdominal pain and bloody diarrhoea.

Rarely patient may develop fulminant amoebic colitis with high fever, peritonitis and colonic perforation resulting into high mortality. Few patients develop extra intestinal complications, commonest of which is liver abscess.

Diagnosis

Diagnosis of amoebiasis depends upon microscopic examination of stools. Finding of trophozoites in stools indicates occurrence of invasive colitis.

Treatment

Metronidazole 250 mg tid for 5-7 days OR
Tinidazole 2 grams stat OR
Furazolidone 100 mg qid for 7-10 days.
Information about Rotavirus infection and Shigellosis is given in Section-06 : Child Health.

Diarrhoeal Diseases Control Programme

Definition of diarrhoea

By definition, diarrhoea is passage of three or more liquid/ watery stools in 24 hours. However, change in consistency has more importance than number of stools passed.

Diagnosis of dehydration

Although number of organisms are responsible for causing diarrhoea, clinical presentation is same i.e. passage of watery stools leading to dehydration in all these cases. Therefore, assessment of dehydration status and correct management of dehydration by ORT is mainstay of diarrhoeal disease control programme.

General guidelines

- Diagnosis of dehydration is very simple, provided you examine patient systematically. MO, HAs, MPWs, and Anganwadi Workers from PHC must know how to examine diarrhoea patient for diagnosis of dehydration.
- Discuss diagnosis and management of dehydration in detail during monthly meetings.
- All Anganwadis and sub centres must have charts indicating diagnosis and management of dehydration. Also keep charts in the room of MO, HA, Pharmacist and ward in PHC.
- All MPWs must keep with them dehydration treatment card and 10 packets of ORS and tablets of zinc during home visits. Zinc supplementation reduces the duration and severity of diarrhoea and prevents subsequent episodes.

There is no need to give other medicines not mentioned in these guidelines, e.g. higher antibiotics, other IV fluids, multivitamins, anti-motility drugs, etc. to patients during management of dehydration. Addition of these medicines will unnecessarily increase cost of treatment and may divert your attention from correct management of dehydration, which is vital to save life of patient.

For systematic examination for dehydration, special indoor paper for patients of diarrhoea/dysentery should be used so that no point will be missed in correct assessment and management of dehydration. MO or health worker should only tick mark appropriate boxes of examination points, diagnosis and management. Printed indoor paper will cover all points and improve management practices of diarrhoea cases. (Table- 3.2)

Following steps should be carried out in given sequence for management of diarrhoeal diseases.

Table: Diagnosis of diarrhoea

Sign/symptom	Acute diarrhoea	Persistent diarrhoea	Dysentery
Frequency of stools/day	Three or more	Three or more	Three or more
Consistency of stools	Watery	Variable	Variable
Duration of diarrhoea	Less than 2 weeks	Two or more weeks	Less than 2 weeks
H/o fever	No	Variable	Yes
H/o blood-stained mucus	No	Variable	Yes
Effect on appetite	No	Loss of appetite	Loss of appetite
Dehydration	Important, may lead to severe dehydration if not treated in time	Patient may have some dehydration.	Patient may have some dehydration.
Treatment principle	Management of dehydration is priority	Start management of dehydration. Simultaneously find cause of persistent diarrhoea and treat accordingly.	Patient may have some dehydration. Simultaneously start appropriate antibiotics.
Long term effects	No long-term effect for occasional episodes. Repeated attacks may lead to PEM.	If not treated correctly, child may get severe Protein Energy Malnutrition	Repeated attacks may lead to Protein Energy Malnutrition

Assess status of dehydration of patient.

Table below will help in diagnosing dehydration status in diarrhoea case -

DEHYDRATION DIAGNOSIS CHART PHC .....

Name of patient: ..... Age .....Sex: M/F

Address: .....

.....

Sign/Symptom	Severity of symptoms and signs (Encircle *the* finding)		
	No dehydration	**Some dehydration**	**Severe dehydration**
General condition of patient	Patient well alert	Restless and irritable	Lethargic, unconscious, floppy
Presence of thirst	Normal/not thirsty	Thirsty, drinks water immediately when offered	Not able to drink
Dryness of mouth and tongue	Moist mouth and tongue	Mouth and tongue dry	Mouth and tongue very dry
Condition of eyes	Normal	Sunken	Very sunken, patient's face looks like old man's face
Condition of tears	Tears appear while crying	Tears appear while crying	No tears, dry eyes even in crying child
Skin turgor	Normal. Pinch to skin immediately goes back to Normal	Pinch slowly goes back and takes some time to become flat.	Pinch remains as it is for 2-3 seconds and then slowly goes back
Classification of dehydration	No dehydration	Some dehydration	Severe dehydration
Treatment of dehydration	Plan – A	Plan – B	Plan – C

Important:

- Dehydration status should be decided by the column from which maximum signs and symptoms are observed.
- Patient with only thirst without any other sign or symptoms of dehydration should be classified as having some dehydration and given Plan-B rehydration treatment.
- Lethargic child not able to drink with history of acute diarrhoea should be classified as having severe dehydration and given Plan-C rehydration treatment.

Management of dehydration

Most important aspect in management of diarrhoeal diseases is correction of dehydration. Treatment of dehydration is divided into three plans as follows-

- Plan-A: For patients with no dehydration – principle is to prevent dehydration.
- Plan-B: For patients with some dehydration – principle is treatment of some dehydration and preventing patient from going into severe dehydration.
- Plan-C: For patients with severe dehydration - This is life saving plan. Rehydrate patient as early as possible and prevent from going again into severe dehydration.

Description of treatment plans in details is as follows:

Plan-A

Plan-A is for patients who are having diarrhoea but no signs of dehydration.

Principle of treatment

As diarrhoea is continuing, there is continuous loss of water and electrolytes from body of patient which may lead to dehydration. Therefore, principle of Plan-A schedule is correction of whatever loss of water and electrolytes before the patient develops signs of dehydration. Plan-A can be advised at home to caretaker of patient. However, make sure that care taker has understood danger signs of dehydration (like thirst) before he/ she leaves the hospital. Following steps are recommended in Plan-A.

Home available fluids

- Advise to give Home Available Fluids (HAF) e.g. sarbat, lassi, vegetable soup, khir, buttermilk, tea, coconut water, etc. i.e. any liquid available at home to patient as much he/she can drink. In case of under-five children, MPW/ HA should not leave house of child till the mother has started giving ORS/HAF to child as child may quickly go into dehydration.
- Continue breast feeding and feeding – If child is being breastfed, then breast-feeding should be continued.
- Regular feeding of non-breast fed child should also be continued.

ORS to prevent dehydration

- If frequency and amount of diarrhoea is not declining or amount of stool is large, then start ORS. For other patients, if you have sufficient ORS packets, give one packet to mother for maintenance of hydration of child.
- Contents of WHO ORS are as follows –

Sodium chloride	3.5 grams
Potassium Chloride	1.5 grams
Sodium Citrate	2.9 grams
Glucose	20 grams

- Dissolve the packet in one litre of water to prepare ORS.
- Show caretaker how to prepare ORS. Following steps should be carried out for preparation of ORS –
- Take clean pot of one and half litre capacity and one clean spoon.
- Pour 1 litre of clean drinking water in the pot. (No need to boil water)
- Add whole packet of ORS into one-litre of water and stir till all powder is dissolved. Now ORS is ready for use.
- Give ORS by cup or spoon to small children and by glass to bigger children and to adults as per indicated dose.
- If patient has vomiting, wait for 5 minutes and start again.
- Keep ORS covered. Once prepared, ORS should be used within 24 hours. Do not use ORS beyond 24 hours, as there are chances of contamination.
- If child develops swelling on eyelids, stop ORS as it indicates overdose

Ask relative to give ORS in following doses after passage of each liquid stool

Less than 6 months	50ml
6 months to 2 years	50 - 100 ml
2 to 5 years	100 - 200 ml
5 +	As per demand

Watch for signs of dehydration

Ask caretaker to watch for signs of dehydration – Advise to bring patient to SC/PHC in case of following conditions;

- Increase in severity and/or frequency of diarrhoea
- Patient becomes thirsty
- Irritable

Plan –B

Start Plan-B treatment to patients showing signs and symptoms of some dehydration as per dehydration diagnosis chart. Aim of this plan is to correct dehydration and prevent patient from going into severe dehydration.

Principle of treatment

Patient with some dehydration should be given ORS for correction of dehydration.

Steps in preparation of ORS are given in Plan-A

Dose of ORS: Dose of ORS is calculated preferably according to weight of patient. Give ORS in a dose of 100ml/kg in 4 hrs. If weighing is not possible, calculate age wise ORS requirement for four hours as given in table below

Continue breast feeding and feeding – If child is being breastfed, then breast-feeding should be continued. Regular feeding of non-breast-fed child should also be continued

Table: Age wise ORS requirement for four hours

Age	< 4 months	4–11 months	12–23 months	2 – 4 years	5 – 14 years	15 + years
Dose	200 - 400 ml	400 – 600 ml	600 – 800 ml	800 – 1200 ml	1200 – 2200 ml	2200 - 4000 ml

Re-examination of patient

Re-examine patient after every four hours for status of dehydration with the help of dehydration diagnosis chart and decide plan freshly as per dehydration status as follows:

Condition of patient on re-examination	Management advice
Patient improves, no signs of dehydration on examination and diarrhoea stops	Keep patient under observation for 24 hours. Continue HAF. Observe if diarrhoea and/or vomiting start again.
Patient improves, no signs of dehydration on examination but diarrhoea continues	Continue giving ORS in doses suggested in Plan-A, re-examine after four hours
Dehydration status same	Continue with Plan-B. Check whether ORS is being given in correct dose. Re-examine after four hours. If severity and frequency of diarrhoea increases and patient is at home or SC, shift patient to PHC.
Signs of severe dehydration	Switch on to Plan - C (start IV fluids). Shift patient to PHC if patient is at home or SC.

	Continue to give ORS as much as possible during shifting.

Use of antibiotics and other drugs

Antibiotics are recommended only to suspected patients of cholera and dysentery. Other drugs like anti motility drugs, binding agents, anti-secretary agents and steroids are not of any use in management of diarrhoea. They are harmful to patients and therefore not at all recommended for treatment.

Strategies for lowering diarrhoea deaths

Following important actions will help to reduce incidence of diarrhoea and deaths –

- Promote healthy environmental and personal hygiene practices. Coordinate with Gram Panchayat for safe drinking water supply and sanitation.
- Discuss correct assessment and management of dehydration with PHC staff during monthly meetings especially before and during rainy season.
- Make ORS readily/freely available. Widen the net of providers who can treat diarrhoea. Train ASHA, AWW's, Link workers and volunteers in management of dehydration. Train private practitioners of Modern medicine and ISM systems in rational treatment of diarrhoea.
- Ensure prompt emergency care on admission, correct diagnosis and treatment of diarrhoea cases in PHC.
- Always keep sufficient supply of Ringer's Lactate and ORS. Ensure adequate supply of ORS at village level through health workers, AWW, Dai, ASHA etc.
- Continue to emphasize on following points:
  - Exclusive breastfeeding up to the age of 6 months
  - Never use bottle for feeding a child
  - Dangers of diarrhoea – dehydration, malnutrition
  - Use of HAF in case of diarrhoea
  - Measles immunization as a preventive measure for diarrhoea/dysentery

6.4.2 Enteric Fever

Enteric fever is an acute, febrile illness, caused by bacterium *Salmonella typhi* which may become sometimes life threatening.

Etiologic agent

Enteric fever is caused by *Salmonella typhi* and *S. Paratyphi*. Enteric fever caused by *S.typhi* is more severe and frequent. (Commonly called as typhoid).

Epidemiology

Man is the only natural reservoir of *S.typhi*. Ingestion of food or water contaminated with human faeces is most common mode of transmission. *S.typhi* is present for about 1-2 months in stools of patients. Carriers are important epidemiologically because they are mainly responsible for spread of typhoid in community. Complete antimicrobial therapy reduces chances of carrier stage.

Clinical manifestations

After incubation period of 10-14 days, typhoid fever has an insidious onset characterized by fever, headache, constipation, malaise, chills and myalgia. Splenomegaly, leukopenia, abdominal distention and tenderness are generally present. If untreated, fever increases up to 40°C and fatigue, anorexia, abdominal symptoms and cough may appear with increase in severity. Nausea and vomiting in second and third week suggest complications.

Diagnosis

S. Typhi is most frequently isolated from blood during first week of illness. Collect blood sample of suspected enteric fever case before starting antibiotic. Widal test, which measures antibody response to H and O antigens, can only suggest diagnosis of enteric fever. Widal test results are not definitive and must be interpreted with care because titre may be elevated without enteric fever. If Widal test is performed, repeat the test after 10 days. Four-fold rise in antibody titre of second sample should be used for diagnosis rather than single test result.

Treatment

Effective antimicrobial therapy reduces morbidity and mortality from typhoid fever. Without therapy, illness may last for 3 to 4 weeks, and there could be 12-30% deaths. Multi-drug resistant typhoid fever is reported from many places in the state. Therefore, presently drug of choice for typhoid fever is Ciprofloxacin 500-750 mg twice a day for 15 days. Alternatively, Ceftriaxone and Cefaperazone can be used if resistance to Ciprofloxacin is documented.

Control of Typhoid outbreak

Following steps should be carried out for confirmation of diagnosis of fever outbreak.

Confirmation of diagnosis

- Start survey of affected area. Decide whether cases are clearly in excess than expected fever cases from village. If yes, inform DHO about fever outbreak and your clinical diagnosis of cases.
- First collect and examine PBS of all fever cases for malaria even if your clinical diagnosis is not malaria. Exclude malaria on the basis of negative PBS results.
- Once malaria is excluded try to differentiate fever cases on the basis of clinical examination into viral fever or typhoid fever. Diagnostic features of typhoid fever are atypical fever pattern, coated tongue, relative bradycardia, tender splenomegaly and relative leukopenia.
- If you suspect typhoid, collect 5 ml blood for culture, inoculate on enriched media (available at District Public health laboratory) and send to District Public Health Laboratory by special messenger. Keep media at room temperature during transportation. Alternatively, you can request DHO to send Public health laboratory microbiologist for blood culture examination. Also request laboratory for antibiotic sensitivity pattern.
- Do not declare epidemic as of typhoid on the basis of serological examination such as Widal test as this test is not confirmative of Typhoid fever.

If you are confident about clinical diagnosis then start antibiotic after collection of blood for culture.

Once you get result of blood culture, and if blood culture is positive for S. typhi, then label epidemic as of Typhoid fever. Change antibiotics suitably if investigations indicate resistance of S. typhi to Ciprofloxacin.

Prevention and Control of Enteric Fever

- Preventive and control measures of enteric fever are described in chapter of control of water borne diseases.

6.4.3. Viral Hepatitis

Presently five viruses are responsible for viral hepatitis as they have common characteristics as primary replication in liver. Each virus belongs to different taxonomic family. Amongst these, two viruses, Hepatitis A virus (HAV) and Hepatitis E virus (HEV) are transmitted by faecal-oral route, produce acute self-limiting infections and they have ability to develop into epidemic form. Hepatitis B virus (HBV), Hepatitis C virus (HCV) and Delta Hepatitis virus (HDV)

are transmitted by blood and body fluids and have ability to produce a persistent infection and chronic liver diseases. They rarely present in epidemic form.

Clinical symptomatology does not distinguish between different types of viral hepatitis. Therefore, clinical symptoms alone should not be used to establish etiologic diagnosis in jaundice patients. Enterically transmitted viral hepatitis (Viral Hepatitis A and E) is described in this chapter whereas parenterally transmitted viral hepatitis (Viral Hepatitis B, C and E) is described in section 7.8.2)

Characteristics of Enterically transmitted Viral Hepatitis
Salient characteristics of enterically transmitted types of hepatitis are given below.

Hepatitis-A
Hepatitis-A is endemic in our state. HAV is non-enveloped single-stranded RNA virus. It spreads through faeco-oral route.

Clinical characteristics
Incubation period of HAV is between 14-45 days with median of 28 days.
Characteristics of HAV infection are - faecal shedding of virus, viremia, age dependent expression of clinical illness (i.e. jaundice), occasional occurrence of liver failure, and absence of chronic liver disease.

Children under six years of age generally have mild, nonspecific symptoms that include malaise, nausea, vomiting, diarrhoea, fever and dark urine. Jaundice is uncommon in this age group. Among adolescent and adults infected with HAV, majority have classic signs and symptoms, including jaundice, fever, malaise, nausea, vomiting, loss of appetite and dark urine.

Susceptible household contacts have a 10 to 50 percent risk of acquiring disease from a family member with acute illness. During epidemic of Hepatitis A contact with children under six years of age appears to be a risk factor for infection

Prevention of Hepatitis-A
Hepatitis-A is prevented by avoiding contamination of water, boiling drinking water during epidemic and personal hygiene. Effective vaccine against Hepatitis-A is available. As HAV infection is very common among preschool children, it is asymptomatic in this age group and gives immunity after infection; Hepatitis-A vaccine is not yet included in National Immunization Schedule

Hepatitis-E
Epidemics of Hepatitis-E are now becoming very common for last few years. Incubation period of Hepatitis-E is longer than Hepatitis-A with a range of 22-60 days. A prodromal phase lasting for 1 to 10 days is followed by nausea, dark urine, abdominal pain, vomiting, pruritis, diarrhoea, etc in varying number of patients. Children have lower rate of symptomatic infection.

A high case fatality rate among pregnant women has been consistent feature of Hepatitis-E and has ranged from 5-25%. Most persons with Hepatitis-E have a self-limiting disease with complete recovery.

Spread

HEV is primarily transmitted by faeco-oral route. In endemic areas, primary source of infection is faecal contaminated drinking water, although food-borne transmission is suggested but not proven. Person to person transmission is rare and secondary attack rate among household is low (less than one percent).

Diagnosis

It is difficult to differentiate Hepatitis-E clinically from other forms of hepatitis. Hepatitis-E is observed in areas where Hepatitis-A is endemic. However, few epidemiological features distinguish Hepatitis-E from Hepatitis-A. In Hepatitis-E there is high attack rate among adults and high case fatality among pregnant women. Highest prevalence of Hepatitis-E is observed in age group of 20-29 years. As secondary attack rate in Hepatitis-E is very low, it is rare to find secondary case in same house.

Prevention

Most important means of prevention of Hepatitis-E is protection of water from faecal contamination. Chlorination of water has no definite effect on HEV. Boiling water for 10 minutes definitely kills HEV.

Investigation and control of Hepatitis outbreak

Once you get report of jaundice case, immediately visit the village along with PHC team. Following points will help you to arrive at conclusion whether outbreak is due to enterically transmitted viral hepatitis or not:

- If single case is reported then diagnosis could be any type of hepatitis including obstructive jaundice. However, occurrence of multiple cases in same village within one incubation period (3-6 weeks) almost rules out parenterally transmitted hepatitis and obstructive jaundice.
- Examine clinically the reported case. First try to rule out obstructive causes of jaundice. Severe abdominal pain, absence of prodromal symptoms particularly fever and malaise, rapid deep jaundice, itching of skin, etc. are important factors to distinguish obstructive jaundice from viral hepatitis.
- Carefully ask patient about h/o blood transfusion, surgery, injections, unsafe sex etc. in last 6 months to rule out parenterally transmitted Viral Hepatitis.

If you suspect that jaundice in cases is due to enterically transmitted hepatitis, start control measures as described for control of water borne diseases in Chapter 3G in addition to special precautions for pregnant women as follows-

- Ask MPWs to identify pregnant women & personally advise them about –
- Drinking only boiled water
- Follow personal hygiene rules strictly
- Get human immunoglobulin injections when arranged by PHC staff.
- Arrange for giving Human Immunoglobulin to all pregnant women in affected village. Human Immunoglobulin should be from pooled sera of Indian donors. Dose of Human Immunoglobulin should be checked with the manufacturer 's dose schedule.

6.4.4. Guinea Worm Disease

Maharashtra is guinea worm free since l991. However regular GW survey and rumours investigations are necessary till the disease is declared as eradicated from country. Although fatal, it causes morbidity and enormous socioeconomic burden in rural areas & hence considered for eradication.

Etiologic agent

Guinea worm disease (Dracunculiasis) is caused due to infection by parasite *Dracunculus medinensis*. Adult male Guinea worm measures 2-3 cm whereas adult female worm measures 50-120 cm. in length.

Life cycle

- Life cycle of Dracunculus medinensis starts when person with Guinea Worm disease enters ponds or step well. After contact with water, female guinea worm releases thousands of larvae which are picked up by cyclops in water.
- After going through two cycles of about 15 days inside Cyclops, larvae are ready to infect susceptible person. When a person drinks water containing infected Cyclops. Cyclops are killed in stomach by gastric juice and larvae become free.
- Free larvae migrate through stomach wall into abdominal cavity and develop into male or female parasites which mate in abdominal cavity. Male worm is short (2-3 cm) and dies after mating and is absorbed in body. Female worm continues to grow.
- About 10-14 months after beginning of infection, adult female worm measuring about one meter long (50-120cm) migrates towards skin. Once female worm reaches skin it releases toxin which forms a painful blister. When blister ruptures (usually after immersion of limb in water), gravid female worm which resembles thick milky thread releases thousands of larvae in water.
- Total cycle (from ingestion of infected Cyclops to appearance of GW) takes approximately one year and continues in village every year till contact between infected Cyclops and susceptible person continues

Clinical manifestations

- Though female worm is growing inside body, infection is asymptomatic during the year long incubation period.
- Shortly before worm emerges, patient may experience nausea, fever or aching but often first sign of infection is painful blister or appearance of worm under skin.
- Although most of the victims suffer from only one worm that emerges through lower leg, multiple parasites may emerge from any part of body. Painful infection incapacitates person for averaging two months

Diagnosis

Diagnosis of the disease is facilitated by striking appearance of milky white, thick, thread like worm emerging through skin, since no other human infection manifests in this

Treatment

Treatment includes relief of pain (anti-inflammatory) and prevention of secondary infection (antibiotics). Injection TT should also be given to patient if not previously immunized

Physical removal of worm by slowly wrapping it around a stick over several days or weeks shortens duration of suffering. Great care should be taken to avoid breaking worm, since withdrawal of broken worm into body spills larvae in tissue and causes a severe inflammatory reaction

National Guinea Worm Eradication programme

GW eradication strategy

National campaign for eradicating Guinea Worm Disease started in 1984. The eradication strategy comprises of following elements -

- Provision of safe drinking water (elimination of step wells
- Control of Cyclops
- Disease surveillance

- Treatment of GW disease case by admission in hospital
- Health education of community regarding not using step wells, use of Temiphos, filtering water and reporting GW disease case

GW eradication activities

In view of the sustained efforts of the state, GW is eliminated from Maharashtra state in 1991. Presently following activities are carried out under the programme –

GW disease surveillance:

- Passive surveillance by all health institutions.
- Active surveillance once a year in the month of June by house-to-house survey.
- Health education to community regarding identification and reporting of disease.
- Investigation of rumours of GW disease case and reporting to State GW officer.

GW disease surveillance

Passive surveillance

All cases with blister attending OPD are thoroughly examined for evidence of thread like worm. If required, case is followed up for 1-2 weeks

Active surveillance

Active surveillance is carried out once a year in the form of house-to-house visit by health workers. It is usually carried out in month of June. Exact dates of active surveillance are communicated by DHO. Guidelines for active surveillance of GW disease are as below –

- Prepare programme for survey of all villages, wadi/pada/ hamlet in PHC area with help of MPWs and HAs.
- Provide photo card of GW disease patient to all MPWs and HAs. MPW/HA should show this card in every house and ask whether any family member was suffering from such disease since last survey and also whether they know anyone who has developed such disease.
- Showing picture is very important because majority of people have not seen a case of GW disease since long time.
- After visiting each house, marking is made on door, which indicates that MPW has visited house for guinea worm surveillance activity.

Health education

Opportunity of house-to-house survey should be utilized for health education of community. Write slogans related to GW disease identification on walls. Show pictures of GW disease cases and request to inform nearest PHC if such case is seen.

Investigation of rumour of GW disease case

MO himself must investigate all rumours of GW disease case.

- Take careful history of patient. Examine blister and surrounding area of skin. Blister is very painful and inflamed in GW patient.
- Clean blister and surrounding area with antiseptic solution and look for thick, thread like white structure coming from blister. Sometimes purulent discharge from abscess may

6.4.5. Helminthiasis

Infection by intestinal worms is recognized as an important public health problem, particularly in developing countries. Intestinal helminths rank first as cause of disease burden in children aged 5-14 years and also rank high as disease that can be efficiently controlled by cost-effective intervention

Adverse effects of worm infestation:

- Affects nutritional equilibrium and induces mal-absorption of nutrients.
- Reduces food intake and competes for absorption of available micronutrients.
- Reduces growth and affects cognitive development.
- Causes internal bleeding and surgical complications (obstruction, rectal prolapse, and abscess).

Common worm infestations:

Ascariasis (Round worm)

It is most common intestinal worm infestation caused by *Ascaris Lumbricoide.*

Life cycle

Adult female releases millions of fertile and infertile eggs which are laid into soil along with stools. Eggs become infective in 2– 3 weeks. Infective eggs are ingested by a person through contaminated food. Eggs hatch in gut and resulting larvae penetrate gut wall. Larvae invade portal vein, pass through bloodstream to liver and then to lungs. In lungs they break through alveolar walls and migrate into bronchioles. They are coughed up through trachea and are swallowed by human host. On reaching intestine they become mature and start laying eggs.

Mode of transmission

Mode of transmission is faecal-soil-oral, through food contaminated with eggs. Inhalation of airborne eggs may produce

Clinical features

Most individuals are asymptomatic. Heavy infestation can produce nutritional deficiency and growth retardation. Fever, intestinal colic, urticaria, vomiting and diarrhoea, giddiness can occur. In few children, pneumonitis or bronchitis with eosinophilia may develop when larva migrate through lungs Occasionally worms may form a bolus causing intestinal obstruction in children.

Treatment

Any of the following medications are useful for Ascariasis:

- Mebendazole: 100 mg twice daily for three days.
- Albendazole: Given as a single dose of 400 mg.
- Pyrantel pamoate: Effective in a single dose of 10 mg per kg body weight
- Piperazine citrate: This is used in case of intestinal obstruction. Dose is 75 mg/ body weight with maximum dose of 3.5 gm for 2 days.

Prevention and control

Prevention of Ascariasis requires proper disposal of human waste, provision of safe drinking water and food hygiene. Health education regarding use of latrines, personal hygiene, and food hygiene should be given.

Hookworm disease

It is caused by *Ankylostoma duodenale* and *Necator americanus.* Worms live in duodenum and upper jejunum. They get attached to mucosa, suck blood and intestinal fluid rich in proteins.

Life cycle

Adult female Hookworm liberates eggs which after fertilization are excreted in stools. When eggs are deposited in soil, they hatch in 2 days and develop into infective larvae. Fully developed larvae on coming in contact with human host, pierce skin most commonly through gaps between fingers of feet. Once inside body, larvae enter blood vessels, migrate to lungs through heart in blood stream, break into alveoli, ascend bronchi and trachea and get

swallowed. Larvae are fully-grown into adult worm when they reach small intestine and become sexually active.

Clinical features

- When larvae penetrate skin, it may produce local pruritic rash with blister formation. Secondary bacterial infection may occur if lesions are scratched.
- There may be transitory cough, breathlessness and fever when larvae are in lungs.
- Patient may develop iron deficiency anaemia, hypoalbuminemia and oedema.
- In children, severe anaemia may lead to loss of appetite, cardiac failure, retarded physical, mental and sexual development, impaired learning and cognitive development. Pica with constipation may be seen

Mode of transmission

Hookworm larvae enter body through feet by penetrating skin or may be acquired through oral route by contaminated fruits and vegetables.

Treatment

- Mebendazole, albendazole and pyrantel pamoate are effective in doses given for ascariasis.
- Iron supplementation for treatment of anaemia

Prevention and control

- Avoid open air defecation, ensure sanitary disposal of human waste.
- Wearing shoes
- Health education for use of latrines, use of footwear and food hygiene

Enterobiasis (Pin worm)

Enterobiasis is caused by *Enterobius vermicularis* usually involves school-aged children. It affects children and those who live collectively in hostels etc. Enterobiasis spreads rapidly within families, institutions, day care facilities etc. Adult worm lives in caecum, appendix and large intestine.

Life cycle

Gravid female is carried in bowel to anus at night where she deposits eggs on perianal skin and dies. When child scratches peri-anal region, larvae get attached to fingertips to fingernails. Auto infection or infection to others occur by swallowing eggs attached on fingertips or fingernails. Larvae are released from eggs in small intestine from where they migrate to caecum. Life cycle takes one month to complete

Mode of transmission

Ingestion of infective eggs via contaminated fingers, fomites.

Clinical features

Only symptom is pruritus ani. When this is severe may lead to secondary bacterial infection in perianal region. Vulvovaginitis and urinary tract infection in females may occur.

Treatment

- Mebendazole in a single dose of 100 mg repeated after 2 weeks or pyrantal pamoate 10 mg/kg in a single dose repeated after 2 weeks is effective.
- All family members need to be treated simultaneously.

- Good personal hygiene which includes clean hands, scrubbed nails, fresh garments and bed linen are equally important Change undergarments and bedding regularly.

Trichuriasis

Trichuriasis is extremely common infection caused by *Trichuris trichura* or *whipworm*. Co infection with Ascaris or hookworm is common. Adult worms are found in large intestine.

Life cycle

Adult female lays eggs which are passed in faeces. Eggs become infectious after 3 weeks. When they are ingested, eggs hatch in small intestine and penetrate gut wall for a short period of time. After penetration they return to lumen and migrate to colon to mature in to adults.

Clinical features

Light infections are asymptomatic. Abdominal pain, anorexia, diarrhoea can be seen. In heavy infection, colitis occurs with passage of blood and mucus. Anaemia may develop due to bleeding from gut. Dysentery may be severe leading to prolapsed of rectum when heavy worm loads lead to local irritation and constant straining at stool.

Treatment

Mebendazole, albendazole and pyrantel pamoate in doses used for ascariasis are effective.

Prevention and control

Proper disposal of human waste. Avoid ingestion of unclean vegetables and fruits contaminated with soil.

Taeniasis

This is helminthiasis caused mainly by three types. They are hermophrodites and absorb nutrients directly through cuticle

Types of taeniasis

T. saginata (Beef tapeworm)

This occurs where cattle are reared and sanitation is poor. Gravid segments of *T. saginata*are passed in human faeces. When they are ingested by grazing cattle, eggs hatch to release embryos that encyst in muscles as cysticerci. Humans are infected by eating uncooked, half cooked beef containing viable cysticerci.

T. solium (Pork tapeworm)

Life cycle of *T. solium*is similar to that of beef tapeworm, except that pig is host to larval stage. Humans become infected by eating undercooked pork containing cysticerci. Cysticerci develop into an adult worm in small intestine

H.nana

Both larval and adult stages are found in human intestine and there is no intermediate host. Eggs passed in faeces are immediately infective. Eggs are transmitted in most cases directly from person to person. Internal auto infection also occurs

Clinical features

Tapeworm infections are generally asymptomatic. Occasionally non specific symptoms like abdominal discomfort, nausea and dizziness may occur. Diarrhoea, abdominal pain, vomiting and weight loss are seen in infection with H.nana

Treatment

- Niclosamide in single dose of 2 gm should be given on fasting.
- Praziquantel 10 mg per kg as a single dose is also effective

6.4.6. Prevention Of Water Borne Diseases

Water borne diseases can be prevented by safe water supply and improvement in environmental sanitation in villages

Important aspects in safe water supply to community

- Water quality monitoring
- Water quality surveillance

Water quality monitoring is responsibility of local body like Gram panchayat, Municipal council, corporations. As Gram Panchayat (GP) is responsible for safe water supply to community in rural areas, it is responsible for maintaining water quality supplied to village. *(Ref - ik.kh iqjoBk o LoPNrk foHkkx 'kklu fu.kZ; dz- 20110330152138001---------- fn- 30 ekpZ 2011)*

Responsibilities of GP included in water quality Monitoring

- Daily disinfection of water at source at least half hour before supply.
- Daily OT test to check water disinfection. If OT test is negative then repeat chlorination and ensure proper chlorination.
- Regular inspection of leakages, blocks, etc. in water supply scheme and timely repairs of these defects.
- Keeping surrounding of water supply source, overhead tanks, valves, pipeline and stand posts clean.
- Proper storage of TCL. Uninterrupted supply of TCL to water supply scheme

Village Health, Nutrition and Sanitation Committee -

Each villages now has **Village Health, Nutrition and Sanitation Committee** and at least one village water supply worker. Conduct meeting of committee in Gram Panchayat every month. Ensure that Jal Surakshak is also present during meeting. Inform them about importance of regular water disinfection, procedure of water disinfection, water quality monitoring and TCL quality. Show committee members water sample and TCL testing reports of previous year and discuss about reasons for contamination if any.
(Ref - ik.kh iqjoBk o LoPNrk foHkkx 'kklu fu.kZ; dz- 20110330152138001---- fn- 30 ekpZ 2011)

Responsibilities of village water supply worker

- Identify and register all water sources and population dependent on each source.
- Daily water disinfection by TCL. Dose of TCL is estimated by MO PHC.
- To release water to all areas half hour after disinfection.
- Regular sanitary inspection of area surrounding water supply scheme, timely repairing valve leakages, draining the water collections formed due to leakages, minor and repairs of valves, pipeline, stand posts, etc.
- Daily OT test (Orthotolidine test) to check the chlorination of water and recording the test result in OT register.

Record related to water supply kept at Gram Panchayat

- Information of all water sources, total water quantity in each source, dose of TCL required for chlorination of each source.
- Daily OT test record
- TCL stock and quality monitoring
- TCL daily use and daily chlorination record, Water sample reports received and corrective action taken

Water quality surveillance

Water quality surveillance is carried out to ensure that safe water is being supplied by Gram Panchayat to the community. This responsibility has been entrusted to health department. Medical Officer is responsible for water quality surveillance of all the villages in PHC area

Activities for water quality surveillance

- OT test of water in all villages in maximum possible frequency.
- Collection and sending of water samples to laboratory.
- Communication and advice on results of testing to water distribution authority.
- Notify and document the trends in seasonal changes in water quality.
- If water sample of any Gram Panchayat is reported as unsafe, identify the reason(s) for water contamination and advise the water supply authority accordingly.
- Meeting with members of village water supply committee at least once in year.
- Training of water supply workers and Gram Sevaks in water disinfection and record keeping.
- Checking stock of TCL, its storage and chlorination procedure, TCL quality record.
- Periodic sanitary survey.
- Generate, summarise and analyse surveillance data for improvement.

Responsibilities of health staff in water quality Surveillance

Over all responsibility of PHC is to identify the contaminated source in time and suggest corrective action to Gram Panchayat, so that unwanted situations like epidemics are averted. To achieve this objective, there should be good coordination between PHC and Gram Panchayat. Responsibilities of PHC staff in ensuring safe water supply to community are as follows:

Multi-Purpose Worker (Female and Male)

MPW-Female is responsible for water quality surveillance of sub centre HQ village and MPW-Male should look after remaining villages of the sub centre. In case of single village in sub centre, this will be the responsibility of MPW - Male. Detailed responsibilities of MPW sin water quality surveillance are as follows-

MPW-Female is responsible for water quality surveillance of sub centre HQ village and MPW-Male should look after remaining villages of the sub centre. In case of single village in sub centre, this will be the responsibility of MPW - Male. Detailed responsibilities of MPWs in water quality surveillance are as follows-

- Always start village visit with OT test of water from one or two houses. Conduct OT test at various points in village afterwards and record in OT register
- If OT test is negative, then collect the water sample. In case of negative OT test, at least two water samples from each village per month - one at the place of entry (first water connection) and another at lower end of distribution (area of lower end should be changed every time) should be collected. If population of village is more than 5000,

collect one more water sample for each 5000 population from different sites of the village. If there is a group GP then one water sample of common water source from each wadi /wasti/pada should be taken.

- Send the water sample to Rural Hospital designated for your PHC for testing, or to District Public Health Laboratory if testing facility at RH is not available. If field test is repeatedly positive for a particular source, then water sample of that source is sent for microbiological examination at District Public Health laboratory. Send water sample at least twice in a year for chemical analysis for chemical potability to District Public Health Laboratory.
- In addition to water sample, also collect TCL sample from each Gram Panchayat every three months. Collect 25-50 grams of TCL in polythene bag and close the bag airtight. Put this bag into another polythene bag and close carefully again. Enter name of village, date of sample collection over to HA. TCL sample can be taken in glass bottle also.

Responsibilities of Health Assistant (Male)

- OT test at the time of visit to any village, enter in OT test register and convey to GP.
- Monitor the OT test results and water sample collection by MPW in the allotted area.
- Arrange for transport of water samples from PHC HQ to Laboratory.
- Arrange for train in g of GP staff in water quality monitoring.
- Assist medical officer in sanitary survey of the water supply schemes.
- Visit to GP to supervise adequacy of TCL stock, regular chlorination, TCL quality record

Responsibilities of MO

Medical officer should visit each GP in his area at least once a month. Following are the responsibilities of MO in quality water supply

Training

MO should conduct training of Village Water Supply and Sanitation Committee members, Gram Sevak and water supply worker in water quality monitoring twice a year. Concerned HA and MPW should also be involved in this training. Water quality monitoring training includes following aspects:

- Importance of safe water supply and water quality monitoring
- Measuring the water quantity in water sources like well and calculation of TCL requirement of water supply scheme
- Water chlorination procedure
- OT test procedure and interpretation
- Storage of TCL
- Water quality monitoring records and their significance

Ensure regularity of chlorination of water

Following points will give medical officer the idea of regularity of chlorination of water:

- Check OT register and see whether daily OT test is taken and result noted. Free chlorine should be within 0. 2 to 0.5 PPM.
- Check the time of water chlorination and time of OT test and see whether place of OT test is changed daily and last stand posts are included.
- Review the action taken by GP when the OT test was negative.
- Inspect the stock of OT reagent and condition of chloroscope.
- Personally go and inspect TCL storage and TCL residual heap at the place of chlorination.

TCL stock and inventory

- Check the TCL stock: Availability of TCL on the day of visit: Not more than 3 months requirement of TCL should be purchased each time.
- Check ISI mark on the TCL used by GP, as only ISI mark Grade - I (Chlorine 34%) or Grade - II (Chlorine 32%) TCL should be purchased.
- Place of TCL bag – It should be dry, cool, dark place.
- Closing of TCL bag - TCL bag is in two layers. Both the layers should be separately closed. Inside polythene/plastic layer should be firmly closed and then outside layer should be closed.
- Check how TCL is measured daily for chlorination

Water samples

- Arrange for the transport of water samples to RH for field test in and also to District Public Health laboratory for crosschecking and detailed analysis.
- Communicate the results to the concerned water distribution authority with advice about corrective measure
- GP is supposed to take corrective measures as proposed by Medical Officer if the report of water sample indicate contamination. Medical officer should verify whether the actions as per recommendations have been taken by GP.
- If GP is not responding to the instructions given by the Medical Officer which may lead to unsafe water supply to community, then following procedure should be adopted:
  - Reminder to GP regarding corrective measures to be taken.
  - If no response in two weeks, write to BDO stating the importance of corrective measures.
  - If no response to this letter in two weeks, then write DHO should bring such matter immediately to the to DHO and send copies to GP, BDO and Dy. CEO (Panchayat).
  - Notice of DY. CEO (Panchayat) and discuss in Health Committee and Coordination Committee meeting of Zilla Parishad
  - Conduct sanitary survey of water supply scheme once a year and issue Green/Red card and identify high-risk villages holding red cards. (Details given below)

Collection of water sample for bacteriological examination

Water sampling should fulfil following requirement

- Sampling should be properly planned.
- Sampling points should be representative of water source and located in proportion to population served.
- Sample should be collected properly, in adequate quantity (at least 200 ml), in a sterile glass bottle with properly fitting stoppers or caps and properly dispatched. As per the WHO guidelines the number of samples and its frequency on basis of population served should be as given below:

Table: Frequency of water sample collection

Population served	Frequency	Minimum samples to be collected in a month
Less than 20,000	Per month	10
20,000-50,000	Per week 5	20

50,001 to 1,00,000	Per week 10	40
More than 1,00,000	Per week 20	80
Corporation area	Per day 5	120

Method of water sample collection

Tap or fixed hand pump outlet

When water is taken from tap, flame the mouth of tap and allow the water to run for 3 minutes before filling the bottle.

Sampling from water source or reservoir (Lake, river, tank, etc.)

Insert the bottle with stopper on mouth, 12-15 inches below the surface of water. Open the stopper carefully without touching the bottle. Replace the stopper after the bottle is filled with water. Avoid the collection of surface water as it contains organic matter.

Sampling from dug well

Attach a suitable sized stone (after washing thoroughly) with a string to the sampling bottle in such a way that while immersing, the bottle will have 450 angle with water surface. Remove the stopper or unscrew the cap, lower the bottle slowly, immerse the bottle about 12-15 inches below water surface, fill and bring up. Discard some top water and replace the stopper

Storage and transportation of the samples

There can be changes in coliform and E. coli content of the water during storage hence prolonged storage should be avoided and therefore in no case the time interval between the collection and examination of the sample should exceed 24hours.

Labelling

Sample should carry the label on bottle giving following particulars:

- Name of the sender:
- Source:
- Location:
- Place:
- Date and time of collection:

Collected by:

Collection of water sample for chemical examination

- Collect the water sample in a glass or plastic container.
- Ideally a new container should be used but if unavailable, wash the used containers first with chromic acid cleaning mixture, then rinse with tap water and then with distilled water.
- Collect two samples of 2.5 litre each. First sample is for chemical analysis and second sample for chlorine dose estimation.
- Avoid surface scam.
- Collect the water sample in a glass or plastic container.

- Ideally a new container should be used but if unavailable, wash the used containers first with chromic acid cleaning mixture, then rinse with tap water and then with distilled water.
- Collect two samples of 2.5 litres each. First sample is for chemical analysis and second sample for chlorine dose estimation.
- Avoid surface scam.

Characteristics of Drinking Water

When the water sample of a new water source is sent for analysis, following important aspects are tested in District Public Health laboratory. Upper limit of important characteristic and medical significance in short is as below:

Table: Drinking water norms

Sr	Characteristic/substance	Desirable limit	Significance
1	Colour	5 (TCU)	Colour may be due to coloured organic matter or metals or industrial waste. Above 5, consumer acceptance decreases
2	Odour and taste	Unobjectionable	Indicates some form of pollution. May be by-product of chlorination
3	Turbidity	5 (NTU)	Caused by particulate matter. Above 5 consumer acceptance decreases. Interferes with disinfection.
4	pH	6.5 to 8.5	Beyond this range water affect s mucus membrane and causes corrosion of water supply pipes
5	Total hardness	300 mg/lit	If more, may cause scale deposition in water supply system. If low level, corrosive effect on pipes.
6	Iron	0 .3 mg/lit	Beyond this, taste/ appearance is affected. Adverse effect on domestic uses and water supply structures. Promote growth of 'iron bacteria'.
7	Chloride	250 mg/lit	Beyond this limit taste, corrosion and palatability are affected.

8	Dissolved Solids	500 mg/lit	Beyond this limit solids palatability decreases and may cause gastro intestinal irritation
9	Sulphates	200 mg/lit	Beyond this causes gastro intestinal irritation
10	Nitrate	45 mg/lit	Methheamoglobinemia takes place beyond this limit. Bottle fed infants < 3 months are more susceptible.
11	Fluoride	1 mg/lit	It should be as low as possible. High fluoride may cause fluorosis.

Collection of bleaching powder sample for chemical examination

- Sample shall not be exposed to atmosphere for longer time than necessary and sampling shall be done as rapidly and thoroughly as possible.
- Sampling instrument should be clean and dry when used.
- To draw a representative sample, content of each container shall be mixed as thoroughly as possible by rolling, shaking or stirring by suitable means while container is closed.
- Draw with an appropriate galvanized iron or other suitable plastic sampling instrument, small portion of material from different parts of each selected container.
- Sample shall be placed in clean, dry and airtight glass or polythene bag on which the material has no action.
- Sample containers shall be of such a size that they are nearly filled by sample.
- Each sample container so filled shall be sealed airtight after filling and marked with the full details of sampling, the date of sampling, the month and year of manufacture of material and its grade.
- Precautions shall be taken to protect the sample; the material being sampled, the sampling instrument and containers of the sample from adventitious contamination.
- Care should be taken to avoid direct contact of bleaching powder with skin. Face should be kept at a safe distance from the container when it is opened.

Storage

- Sample shall be placed in a cool and dry place.
- Sample should be stored in such a manner that the temperature of material does not vary unduly from the normal shade temperature.
- The label should not come in contact with bleaching powder sample. In order to protect the label it should be kept in a sealed plastic bag along with the sample.
- Samples should be sent to The District Public Health Laboratory at an earliest.

Sanitary survey of the water supply schemes

- Medical officer should conduct sanitary survey of all the water supply schemes in PHC area every year during the months of October to January.
- Survey should start from the water source and should end at last stand post of the distribution system.

- If there is possibility of water contamination from source to last stand post due to any of the reasons given below MO should issue red card to the GP indicating the faults:
  - Irregular water disinfection
  - Lack of cleanliness of surroundings of water supply scheme
  - Leakages
  - Inadequate or no stock of TCL
  - Unprotected wells with dirty surroundings
  - Cracked bore well platforms and stand posts
  - Any other finding that may contaminate water supply.
- MO should also suggest corrective measures needed to be taken for making the water supply safe at the time of issuing the red card.
- If the water supply scheme is without any faults and water disinfection is regular then Green Card is issued to GP.
- Red and Green cards will be supplied by District Health Officer.
- All the villages that were issued red cards should be again surveyed before Monsoon i.e. in last week of May or first week of June by the Medical Officer. If the corrective measures are taken and water supply is safe then Green card should be issued. If no or inadequate corrective measures are taken then maintain the red card status of GP.
- Inform the BDO about Green/Red status of all the GP from your PHC area along with the reason for giving red card on 10th June every year.
- If there is outbreak in the village that was issued Red card then bring this matter to the notice of BDO and DHO by DO letter. Mention the status of village (Green/Red card) while submitting the epidemic investigation report to DHO with one copy to BDO.

Chlorination of water

Chlorination of well water

- Calculate volume of water in litres (All the measurements should be in meter).
- Square well - Length × breadth × height of water × 1000= water in litres
- Round well- Well Diameter ^{2} × height of water × 785 = water in litres
- Calculate the dose of TCL: For 1000 litres of water 5 gm of TCL containing 33% chlorine is used.

Chlorination by liquid chlorine

- Liquid chlorine mixes with water quickly without residue. So when house to house chlorination or chlorination of water containers is to be done, liquid chlorine is more convenient than TCL. Liquid chlorine is mainly used during epidemics, fairs and festivals. The liquid chlorine supplied is usually having concentration of 5% chlorine.
- Add 1ml liquid chlorine (5%) solution to 50 litres of water to get 1PPM chlorine level.
- Add two drops of liquid chlorine solution to one bucket water (Approx. 10 litres)

Chlorination by using stock (mother) solution

When liquid chlorine is not available, stock (mother)solution can be prepared from TCL and used as liquid chlorine. Steps in preparation of stock solution are as follows:

Preparation of 5% stock (mother) Solution

- Take 5 litres of water in plastic bucket. Add 1kg bleaching powder to water. Stir well and cover bucket for 15 minutes.

- Supernatant liquid is 5% stock solution. Use solution immediately after preparation. If you want to stock solution for future use, pour supernatant liquid in water tight container and close the lid tightly.
- Concentration of chlorine in stock solution slowly decreases even if it is stored in water tight container. To avoid this, stock solution should be prepared only when itis required and should not be kept for more than 7 days.

Uses of stock (mother) solution

Stock solution should be used for water disinfection in following conditions -

- House to house chlorination
  - At the time of epidemic of water-borne diseases
  - When water source cannot be disinfected e.g. lake, river, etc.
  - When multiple water sources are used by community and it is difficult to chlorinate each water source. This situation particularly arises in tribal and hilly areas.
- Disinfection of water containers during fairs, festivals and large gathering of people for any reasons.

Chlorination by use of chlorine tablets

Chlorine tablets are also used sometimes in place of liquid chlorine. These tables are of different sizes. Indications for use of these tablets are similar to liquid chlorine. As it takes 10-15minutes for dispersal of tablets, the water container should be kept covered for 45 minutes before use if chlorine tablet is used for disinfection. Dose of chlorine tablets should be used as per guidelines given by manufacturer.

Chlorination of hand pump

This is not routinely done. If water sample is found to be contaminated, then corrective actions like repairing handle of hand pump, clearing cracks in the platform, cleaning the area etc. has to be done on priority. In addition to this as a supplementary action, chlorination of hand pump is done as follows:

Dose of TCL depends on the diameter of bore well. If diameter is 4 inches, dose is 150gm and when diameter is 6inches dose is 300 gm.

TCL is mixed with 1/2 litre of water and solution is added by removing 3 bolts of hand pump. This should be done in the evening and hand pump should not be used for 6 - 12 hrs.

Orthotolidine Test

OT test indicates amount of chlorine available in water. It is used to verify whether correct dose of TCL has been used and chlorination is proper or not.

At source free chlorine from chlorinated water should be 1 ppm and at the end of distribution system, it should be 0.2 to0.5 ppm.

MO should ensure that, each worker has a good quality working chloroscope.

OT test is carried out with the help of chloroscope as follows

- Fill up both the tubes with water to be tested.
- Place the tubes in chloroscope.
- Add two drops of OT reagent in tube on right side of chloroscope.
- Match the colour of tube with small discs of yellow colour shades parallel to tube.
- Nearest match in g yellow coloured disc indicates concentration of chlorination

Precaution

Do not allow the OT reagent to spill on hands or never smell the OT reagent. In case of accidental contact with OT reagent, wash with plenty of water.

Water sample testing (H S-strip field test)

Important aspects

- At Rural Hospital, H S-Strip field test for detection of faecal pollution of water sample is being performed. Report is
- received within 2 4 h our sand time is saved on transportation.
- Reliable, rapid method, simple, low testing cost, easy interpretation of results (black colour formation), technical compatibility are the advantages of the test.
- It is useful during outbreaks as a rapid screening test.
- Principle of the test is that, presence of coliforms in drinking water is consistently associated with the organisms that produce Hydrogen Sulphide (HS), such as Salmonella, Proteus, and Citrobacter etc. When contaminated water is being tested it contains these organisms. They produce Hydrogen Sulphide gas and this gas leads to black colour in the tested water sample.

Method and results

- Ready to use medium bottles are provided, which contain filter paper with 1 ml. concentrated media.
- Add 20 ml. of water sample under test to already prepared media bottle. Incubate the inoculated bottle at 370c for 24hours.
- Observe the results after 24 hours.
- Faecal contamination is indicated by the development of black colour of the contents in the bottle and water is graded as unfit for human consumption.
- If there is no colour change in the contents, incubate further for 24 hours. If no colour change even after 48 hours, water is fit for human consumption bacteriologically.

Sanitation

Bad sanitary conditions in village lead to contamination of water supply, increase in nuisance of flies and mosquito breeding resulting into possibility of epidemics like gastro, cholera, hepatitis, malaria, dengue fever, etc.

It is the responsibility of HA to inform and recommend GP for cleanliness in and around village. Following actions should be taken in this regard -

- Visit each house, pada, wasti once in at least two months to look for sanitation status.
- Look for garbage, animal waste, cesspools, etc. in the village.
- Inform GP in writing about the sanitary condition mentioning exact place of nuisance and control measures required to be taken.
- In case of possible water supply contamination, the information should be given immediately.
- Check whether the control measures suggested last time have been implemented. If not then inform MO with request to give instructions to GP indicating health hazards of bad sanitary conditions.
- Guide the village health committee during Gadgebaba Gram Swachata Abhiyan about sanitation measures.
- Keep separate sanitation file for each Gram Panchayat.

Summary of responsibilities of health staff for water borne disease control

Sr.	Activity	Responsibility of PHC staff	
		Designation	**Responsibility**
1	Water quality surveillance	MPW (M)	OT of all the villages in sub centre during each fortnight visit. Collection of at least three water samples (one at source, one at beginning of distribution system and one of last stand post) if OT is negative and sending to PHC on same day.
		MPW (F)	OT of HQ village and collection of water sample as mentioned above.
		HA (M)	Transport water sample to laboratory Provision of sterilized bottles to MPWs Keeping record of water quality surveillance Communicating Gram Panchayat about water sample quality
		MO	Investigation of cause of water contamination Advise to Gram Panchayat about corrective measures for safe water supply.
2	TCL Sample collection	MPW (M/F)	TCL sample collection of each village once a month. Collect sample from TCL bag which is currently in use
		HA (M)	Transporting sample to laboratory Keeping record of TCL sample examination and advise to Gram Panchayat
		MO	Communication to GP and BDO about result of TCL examination and advise about corrective measures
3	Sanitary survey	HA (M)	Assisting MO in sanitary survey Keeping record of sanitary survey and issue of Red/Green card
		MO	Sanitary survey of all water supply schemes once a year. Issue of red/green card to GP. Resurvey of red card issued water supply schemes before monsoon

4	Training of GP staff in water supply	HA (M)	Collection of information of all the persons responsible for water supply and arrangement of training of these persons Keeping record of training
		MO	Conducting training of water supply for all the villages in PHC area.
5	Sanitation	MPW	Inspection of village surroundings
		HA	during visit to village
		MO	Communicating the GP if there is fly nuisance, water supply contamination, breeding of mosquito or any health hazard seen

6.4.7. Control of Water-Borne Diseases

Epidemics

Water-borne epidemics are the commonest epidemics observed in rural areas of the state. Thus medical officer must know the characteristics, management, investigation and control measures of the epidemics. Detailed instructions about epidemic control are given at the beginning of this section in Chapter-1. Specific instructions related to water borne disease epidemic is given below:

Characteristics

- It is confined to the people who are drinking water from a particular source of water.
- Outbreak is usually explosive i.e. many cases report in short period.
- Outbreak declines after stoppage of use of contaminated water source or disinfection of that particular water source

Laboratory investigation

Following laboratory samples should be collected for investigation:

- Water samples should be collected before starting control measures. Minimum five water samples should be collected. Places of water sample collection should be -
  - One sample from reservoir (well, tank etc.)
  - One sample at place of entry to village (main valve)
  - Two samples from last stand posts in village.
  - One sample from house of index case.
- Fifty grams TCL should be sent to DPHL from storage point to know the available chlorine in the TCL.
- If you suspect cholera, collect stool samples in CB media
- For enteric fever, whole blood for culture, sensitivity and serology.
- Viral hepatitis: Serum sample for antibody titre and stool samples for virus isolation should be collected. Both the samples should be transported in cold chain.

Control measures to be taken in case of water-borne diseases epidemic

Chlorination of water

Start Chlorination of water immediately. In case of piped water supply, chlorine level should be 0.5 PPM at the last stand post. If you are not getting desired level then start house-to house chlorination by using either mother solution or chlorine tablets. Help of school children can be taken for this. In any case each and every person should drink only chlorinated water.

Identify the place of contamination (cause of epidemic):

Identifying place of contamination and taking corrective measures will halt spread of epidemic. Following steps are useful in identifying the exact place of contamination -

- You have identified the time period of contamination with the help of epidemic curve and area first affected with the help of serial spot map. Concentrate on the area from where the epidemic has started as indicated in spot map.
- Ask the members of household about any change/alteration in drinking water e.g. change in taste, colour or odour. Also ask whether the source of drinking water was changed during that period because of any reason.
- Ask the Gram Panchayat to chlorinate the water up to 1PPM and release the water supply in this area.
- Start walking along the main pipeline in this area towards flow of water and go on performing OT test from each household on this line.
- You will find sudden reduction in chlorine concentration of water at some house hold. Pipeline between the tap of house with 1PPM concentration and tap of house with reduced concentration is having leakage. Carefully re-examine this area for leakages and request Gram Panchayat for control measures accordingly.
- Reduction in free chlorine concentration at leakage takes place due to mixing of organic matter in pipeline by sucking mechanism, which suddenly increases chlorine demand of water and absorbs the available free chlorine.
- You can also identify contamination spot from the leakages. When water supply is released, it gets collected around the leakage, mixing all the surrounding dirt. When water supply valve is closed, all this water collection is sucked in the pipeline due to the negative pressure. Ask households about any such situation in the area.

Start housefly control measures

Houseflies are restless insects. They continuously move to and fro between food and excreta resulting into contamination of food. Houseflies also deposit their stools on food, which is also a rich source of pathogens. Inform Gram Panchayat for starting fly control measures. Cleaning the village by removal of garbage is most important. Flies breed on human excreta, manure of animals, garbage, decaying fruits and vegetables etc. which should be removed from the village. Adult flies should be killed by spraying insecticides like Lindane (0.5%), Malathion (5%) or Ronnel (5%). Insecticide spraying without cleaning the environment is wastage of time and resources, as flies reappear again within 2-3 days.

Personal hygiene

Six rules of cleanliness to be observed at home should be conveyed to villagers. These are;

- Drinking water should be covered.
- It should be kept at height
- For taking out water for drinking, use long handled pot.
- Before eating and before preparation of food wash hands rubbing well with soap and water.

- After defecation wash hands with soap and water.
- After cleaning child, wash hands with soap and water.

Health Education

Gram Sabha followed by person-to-person communication during survey are the best approaches. If village is large then it should be supported by distribution of pamphlets, and loudspeaker announcements and ward wise meeting of Gram Panchayat members.

Sanitary survey of water supply scheme

Carry out sanitary survey of village water supply scheme as indicated in Chapter-6. Inform the Gram Panchayat in writing about the findings of sanitary survey. If the Gram Panchayat has been already issued red card, this should be mentioned in report.

Epidemic kit

Necessary instruments, equipment and medicines required for epidemic control should be kept in one box and labelled as Epidemic Kit''. As the treatment and control measures of gastro epidemic and fever epidemic are totally different, two kits one Gastro Epidemic Kit and another Fever Epidemic Kit should be kept ready.

Preparation & maintenance of Gastro Epidemic Kit

Instructions given below should be followed regarding preparation and maintenance of kit.

- Use cardboard or paper box of suitable size for the kit.
- Label the kit in bold letters on white paper as 'Gastro Epidemic Kit'.
- Put mentioned quantity of medicines, equipment and instrument in the kit, wrap with transparent plastic sheet and close in such a way that it should not get damaged while transportation or become wet during rains.
- Keep both the kits in MO room on left side of chair of MO. If this place is not suitable then, any other prominent place may be identified and should be known to everyone in PHC including Group-D staff and Part Time Lady Attendant.
- Open the kit after every three months, check the condition of medicines, take back the near expiry medicine for routine use and replenish the stock. Do not keep expired medicine in kit.
- Never use medicines in the kit for routine purpose.

Contents of Gastro Epidemic Kit

Table: Contents of gastro epidemic kit

Sr	Particulars	Quantity	Use
1	Tab. Furazolidine 100 mg	1000	For children below 12 years
2	Cap. Tetracycline 250 mg	1000	For cholera
3	ORS Packets	100	Treatment of dehydration
4	Ringers lactate bottles	50	Treatment of severe dehydration

5	Cotrimaxazole tablets	100	For treatment of dysentery
6	CB media bottles	10	Stool sample collection
7	Sterile glass bottles	5	Water sample collection
8	Polythene bags	5	TCL sample collection
9	Liquid chlorine 1 lit.	5	House to house chlorination
10	IV set	100	For IV fluids
11	Scalp vein set	50	For IV administration to small children
12	Cotton bundle, Bandage	2 each	Minor purposes
13	Vene-section set	1 Set	Severely dehydrated patient
14	Forceps, Scissor, Blade	2 Each	For patients
15	Weighing machine	1	Weighing for calculation of IV dose
16	Rope - 5 meters	1	Multipurpose

6.5 Vector Borne Diseases

" WAR BETWEEN MAN &MOSQUITOES IS UNENDING.
WHO WILL SURVIVE – THE FITTEST ONE i.e.....? "

Centre For Vector Borne Diseases Control (NCVBDC)
All the vector borne diseases of public health importance are now clubbed together under one programme called as National Vector Borne Diseases Control Programme.
Diseases which will be considered for control under this programme are -

- Malaria
- Dengue Fever
- Chikungunya
- Japanese Encephalitis
- Filariasis
- Kala Azar (Not found in Maharashtra)

Primary Health Centre is expected to implement control activities of all diseases mentioned under NVBDCP. Malaria shows its presence throughout the state; though risk of malaria transmission differs from place to place. Dengue Fever, Japanese Encephalitis, Chandipura viral disease and Chikungunya are newly emerging diseases and are being reported from new

areas every year, therefore all PHCs must be alert for these diseases. Filaria is prevalent in more than 50% districts of the state. We do not get cases of Kala Azar in Maharashtra.
Many other diseases are also spread by various types of vectors. Important vectors and diseases spread by them in Maharashtra state are as follows –

Table: Important vector-borne diseases

Sr. No.	Vector	Diseases transmitted
1	Anopheles mosquito	Malaria
2	Culex mosquito	Filaria, Japanese Encephalitis
3	Aedes mosquito	Dengue fever, Chikungunya
4	Sand fly	Sandfly fever, Chandipura, Encephalitis
5	Rat flea	Bubonic plague
6	Cyclopes	Guinea worm disease
7	Houseflies	Diarrhoea, dysentery, typhoid
8	Ticks	Rickettsial Fever, Congo Cremean Haemorrhagic Fever

Characteristics of vector mosquito:
Transmission of vector borne diseases

- Direct contact: Diseases directly transmitted from man to man through direct contact, e.g. scabies
- Mechanical transmission: Disease agent is mechanically transmitted by vector. Majority of diseases transmitted by housefly are mechanically transmitted.
- Biological transmission: Disease agent multiplies and/or undergoes some developmental change in vector host e.g., Malaria, Filaria.

6.5.1. Malaria

Malaria is protozoal disease caused by infection with parasite of the genus Plasmodium and transmitted to man by certain species of infected female Anopheline mosquitoes.

Clinical features of malaria vary from mild to severe and complicated form according to the species of parasite and susceptibility of individual. In India it is estimated that there are more than one crore cases of malaria every year out of which approximately one fourth are reported.

Etiologic agent
There are four species of malarial parasite namely -

- Plasmodium vivax

- Plasmodium falciparum
- Plasmodium malaria

Plasmodium ovale

Out of these four species, only two i.e. **P. vivax & P. falciparum** commonly found in Maharashtra.

Epidemiology:

General features

- All age groups and sexes are susceptible.
- Malaria in pregnancy can lead to intrauterine death, premature labour or abortion thus leading to maternal & infant deaths.
- June to December is high transmission season for malaria.
- Rainfall increases relative humidity, which contributes to better longevity of vector mosquito. However heavy rains have adverse effect on mosquito density by flushing out breeding places. Early rains, rains interspersed with few rainy days are associated with epidemics.
- People migrating from one place to another place especially on large projects, sugarcane factories, nomadic tribes, etc. are at high risk of getting malaria.

Vector of Malaria

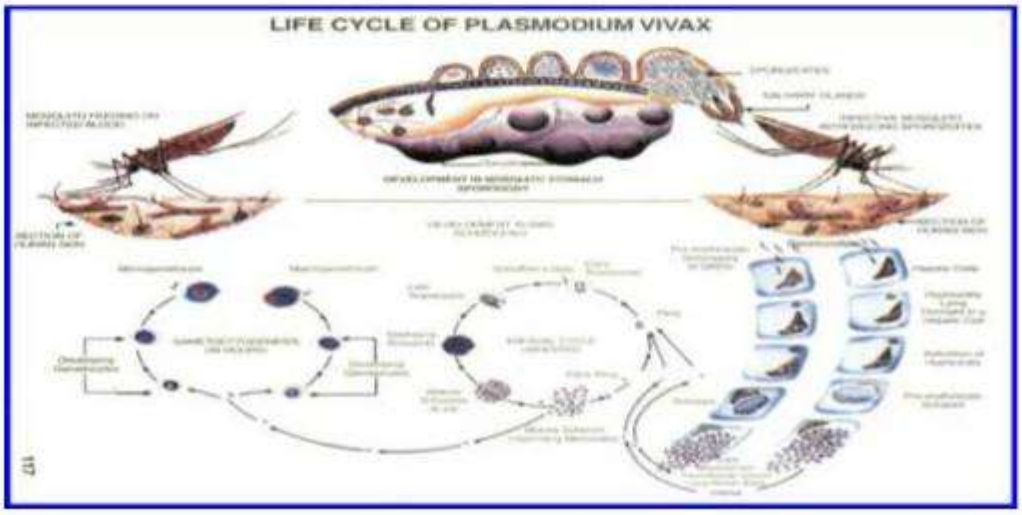
Anopheline mosquitoes are the important vectors of malaria in India. Three important species transmitting malaria in Maharashtra are Anopheles culicifaces in rural areas, Anopheles stephensi in urban area and Anopheles fluviatilis in hilly areas.

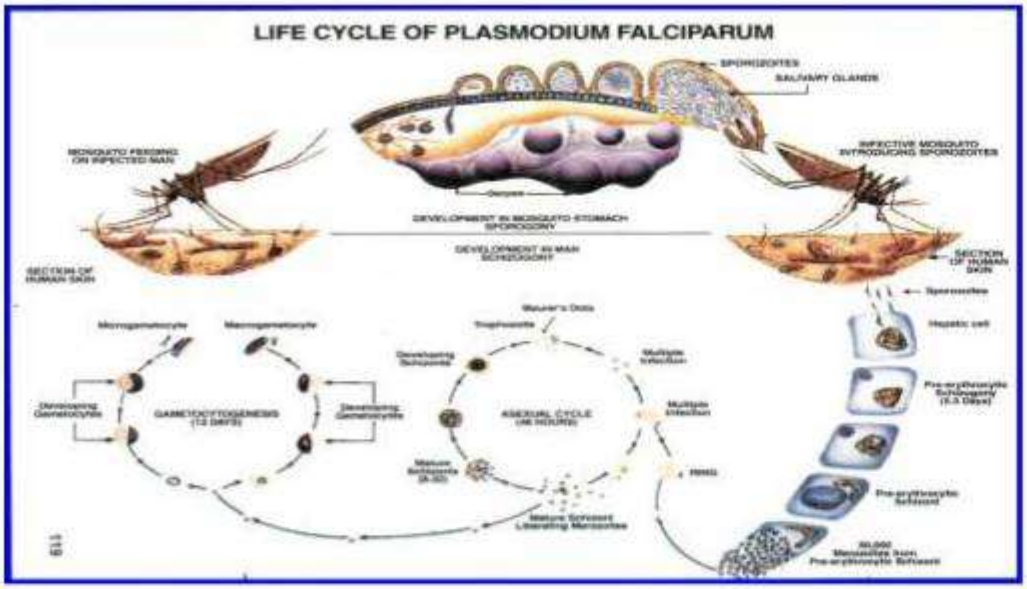
- They breed in fresh and stagnant water collections such as wells, cisterns, fountains, overhead tanks, seepages of canals etc.

Life cycle of malaria parasite:

Malaria parasite life cycle consists of two phases:

- Sexual phase (Sporogony): With development of multiplication of malarial parasite in female anopheline mosquitoes.
- Asexual phase (Schizogony): In man- Consists of two parts-
  - Schizogony in liver cells- Pre-erythrocyte Schizogony or tissue phase
  - Schizogony in red cells- Erythrocyte Schizogony or erythrocyte phase





***Erythrocytes phase is responsible for febrile paroxysm. The duration of each erythrocyte cycle varies from species to species e.g. 48 hrs for P. Falciparum, P. Vivax and P Ovale & 72 hrs. for P Malarae*

Clinical manifestations:

- Salient features of malaria include intermittent periodic fever, splenomegaly, anaemia & leukopenia.
- Prodromal symptoms consist of malaise, muscle pain, headache, anorexia, mild fever and abdominal discomfort. Most important and consistent symptom of malaria is fever with chills.
- Classical malarial fever consists of three stages namely cold stage, hot stage, and sweating stage. However, classical picture of malarial fever is seldom seen in actual clinical practice. This is because symptomatology of malaria is modified by many factors like age, sex, immune status, presence of other concomitant infections, pregnancy etc.
- Thus, none of the clinical features of malaria are diagnostic except fever which is constant in almost all patients of malaria. Only results of microscopic examination of blood smear can confirm the diagnosis. Due to the non-consistent features of malarial symptomatology every fever case is presumed as malaria case unless proved otherwise by laboratory examination.

Clinical manifestations of P vivax malaria

- Incubation period may vary from 12 to 17 days.
- Classical symptoms of malaria are more commonly seen with abrupt onset initiated by rigors, sensation of extreme cold, rising temperature to about 40-410C, severe headache, epigastric discomfort, nausea, vomiting, followed by sweating.
- Enlargement of spleen is a characteristic of P vivax malaria.
- Some pre-erythrocyte liver schizonts may get converted into hypnozoites and may remain dormant in liver and get activated after long time, thus relapses after variable duration is the key feature of P vivax malaria.

Clinical manifestations of P Falciparum malaria

- Incubation period is 9 to 14 days with an average of 12 days.

- Onset is insidious with gradually headache, pain in back and limbs, gastro-intestinal symptoms.
- A sensation of chillness rather than frank chill, a prolonged and intensified hot stage and lack of terminal sweating are classical features of P Falciparum malaria.
- Fever is continuous or irregular and during the period of remission there is no return of sense of well being.
- Anaemia of haemolytic type is an important feature.
- Short term relapses occur mostly up to one year and long term relapses are not found, as all the pre-erythrocyte liver schizonts are released and do not get converted into hypnozoites.

Clinical manifestations of Severe Malaria (Pernicious Malaria)

- About 1-2% of patients with P Falciparum infection may develop severe manifestations in the form of failure of various organ systems due to delayed treatment.
- Severe P Falciparum malaria may manifest as severe anaemia, cerebral malaria, jaundice, pulmonary oedema, circulatory collapse, DIC, acute renal failure.
- Most important amongst all above- mentioned complications in cerebral malaria, as it may rapidly lead to death. If patient of falciparum malaria is suspect for cerebral malaria suddenly shows a change in orientation with or without loss of consciousness.
- **Malaria in pregnancy:** Immunity against P falciparum is reduced in pregnant women from second trimester to delivery leading to severe falciparum malaria. P falciparum malaria infection causes intrauterine growth retardation and rarely foetal loss.

Diagnosis of malaria

- Any fever case should be suspected as a case of malaria unless proved otherwise. Therefore, Peripheral Blood Smear (PBS) of all fever cases should be collected and examined under microscope. On the basis of clinical symptomatology and PBS results, malaria case is classified as follows -
- Suspected malaria case: All fever cases with or without classical symptoms of malaria.
- Confirmed malaria case: When any type of malarial parasite is detected in PBS examination under microscope, it is said to be the confirmed malaria case.

Severe malaria case:

- Cerebral malaria - Fever with variable consciousness appears without any other obvious cause in patients with P. falciparum infection.
- Patient with hyperpyrexia, convulsions, severe anaemia, pregnancy or pulmonary oedema with P. falciparum infections.

Death due to malaria: Death of cerebral malaria case: Microscopically confirmed P. falciparum infected patients death due to any of the complications mentioned above.

Implementation of malarial control activities:

- Identification of risk status of PHC & villages (whether high risk or not)
- Early fever case detection and prompt treatment (EDPT) through active & passive surveillance.
- Immediate laboratory examination of blood smears (within72 hours).
- Radical treatment within one week
- Vector (mosquito) control by various means e.g. sanitary measures, insecticide
- spraying, fogging, antilarval methods including guppy fish programme.
- Personal protection measures

- Supportive interventions and IEC

Following steps should be carried out for prevention and control of malaria in PHC area:

- Identification of the high-risk status of PHC area
- All villages in PHC may not have malaria problem of uniform severity. Malaria problem may be more in some areas. These are as are called as high-risk areas.
- Criteria have been developed to identify high-risk areas as below:
- Recorded death due to malaria in last three years by locally acquired infection.
- Slide Positivity Rate (SPR) 5% or more in one year or doubling of SPR during last three years and SPR reaches4% or more in any of the year.
- Plasmodium falciparum proportion 30% or more when SPR 3% or more.
- Detection of more than 25% cases with Grade II and Grade III Chloroquine resistance.
- Aggregation of labourers in project areas.
- New settlements in endemic, receptive and vulnerable areas. If your PHC fits in any one of above criteria then it is high risk PHC. Inform the high-risk status of PHC to District Malaria Officer in the prescribed format.
- Early fever case detection through fever surveillance
- Early fever case detection is possible with systematic fever surveillance of the area.
- Fever surveillance activities in PHC should be planned in such a way that all fever cases from PHC area are screened at earliest. Surveillance network should also indicate the trend of fever cases so as to recognize epidemic at early stage. These are called as early warning signals.

Fever case detection activity is carried out as follows:

Active surveillance:

- Health functionaries take active role in surveillance of fever cases by house-to-house visits.

Village level

- MPW (male/female) and ASHA workers collect PBS from house to house visits.They are first to know the rising trend of fever cases in particular village. All high risk PHCs should have strong network of village level volunteers for early recognition and effective control of fever epidemic.

Subcentre level

- MPW (Male) visits each house in his area once in fortnight and searches for fever cases. If he finds any person with fever or history of fever since his last visit, he actively collects PBS

Passive surveillance:

Detection of fever cases from patients attending OPD is called as passive surveillance. PBS of such patients is collected by laboratory scientific officer (LSO) in PHC or fever clinics. PBS collected in PHC, RH or Civil Hospital or any other government or non-government institution is categorized under passive surveillance

Health centre level

- PBS of fever cases attending OPD of PHC, RH, SDH, Ayurvedic, Allopathic dispensary, Health Unit, etc. is collected.

Malaria clinic

- If laboratory facility is available at PHC, PBS of fever case is immediately examined for malaria parasite and if found positive, radical treatment is started before patient leaves OPD.

Planning of active fever surveillance

Active surveillance by MPW (M)

- Active fever surveillance by MPW (M) is vital for malaria control. Home visits as per fortnightly i.e, 10 days work schedule.
- Fortnight blood collection by active surveillance is the key activity. Technical justification for fortnightly survey is that, the incubation period for P. Vivax is approximately (12 to 18) days & for P. Falciparum is (9 to 14) days. Surveillance cycle of less than one incubation period will catch most of the secondary cases before the commencement of next cycle.
- Incubation period is time between infection and appearance of symptoms in host. Development of the malaria parasites in two phases.
  - Sexual cycle in the mosquito
  - Asexual cycle in the human being.
- Visits as per work schedule
- Suitable work schedule of MPW (M) should be developed for timely and effective case detection activity. Following steps should be carried out for planning and implementation of work schedule of MPW.
- Firstly, MPW should update village-wise population register (MF-1). This should be updated every year in January. MF-1 is useful for preparing 10 days working programme and for evaluation of MPW activities, e.g. expected smears in one surveillance cycle or on any particular day.
- Second important step is preparing the fortnightly house-to-house visit schedule. Ten days fixed programme calendar for one year is prepared by DMO in the month of December. Villages to be visited on each day should be planned by MPW and HA in consultation with MO. MO should verify that all hamlets, padas, lonely farm houses and new settlements, projects, mass labour movements are included while approving 10 days schedule.
- For planning of schedule, first divide population of Sub centre by 10. This is average daily population to be surveyed. Start with head quarter village. Consider population, distance and approach facility to each village, hamlets, etc. while allocating population to be surveyed per day. More population should be allotted on the days of surveillance of HQ and nearby villages and less during surveillance of remote village, hamlets and lonely farm houses.
- For each day schedule indicate, first M number to start for house visit and last M number i.e. end point of that working day.
- Stencilling: House stencilling is compulsory for MPW (M). He should record his visit to household by putting date and signature on door. Health Assistant should check the "daily visit schedule of MPW once in a week and MO should check once a month.
- Health Assistant should check 10% houses of the "daily visit schedule of MPW" once in a week and MO should check at random 2% houses covered by MPWs in PHC area once a month.
- Collection of blood smear
- MPW (M) should make sure before surveillance cycle begins about sufficient stock of glass slides, lancet, alcohol swabs, pencil and tablet chloroquine etc.

- He will ask about any one suffering from fever at present, anyone who has suffered from fever since his last visit and anyone who has come as a guest and suffering from fever and history of travel.
- If answer to any of the above is "yes" then MPW will collect blood smear & will keep the record in MF-2 register.
- MPW will advise seriously ill cases to visit nearby PHC for immediate intensive treatment. He should accompany semiconscious or unconscious patients having history of fever.

Active surveillance by ANM

- ANM will ask all antenatal and post-natal mothers about history of fever during visit. If any mother gives history of fever, then she should collect blood smear.
- ANM will collect blood smear from all other fever cases, which come across during her routine home visits.
- She should create awareness in community that malaria is very serious complication in pregnancy and postpartum period, which leads to high mortality.

Role of Health Assistant (M) in surveillance activities

- HA (M) will supervise all anti-malaria activities of MPW (M & F).
- He will do concurrent (along with MPW) and consecutive verification (after visit of MPW) of home visits of MPWs.
- If the post of MPW is vacant, HA will do rapid survey of population, will collect PBS of fever cases
- HA will administer radical treatment to all malaria positive cases in PHC area.

Planning of passive surveillance:

- MO has key role in implementation of malaria control activities under National Vector borne Diseases Control programme in PHC area. For this, MO should carry out following activities-
- MO should ensure that all fever cases attending OPD are identified, send for PBS collection and PBS is actually collected by the lab- scientific officer.
- If there is facility of Malaria clinic at PHC, MO will ensure that fever cases with classical clinical symptoms of malaria attending OPD is examined immediately and if found positive, radical treatment is given in the supervision of MO before patient leaves PHC.

Role of MO in malaria control:

- Prepare fortnight calendar of MPW (M) and routinely check whether MPW (M) follows visit schedule as per the calendar.
- Ensure that sufficient stock of micro slides, lancet, antimalarial drugs etc. are available with field staff and at PHC HQ.
- Check registers maintained at level of MPW, HA, laboratory and PHC.
- Analyse PHC data, identify early warning signals and take necessary actions so that it will not take epidemic form.
- Refer severe and complicated cases to RH/SDH/ district hospital for further treatment.
- Investigation & control of fever outbreak
- Monitor vector control activities
- Plan, implement & monitor health education activities

Laboratory examination of Peripheral Blood Smears (PBS)

- The peripheral blood smear should reach laboratory within72 hrs (3 days) & should be examined on the day of receiving and positive result should be communicated to MO/HA for radical treatment within 24 hours of examination. Remember, late examination of blood smears will make all surveillance efforts useless.

Following guidelines should be implemented to achieve this objective:

- Avoid congregation of collection of PBS in last week of a month.
- All PBS collected in tribal PHC should be examined within 48 hours, and from non-tribal PHCs within 72 hours. If more number of PBS reach laboratory and it is difficult to examine them within stipulated time period, send PBS to nearest laboratory or DMO office. DMO will guide you for sending PBS to other laboratory.
- It is the responsibility of MO to get examined all slides from PHC area within 48 hours and convey results to HA/MO (MO of any PHC which is attached for laboratory examination) for radical treatment.
- PHCs, which do not have laboratory facility, are attached to nearby PHC having laboratory. Such MO should monitor time lag between sending PBS slides and obtaining results. Inform MO Incharge of laboratory if time lag is more than 48 hours.
- In Malaria clinic, examination of PBS of fever cases with classical clinical symptoms of malaria attending OPD is carried out immediately on collection. Request patient to wait for 2 hours to obtain the results. If PBS result is positive, give RT according to type of malarial species in the supervision of MO or HA before patient leaves PHC. This will ensure prompt RT & will prevent further spread of the disease.
- Review Laboratory work done by Laboratory Scientific Officer (LSO) at least once a week. Check MF-2 & MF-7 registers to see whether PBS slides are arriving at laboratory within time. Check whether all PBS slides are examined daily and results are communicated on same day.
- Role of Laboratory Scientific Officer (LSO) at PHC/Malaria clinic
- He/She will maintain record of BS collected at Malaria clinic in MF-2 register.
- Laboratory Scientific Officer (LSO)will accept PBS along with MF- 2 register, from peripheral staff of PHC and nearby attached PHC, stain and examine.
- At least 100 fields of each PBS should be examined under microscope before slide is declared as negative.
- Laboratory Scientific Officer (LSO)will report daily to MO all slides examined on that day along with MF-2 register. He/She will also keep daily record in prescribed format.
- In suspected serious and complicated P. falciparum malaria cases, laboratory Scientific Officer (LSO)will examine PBS on emergency basis and record density of parasites and submit results to MO
- He/she will supply micro slides, antimalarials to all peripheral staff and maintain stock register.
- He/She will keep record and stock of staining material and other required laboratory material.
- Laboratory scientific officer should monitor flow of PBS fortnightly, if noticed any increase in PBS in last fortnight, immediately inform to medical officer.

Laboratory Scientific Officer (LSO) will maintain daily record in following register:

Date	Blood smears in hand			Blood Smear examined	
	Backlog	B.S Received on the day	Total BS on the day (2+3)	Examination for the day	Remaining Backlog (5 - 6)
1	2	3	5	6	7

Action for remaining BS					Signature of LSO	Signature of MO
Current Remaining Backlog	Dispatched to other Laboratory for examination	Number of BS		Total B.S.		
	Name of Lab	From	To			
8	9	10	11	12	13	14

Cross-checking (Quality Control) of laboratory results

- All blood smears found positive at PHC are cross checked at ADHS level for parasite species and stage. Laboratory Scientific Officer (LSO) should carry all positive slides to DMO office on 1stday of each month for cross checking.
- 4.5% of all negative slides are also cross checked.
- A specific code number is given for every month by DMO for selection of negative slides for cross checking

Give radical treatment to positive cases

- When PBS of patient is positive for malaria parasite, radical treatment is given. Radical treatment means, treatment to kill all stages of malarial parasites including gametocytes in the body of patient.
- For transmission of malaria from one person to other, gametocyte must be present in body of patient at the time of female Anaphelous mosquito bite. All the gametocytes in patient's blood should be killed for breaking the malaria transmission cycle.
- Tab. Chloroquine has very little action over gametocytes. Therefore Tab. Primaquine has to be given to patient along with Chloroquine in all microscopically positive cases to kill gametocytes. Primaquine also kills liver hypnozoites and prevent relapse in P. vivax malaria. Thus, administration of Tab. Primaquine ensures a complete cure from malaria in positive cases, makes the patient non-infective and helps in preventing spread of Malaria.
- This is the epidemiological basis for early radical treatment to all positive cases as patient continues to spread malaria in community till he/she receives Tab. Primaquine. Therefore, MO should ensure earliest administration of Radical treatment depending upon type of malarial parasite found, sensitivity of parasite to tab Chloroquine. Tab. Primaquine is contraindicated in infants, pregnant women and individuals with G6PD deficiency. 14 days regimen of Tab. Primaquine should be given under supervision.

Treatment of uncomplicated P falciparum cases in pregnancy:

- 1st Trimester: Quinine salt 10mg/kg 3 times daily for 7 days.
- Quinine may induce hypoglycaemia; pregnant women should not start taking quinine on an empty stomach and should eat regularly, while on quinine treatment.
- Children less than one year and pregnant women should not be given Tab. Primaquine

Complete Treatment part should be according to National Drug Policy 2013

Drug schedule for treatment of P vivax malaria:

- **Chloroquine:** 25 mg/kg body weight divided over three days i.e.
  10 mg/kg on day 1,
  10 g/kg on day 2 and
  5 mg/kg on day 3.
- **Primaquine*:** 0.25 mg/kg body weight daily for 14 days.

Primaquine is contraindicated in infants, pregnant women and individuals with G6PD deficiency.

14-day regimen of Primaquine should be given under supervision.

Radical Treatment for Plasmodium vivax:

Age Group (In Years)	1st Day		2nd Day		3rd Day		4th Day to 14th Day
	Chloroquine tab 150 mg	Primaquine 2.5 mg	Chloroquine tab 150 mg	Primaquine 2.5 mg	Chloroquine tab 150 mg	Primaquine 2.5 mg	Primaquine 2.5 mg
Below 1 year	1/2	.....	1/2	.....	1/4	.....	.....
1 to 4	1	1	1	1	1/2	1	1
5 to 8	2	2	2	2	1	2	2
9 to 14	3	4	3	4	1 1/2	4	4
More than 14	4	6	4	6	2	6	6

Note - Presumptive treatment is not recommended in Malaria programme

Treatment of Falciparum Malaria

Diagnosis of falciparum malaria may be made by the use of RDT (Monovalent or Bivalent) or microscopic examination of the blood smear. It is imperative to start the treatment for falciparum malaria immediately on diagnosis.

The treatment for falciparum malaria is as follows:

In Other States (other than North-Eastern States):

Artemisinin based Combination Therapy (ACT-SP) Artesunate (AS), available as 50 mg tablets are given for three days, and Sulfadoxine Pyrimethamine (S-P) tablets, containing 500 mg Sulfadoxine and 25 mg pyrimethamine are given for one day, as shown in the dosage chart below.

- All tablets for a day should be taken together, swallowed with water.
- In addition, Primaquine (PQ Large) tablets should be given on the second day.

Dose schedule for Treatment of uncomplicated P.falciparum cases:

- Artemisinin based Combination Therapy (ACT-SP)
- Artesunate 4 mg/kg body weight daily for 3 days

Plus Sulfadoxine (25 mg/kg body weight) – Pyrimethamine (1.25 mg/kg body weight) on first day.

With the introduction of different coloured Blister Packs for different age groups, treatment by the field level staff has been made easy. The colour code for different age groups for Packing of Tablet ACT+SP has been given as follows:

Table: Radical Treatment for Plamodium falciparum					
Artisunate Combination Therapy					
AGE GROUP (IN YEARS) with Blister Colours	**I st Day**		**2 nd Day**		**3 rd Day**
	Artesunate 50 mg	**S.P 525 mg base**	**Artesunate 50 mg**	**Primaquine 7.5 mg**	**Artesunate 50 mg**
Below 1 year *(Pink Blister)	**1/2**	**1/4**	**1/2**	**0**	**1/2**
1 to 4 (Yellow Blister)	**1**	**1**	**1**	**1**	**1**
5 to 8 (Green Blister)	**2**	**1 1/2**	**2**	**2**	**2**
9 to 14 (Red Blister)	**3**	**2**	**3**	**4**	**3**
More than 14 (White Blister)	**4**	**3**	**4**	**6**	**4**

Treatment of mixed infections (P.vivax + P.falciparum) cases:

All mixed infections should be treated with full course of ACT and Primaquine 0.25 mg per kg body weight daily for 14 days.

In North-Eastern States: Treat with: Age-specific ACT-AL for 3 days + Primaquine 0.25 mg per kg body weight daily for 14 days.

In Other States: SP-ACT 3 days + Primaquine 0.25 mg per kg body wt. daily for 14 days.

Table: Dosage Chart for Treatment of mixed (vivax and falciparum) Malaria with ACT-S

AGE GROUP (IN YEARS)	I st Day			2 nd Day		3 rd Day		4 th Day to 14 th Day
	Artesunate 50 mg	S.P 525 mg base	Primiquine 2.5 mg	Artesunate 50 mg	Primiquine 2.5 mg	Artesunate 50 mg	Primiquine 2.5 mg	Primaquine 2.5 mg
Below 1 year	1/2	1/2	0	1/2	0	1/2	0	0
1 to 4	1	1	1	1	1	1	1	1
5 to 8	2	1 1/2	2	2	2	2	2	2
9 to 14	3	2	4	3	4	3	4	4
More than 14	4	3	6	4	6	4	6	6

Treatment of P. ovale and P. malariae:

In India these species are very rarely found in few places. P. ovale should be treated as P. vivax and P. malariae should be treated as P. falciparum.

Treatment of severe malaria cases

Severe malaria is an emergency and treatment should be given as per severity and associated complications which can be best decided by the treating physicians. Before admitting or referring patients, the attending doctor or health worker, whoever is able to do it, should do RDT and take blood smear; give a parenteral dose of artemisinin derivative or quinine in suspected cerebral malaria cases and send case sheet, details of treatment history and blood slide with patient. Parenteral artemisinin derivatives or quinine should be used irrespective of chloroquine resistance status of the area with one of the following options:

Initial parenteral treatment for at least 48 hours: CHOOSE ONE of following four options	Follow-up treatment, when patient can take oral medication following parenteral treatment
Quinine: 20mg quinine salt/kg body weight on admission (IV infusion or divided IM injection) followed by maintenance dose of 10 mg/kg 8 hourly; infusion rate should not exceed 5 mg/kg per hour. Loading dose of 20mg/kg should not be given, if the patient has already received quinine.	Quinine 10 mg/kg three times a day with: doxycycline 100 mg once a day or clindamycin in pregnant women and children under 8 years of age, - to complete 7 days of treatment.

Artesunate: 2.4 mg/kg i.v. or i.m. given on admission (time=0), then at 12 h and 24 h, then once a day. or **Artemether: 3.2 mg/kg bw i.m. given on admission then 1.6 mg/kg per day.** or **Arteether: 150 mg daily i.m for 3 days in adults only (not recommended for children).**	Full oral course of Area-specific ACT: In North Eastern states: Age-specific ACTAL for 3 days + PQ Single dose on second day In other states: Treat with: ACT-SP for 3 days + PQ Single dose on second day

Note: The parenteral treatment in severe malaria cases should be given for minimum of 24 hours once started (irrespective of the patient's ability to tolerate oral medication earlier than 24 hours).

After parenteral artemisinin therapy, patients will receive a full course of Area-specific oral ACT for 3 days. Those patients who received parenteral Quinine therapy should receive oral Quinine 10 mg/kg body weight three times a day for 7 days (including the days when parenteral Quinine was administered) plus Doxycycline 3 mg/kg body weight once a day or Clindamycin 10 mg/kg body weight 12-hourly for 7 days (Doxycycline is contraindicated in pregnant women and children under 8 years of age) or area-specific ACT as described.
Note:

- Pregnant women with severe malaria in any trimester can be treated with artemisinin derivatives, which, in contrast to quinine, do not risk aggravating hypoglycaemia.
- The parenteral treatment should be given for minimum of 48 hours
- Once the patient can take oral therapy, give:
- Quinine 10 mg/kg three times a day with doxycycline 100 mg once a day or clindamycin in pregnant women and children under 8 years of age, to complete 7 days of treatment, in patients started on parenteral quinine.
- Full course of ACT to patients started on artemisinin derivatives.
- Use of mefloquine should be avoided in cerebral malaria due to neuropsychiatric complications associated with it.

Don'ts in severe malaria case management:
Do not use corticosteroids, give intravenous mannitol, use heparin as anticoagulant, administer adrenaline or overhydrate.

Chemoprophylaxis:
Chemoprophylaxis should be administered only in selective groups in high P.falciparum endemic areas. Use of personal protection measures including Insecticide Treated bed Nets (ITN) / Long Lasting Insecticidal Nets (LLIN) should be encouraged for pregnant women and other vulnerable population including travellers for longer stay. However, for longer stay of Military and Para-military forces in high P.falciparum endemic areas, the practice of chemoprophylaxis should be followed wherever appropriate e.g. troops on night patrol duty and decisions of their Medical Administrative Authority should be followed.

Short term chemoprophylaxis (up to 6 weeks)
Doxycycline: 100 mg once daily for adults and 1.5 mg/kg once daily for children (contraindicated in children below 8 years). The drug should be started 2 days before travel and continued for 4 weeks after leaving the malarious area.

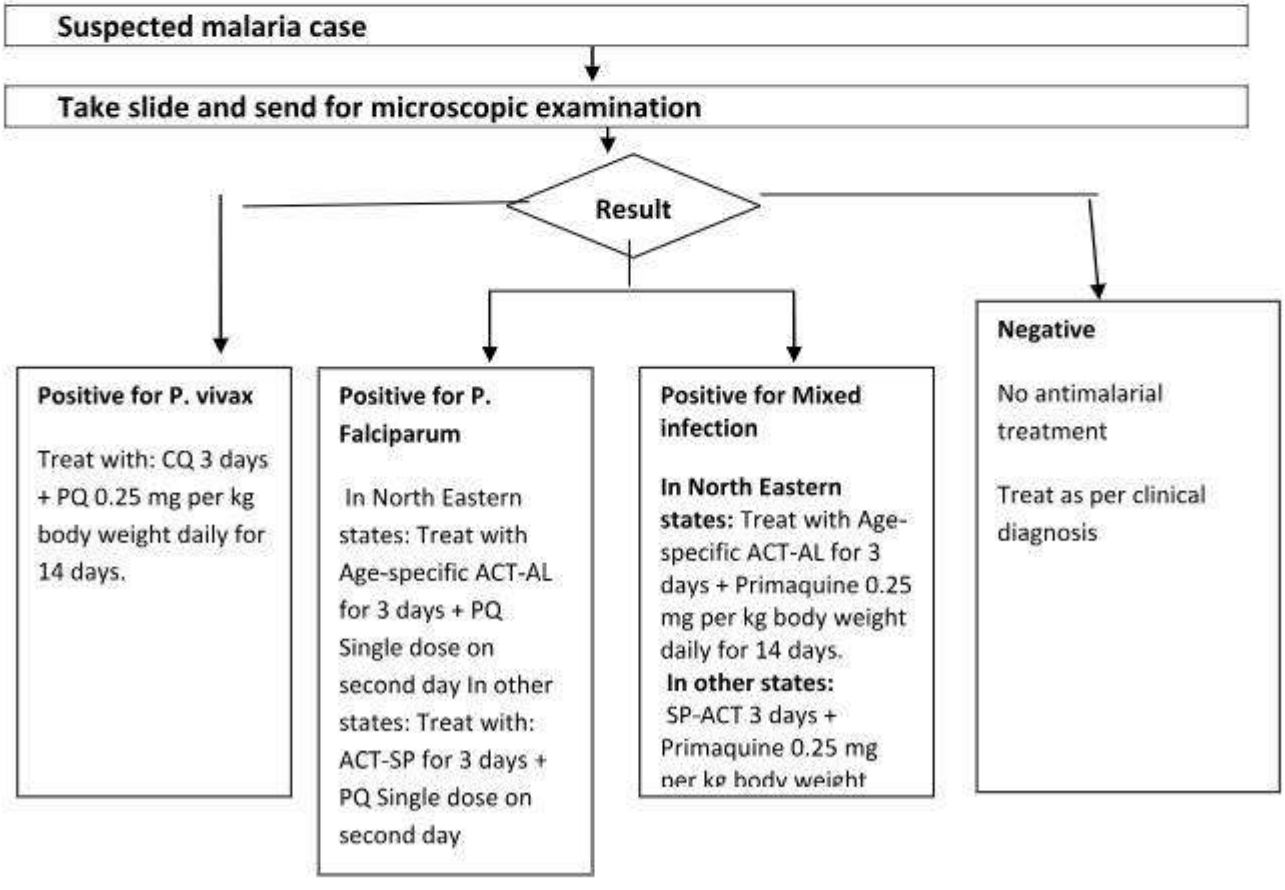
Note: It is not recommended for pregnant women and children less than 8 years.

Chemoprophylaxis for longer stay (more than 6 weeks)
Mefloquine: 250 mg weekly for adults and should be administered two weeks before, during and four weeks after exposure.

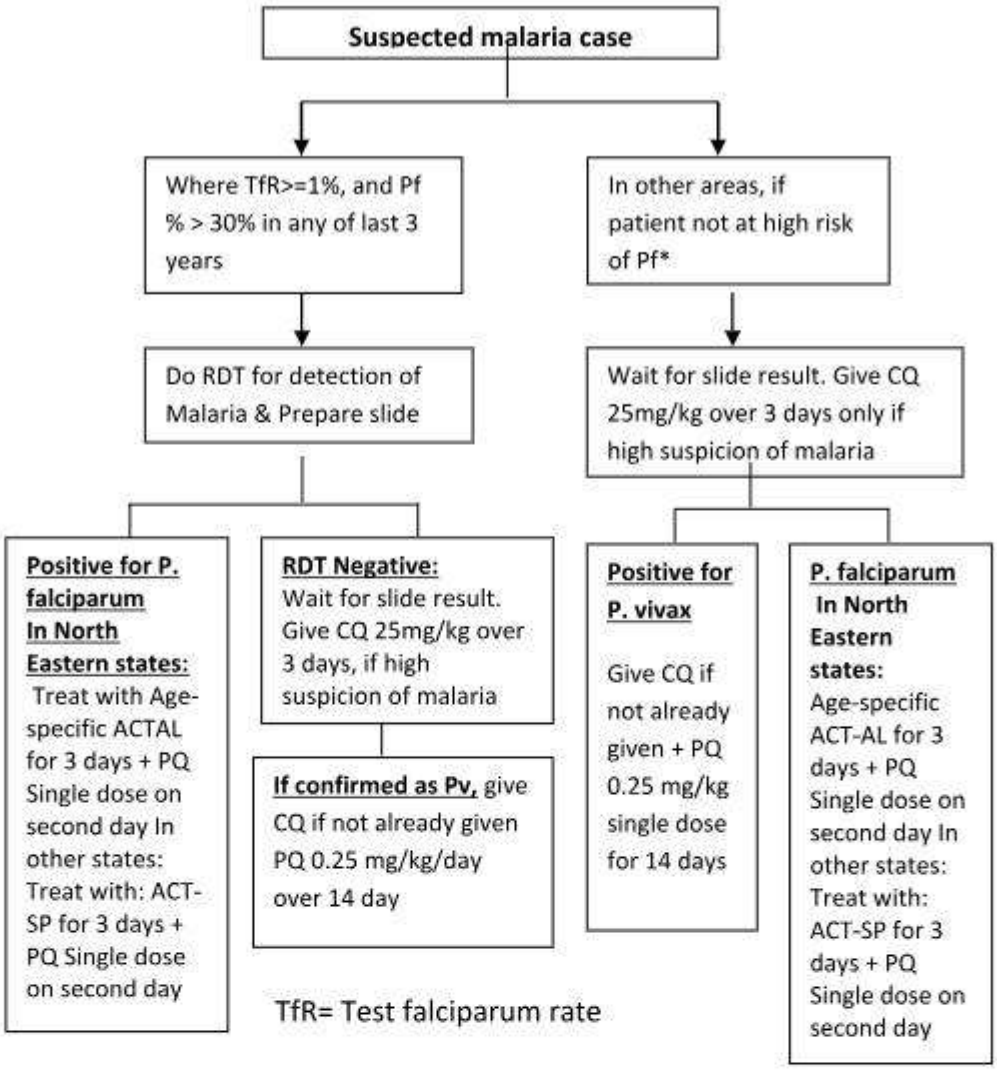
Note: Mefloquine is contraindicated in individuals with history of convulsions, neuropsychiatric problems and cardiac conditions. Therefore, necessary precautions should be taken and all should undergo screening before prescription of the drug.

Note: The treatment matrix for different situations like unavailability of Microscopy in 24 hours, Microscopy available, where Bi-valent RDT is available is given in table below.
Drug Schedule for Treatment of Malaria Under NVBDCP

Diagnosis and Treatment for Malaria:
All fever cases diagnosed as malaria by either RDT or microscopy should be promptly given effective treatment. The medicine chosen will depend upon whether the patient has vivax malaria or falciparum malaria as diagnosed by the blood test. The flow charts in different settings for diagnosis and drug selection for the treatment of malaria are as under
Where microscopy result is available within 24 hours



Where microscopy result is not available within 24 hours and Monovalent RDT is used



Note: if a patient has severe symptoms at any stage, then immediately refer to a nearest PHC or other health facility with indoor patient management or a registered medical doctor.

Note: PQ is contra-indicated in pregnancy and in children under 1 year (Infant).

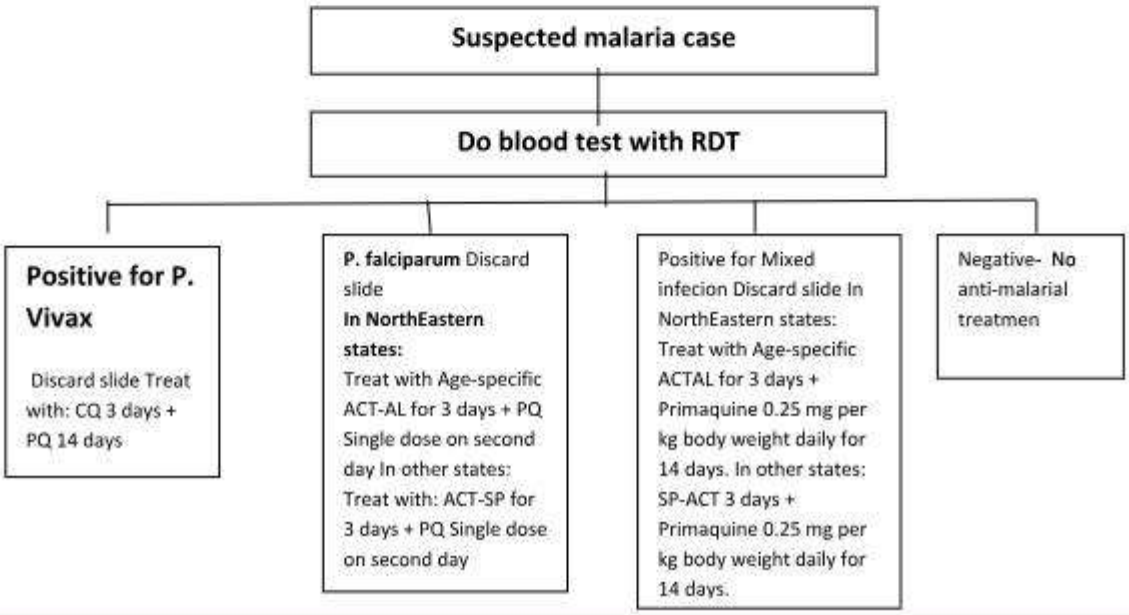
ACT-AL - Artemisinin-based Combination Therapy- Artemether - Lumefantrine

ACT-SP- Artemisinin-based Combination Therapy (Artesunate + Sulfadoxine Pyrimethamine)

CQ - Chloroquine

PQ - Primaquine

Where microscopy result is not available within 24 hours and Bivalent RDT is used



Note:

- However, if malaria is strongly suspected, prepare & send slide for microscopy
- If a patient has severe symptoms at any stage, then immediately refer to a nearest PHC or other
  health facility with indoor patient management or a registered medical doctor.
- PQ is contra-indicated in pregnancy and in children under 1 year (Infant).

Note: PQ is contra-indicated in pregnancy and in children under 1 year (Infant).

Important aspects of drugs used in malaria treatment

a. Chloroquine

- Chloroquine is synthetic 4-aminoquinoline formulated as phosphate salt for oral use. Chloroquine is highly effective blood scizonticide and remains the principal anti-malarial drug in malaria management.
- **Adverse effects:** Chloroquine is usually well tolerated. Nausea, vomiting, abdominal pain, headache or blurring of vision may be noticed rarely. Administration after meals reduces majority of side effects.
- **Contraindications:** Chloroquine is contraindicated in patients with psoriasis as it may precipitate acute attack. Chloroquine should not be used in patients with visual field abnormalities. Kaolin and calcium/magnesium containing antacids, should not be administered along with Chloroquine as they interfere with absorption of Chloroquine. Chloroquine is considered safe in pregnancy and for young children.

b. Primaquine

- **Primaquine** is synthetic 8-aminoquinoline, well absorbed orally, reaching peak plasma levels in 1-2 hours. It is gametocidal and also active against hepatic stage of all malarial parasites.
- **Adverse effects:** Primaquine in recommended doses is generally well-tolerated. It infrequently causes nausea, epigastric pain, abdominal cramps and headache. These symptoms are more common when taken on empty stomach. Rarely Primaquine may cause haemolysis (manifested by cyanosis), especially in persons with G6PD deficiency.
- **Contraindications:** Primaquine should not be given to patients with G6PD deficiency. It should also not be given along with quinidine. It should not be given to pregnant women and infants.

c. Quinine and quinidine

Quinine is rapidly acting, highly effective blood scizonticidal against all the species of malaria. It is a drug of choice for cerebral malaria. However, quinine is not active against liver stage parasites.

- Therapeutic doses of quinine and quinidine commonly cause tinnitus, headache, nausea, dizziness and visual disturbances called collectively as cinchonism. Therapeutic doses may cause hypoglycaemia through stimulation of insulin release. Thus, quinine should always be given in glucose saline.
- Black water fever is rare severe illness that includes marked haemolysis and haemoglobinuria after administration of quinine due to hypersensitivity reaction to drug. Quinine should be discontinued if signs of severe cinchonism, haemolysis or hypersensitivity occur. It should not be given along with aluminium containing antacids.

Quinine should be discontinued if signs of severe cinchonism, haemolysis or hypersensitivity occur. It should not be given along with aluminium containing antacids.

Anti-malaria activities in project areas

Areas with temporary aggregation of labourers for construction, irrigation purposes or any other developmental activities are called as project areas.

Once the malarial parasites introduced in any area through migrated persons of projects, it becomes very difficult and takes long time to make the area malaria free again. Thus, it is always wise and economical to plan antimalaria activities since beginning in project area.

Refer serious malaria case to District/Sub-District Hospital

P.vivax and P. malariae infections usually do not lead to complications except infant or young children who may get disoriented or get convulsions due to high fever.

Serious complications usually arise in P.falciparum infection. They may sometimes develop suddenly in a short span of time and may lead to death of patient if not treated promptly and adequately. Management of cerebral malaria is given in the chapter on "Management of emergency at PHC".

Referral criteria for peripheral worker

Peripheral health workers include, MPW (M and F) & ASHA. Patient first comes in contact with these peripheral workers. Medical officer should repeatedly train these workers for identifying serious cases of malaria and early referral before patient becomes serious. Criteria for referral by peripheral health worker to PHC are:

- Persistence of fever for 48 hours.
- Continuous vomiting
- Disorientation
- Increase in intensity of headache
- Severe weakness - unable to walk
- Convulsions
- Anaemia /Jaundice

Referral criteria for PHC level

- Cerebral malaria patient not responding to quinine
- Severe anaemia (Hb less than 7 gm%)
- Haemoglobinuria
- Pulmonary oedema
- Oliguria not responding to administration of diuretics.

These patients require investigations, oxygen, blood transfusion etc for management. You have to refer the patient at the nearest place where these facilities are available. If telephone facility is available at referral centre, inform hospital about referred patient.

Epidemiological parameters

Important parameters/indices have been developed to understand malaria situation in particular area and also to evaluate the control measures taken. Medical officer must knowhow to calculate these parameters and their epidemiological importance.

Sr.	Parameter / Index	How to calculate	Epidemiological significance
1	Annual Blood Examination Rate (ABER)	No. of BS examined in year x100 ÷ Total population	This parameter reflects efficiency and adequacy of fever surveillance. ABER of 10% is fixed for estimated fever rates. MBER should not be less than 1% per month during June to December.
2	Annual Parasite Incidence (API)	Total no. of BS positive in one year x1000 ÷ Total population	Most important criteria to assess malaria situation in PHC area provided ABER of PHC is more than 10%. At present API > 2 is used to decide the anti malaria strategy for spraying.
3	Annual falciparum Incidence (AFI)	Total no. of BS positive for P. falciparum in one year x1000 ÷ Total population	AFI expresses the P. falciparum incidence in your PHC area.
4	Slide Positivity Rate (SPR)	Total no. of BS positive for malaria parasitex 100 ÷ Total no. of BS examined	This parameter is independent of ABER. Progress of containment measures can be determined by this parameter. Monthly SPR helps to find out seasonal trend of malaria prevalence. SPR in children (2-9 years) especially is important to assess impact of control operations
5	P. Falciparum percentage (Pf%)	Total no of BS found positive for P. falciparum x100 ÷Total no of BS found positive for malarial parasite	This parameter gives relative proportion of P.Falciparum infection and identifies trends of P. Falciparum incidence in relation to total caseload of malaria in the community

Responsibilities of PHC functionaries

Sr.	Activity	Responsibility of PHC staff	
		Designation	**Responsibility**
1	Updating village wise population,	MPW	To complete survey every year in December, completing stencilling (M numbering) on all doors
		HA (M)	Supervise 20% survey and stencilling on doors

	stencilling on doors	MO	Supervise 5% survey and stencilling on doors
2	Establish and improve surveillance for malaria in PHC area	MPW	Visit all houses fortnightly and take BS of fever cases (MPW-M/F) asks H/O fever to all ANCs, PNCs and collects PBS. In addition to this, collects PBS from all other fever cases found during her/his routine home visits.
		HA (M)	Check visits of MPW concurrently and consecutively, supervise BS collection as per population norm (8-10 per 1000 population), ensure that, BS are taken from all villages in both fortnights.
		MO	Passive BS collection in OPD (15% of total OPD), supervising active surveillance, in PHC area especially remote areas. Monitor success of anti malaria activities in your PHC.
3	Radical treatment	HA (M)	Give RT to all positive cases in PHC area and ensure that patient consumes tablets in front of you throughout the RT
		Pharmacy officer	Give age wise and species wise radical treatment at malaria clinic as recommended by MO immediately after the patient is found positive for Malaria by PBS examination.
		MO	Review and ensure all positive cases, get RT immediately (within seven days)
		MPW	Follow up BS collection of positive cases (M) whose RT is completed by HA
4	Inventory of lancets, slides, drugs, spirit, slide box	Lab. Scientific Officer or HA (M)	Indent all material as per requirement, supply to MPWs, pharmacist and keep record
5	Biological method	MPW (M)	Continuous survey of breeding places in his area, develop and maintain guppy fish hatcheries in area, release guppy fish at breeding places

		HA (M)	Survey breeding places during May, supervise breeding places survey, give numbers to breeding places
		MO	Review biological control activities, check 10% breeding places & all hatcheries monthly.
6	Spraying	MPW	Inform all people about dates of spraying, care to be taken of food material, attend spraying activity in his area, health education to community
7	BS examination and record, reporting.	Lab. Scientific Officer	Taking BS of all fever cases attending OPD, immediate examination of classical & suspected Malaria fever cases in Malaria Clinic.
8	Monitor success of anti malaria activities in your PHC	MO/HA	Calculate various indicators and take corrective actions accordingly.

6.5.2. Dengue Fever

In Maharashtra state, outbreaks of Dengue Fever (DF) /Dengue Haemorrhagic Fever (DHF) occur either in post-monsoon period when breeding of mosquitoes is highest due to accumulation of rain water in discarded materials or during scarcity season due to Aedes mosquito breeding in stored water in cement tanks and earthen pots which are not emptied regularly.

Etiological agent

Dengue Fever (DF) /Dengue Haemorrhagic Fever (DHF) is caused by a group B arbovirus (Flavivirus) and include serotypes 1,2,3, and 4 (Den-1. Den-2, Den-3, and Den- 4). Infection with any one serotype confers life long Immunity to the virus serotype, but no cross protection for the other serotypes.

Epidemiology

Life cycle of Dengue virus occurs in both man and Aedes aegypti female mosquitoes. The virus enters mosquito when it bites viraemic host having dengue infection. Mosquito becomes infective after extrinsic incubation period of 8-10 days. After completion of extrinsic incubation period, infective mosquito can transmit the virus to susceptible human host

Vector for DF- Aedes aegypti

- DF is transmitted by bite of an infected Aedes aegypti female mosquito. It is common in most urban areas & recently also seen in rural areas.
- The mosquito rests indoor, in closets and other dark places.
- Aedes mosquito is domestic breeder. Breeding can occur in any artificial, clean water container such as desert coolers, flower vessels, overhead tanks, discarded buckets, half

buried earthen pots (Ranjan), cement tanks, tyres, utensils, etc which are not emptied and cleaned periodically.

Clinical manifestations

Dengue infection causes mild illness in the children, while in adults it frequently produces symptoms. The incubation period of Dengue Fever is usually 4-6 days but may vary from 3 to 10days. Dengue fever is a self-limiting disease in majority of cases of dengue infection. However, dengue virus sometimes causes severe form of clinical syndrome, namely, dengue haemorrhagic fever/dengue shock syndrome (DHF/DSS)

Undifferentiated fever

Infants, children & some adults who have been infected with dengue infection for the first time develop a simple febrile illness indistinguishable from other viral infections.

Dengue fever (DF)

It is most common in older children & adults. The symptoms of dengue fever are an acute biphasic fever with intense headache, body ache, joint pains and retro-orbital pain. Other common symptoms include anorexia, altered taste sensation, constipation, colicky pain, abdominal tenderness, dragging pains in the inguinal region, sore throat and general depression. Patient may or may not have rash. Although DF is commonly benign, it may be incapacitating disease with severe muscle & joint pain& occasionally with unusual haemorrhages.

Dengue Haemorrhagic Fever (DHF)

It is a severe form of dengue fever. Secondary dengue infection is the risk factor for DHF. Although DHF can occur in adults, most cases occur in children less than 15 years. During first few days, illness resembles classical dengue fever. Critical stage is reached after 2-7 days, when fever subsides. Accompanying or shortly after a rapid drop in body temperature, varying degree of circulatory disturbances occur.

- Patient is usually restless and has cold extremities. Sometimes there may be sweating.
- Patient may develop haemorrhagic diathesis, which is demonstrated by scattered fine petechiae on extremities, face, trunk and in axillae. Bleeding from the nose, gums and gastrointestinal tract is less common. Haematuria is extremely rare.
- Liver is usually enlarged, soft and tender but usually jaundice is not observed.
- Approximately 50% of patients have generalized lymphadenopathy.
- Chest X-ray shows pleural effusion, as a constant finding.
- In severe cases, the condition of patient suddenly deteriorates a few days after onset of fever. At the time for shortly after the temperature drops, between three to seven days after the onset, there are signs of circulatory failure. The skin becomes cool, blotchy & congested, circum-oral cyanosis is frequently observed & the pulse becomes weak & rapid. Patient goes in critical stage of shock. Acute abdominal pain is frequent complaint shortly before the onset of shock. Major cause of death in patients of DHF is leakage of plasma in pleural and abdominal cavities leading to hypovolaemic shock.

Grading the severity of DHF

Grading the severity of the disease is important & is found useful clinically & epidemiologically in epidemics. Four grades as per severity are as below:

- **Grade I**: Fever accompanied by non-specific constitutional symptoms; the only haemorrhagic manifestation is positive tourniquet test.

- **Grade II:** Spontaneous bleeding in addition to manifestations of grade I patients, usually in the form of skin & or other haemorrhages.
- **Grade III:** Circulatory failure manifested by rapid & weak pulse, narrowing of pulse pressure (20 mm Hg or less) or hypotension with presence of cold & clammy skin &restlessness.
- **Grade IV:** Profound shock with undetectable blood pressure& pulse.

Diagnosis

Case definition of dengue fever Suspect case

- Acute onset with high grade fever of less than seven days duration
- Severe headache, backache, joint and muscle pain
- Pain behind eyes (specific sign of Dengue fever)
- Presence of skin rash (Not in all patients)

Probable case

- Suspect case of DF +
- High vector density (Aedes Aegypti) OR
- Presence of confirmed case in the area OR
- Blood slide negative for malarial parasite and patient does not respond to anti-malarial drugs

Confirmed cases

- Isolation of virus from blood in early phase
- Serological test for IgM antibody in single serum samples or 4-fold rise of IgG antibodies in paired serum samples.
- ELISA IgG, IgM positive
  (As per NVBDCP guidelines, ELISA IgM & NS1 ELISA are taken as confirmed diagnosis of Dengue)

Case definition of Dengue Haemorrhagic Fever (DHF)

Suspect case

Signs and symptoms of Dengue fever plus bleeding tendencies

Probable case

- Suspect case of DF +Positive tourniquet test

How to carry out Tourniquet test

- Apply sphygmomanometer cuff to the arm and record blood pressure. Calculate mean blood pressure by adding systolic and diastolic blood pressures and dividing the addition by two.
- Inflate cuff up to mean blood pressure and hold for three minutes.
- Make round of 3 cm diameter on a plain paper. Put the paper on arm in such a way that the round is placed on cubital fossa.
- Examine the skin on cubital fossa through the round for petechiae. If petechiae are seen then count them. If you can count more than 20 petechiae in 3 cm diameter circle, the test is positive.

Confirmed case

Probable case +

- Thrombocytopenia < 1,00,000/mm. OR
- Haemo concentration (haematocrit increased by > 20% or evidence of increased capillary permeability) (e.g. pleural effusion in X-ray chest).

Determination of haematocrit and platelet is essential for diagnosis and case management. The time course relationship between fall in platelet count and a rise in haematocrit level appears to be unique to DHF. These changes occur before fever subsides and before onset of shock and are correlated with disease severity.

Laboratory diagnosis

Diagnosis of DF/DHF can only be confirmed by serological tests. The tests include detection of IgM antibodies, which appear around the end of first week of onset of symptoms and are detectable for 1-3 months after acute episode.

A rising title of IgG antibodies in paired sera taken at an interval of ten days or more is confirmatory.

Clinical management

Depending upon severity of infection, management of the cases differs. Early diagnosis & admission of DHF patients is important in order to reduce case fatality rates.

Dengue fever

Management of Dengue fever is symptomatic and supportive. Bed rest is advisable during acute febrile phase.

- Antipyretics and sponging is essential to keep body temperature of patient below 370C. Do not prescribe Salicylates (Aspirin) to suspected DF patient. Paracetamol is preferred.
- Analgesic or a mild sedative may be prescribed for severe pain.
- ORS solution is recommended for patients with excessive sweating, nausea, vomiting or diarrhoea to prevent dehydration.
- Patients should be monitored in DHF area until they become afebrile & after platelet & haematocrit determinations are normal.

Management of Grade I DF/DHF

Management during febrile phase is similar to that of DF.

- Patient should be monitored closely. Critical period for monitoring is transition from febrile to afebrile stage, which usually occurs after third day of illness.
- Platelet count & haematocrit estimation is essential.
- Drop in platelet count to<100,000/cumm, i.e. 1-2 platelets per oil immersion field usually precedes rise in haematocrit. A rise of more than 20% indicates need for intravenous fluid therapy.
- If haematocrit determination is not possible, haemoglobin estimation may be carried out as an alternative.
- Haematocrit should be determined daily from the third day until the temperature remains normal for one or two days.
- Paracetamol is recommended to keep temperature below 400c. Dosages of paracetamol recommended are: 1 – 2 years: 60-120 mg/dose, 3 - 6 years: 120 mg/dose & 7 - 12years: 240 mg/dose.

- Plenty of fluids like ORS & or fruit juices should be given orally, to the extent patient tolerates

Management of Grade II DF/DHF

Any person who has DF with thrombocytopenia &haemoconcentration& presents with abdominal pain, black tarry stools, epistaxis, bleeding from gums etc. needs to be hospitalized. Such patient should be observed for signs of shock.

- The critical period for development of shock is transition from febrile to afebrile phase of illness, which usually occurs after third day of illness.
- A rise of haematocrits of 20% or more reflects need for IV fluid therapy.
- If despite of treatment, patient develops features of shock, management of grade III & IV should be started.
- Blood transfusion may be indicated in patients with severe shock, massive bleeding and DIC.

Indications of red cell transfusion

- Loss of blood (overt blood) -10% or more of total blood volume.
- Preferably whole blood/ component to be used
- Refractory shock despite adequate fluid administration and declining haematocrit
- Replacement volume should be 10ml/kg body wt. at a time and Coagulogram should be done
- If fluid overload is present PCV is to be given. Indications of platelet transfusion
- In general, there is no need to give prophylactic platelets even at < 20,000/ cumm
- Prophylactic platelet transfusion may be given at level of <10,000/cumm in absence of bleeding manifestations.
- Prolonged shock; with coagulopathy and abnormal coagulogram
- In case of Systemic massive bleeding, platelet transfusion may be needed in addition to red cell transfusion.

DO's and DON'Ts for Doctors

DO's:

- Cases of Dengue fever/Dengue Haemorrhagic Fever (DF/DHF) should be observed every hour.
- Serial platelet and haematocrit determinations, drop in platelets and rise in haematocrits are essential for early diagnosis of DHF.
- Timely intravenous therapy. isotonic crystalloid solution can prevent shock and/or lessen its severity.
- If the patient's condition becomes worse despite giving 20ml/kg/hr for one hour, replace crystalloid solution with colloid solution such as Dextran or plasma. As soon as improvement occurs, replace with crystalloid.
- If improvement occurs, reduce the speed from 20 ml to 10 ml, then to 6 ml, and finally to 3 ml/kg.
- If haematocrit falls, give blood transfusion 10 ml/kg and then give crystalloid IV fluids at the rate of10ml/kg/hr.
- In case of severe bleeding, give fresh blood transfusion about 20 ml/kg for two hours. Then give crystalloid at 10 ml/kg/hr for a short time (30-60 minutes) and later reduce the speed.
- In case of shock, give oxygen.
- For correction of acidosis (sign: deep breathing), use sodium bicarbonate.

DON'Ts:-

- Do not give Aspirin or Ibuprofen for treatment of fever.
- Avoid giving intravenous therapy before there is evidence of haemorrhage and bleeding.
- Avoid giving blood transfusion unless indicated, reduction in haematocrit or severe bleeding.
- Avoid giving steroids. They do not show any benefit.
- Do not use antibiotics.
- Do not change the speed of fluid rapidly, i.e., avoid rapidly increasing or rapidly slowing the speed of fluids.
- Insertion of nasogastric tube to determine concealed bleeding or to stop bleeding (by cold lavage) is not recommended since it is hazardous.

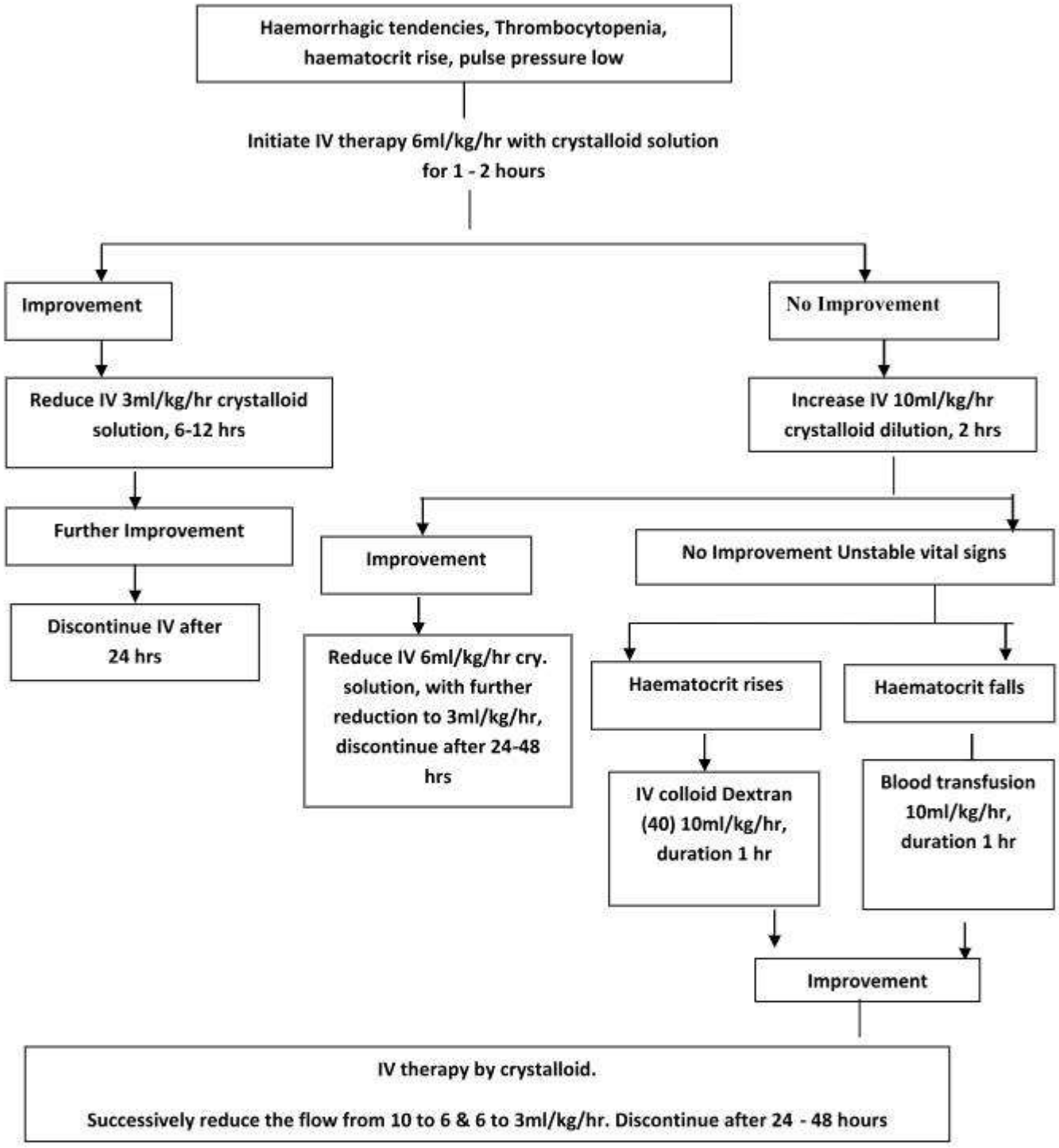
Signs of Recovery:

- Stable pulse, blood pressure and breathing rate
- Normal temperature
- No evidence of external or internal bleeding
- Return of appetite
- No vomiting
- Good urine output
- Stable haematocrit
- Convalescent confluent petechiae rash.

Criteria For Discharging Patients:

- Absence of fever for at least 24 hours without the use of anti-fever therapy
- Return of appetite
- Visible clinical improvement
- Good urine output
- Minimum of three days after recovery from shock
- No respiratory distress from pleural effusion and no ascites
- Platelet count of more than 50,000/mm

Management of grade I & II DHF - Volume replacement flow chart

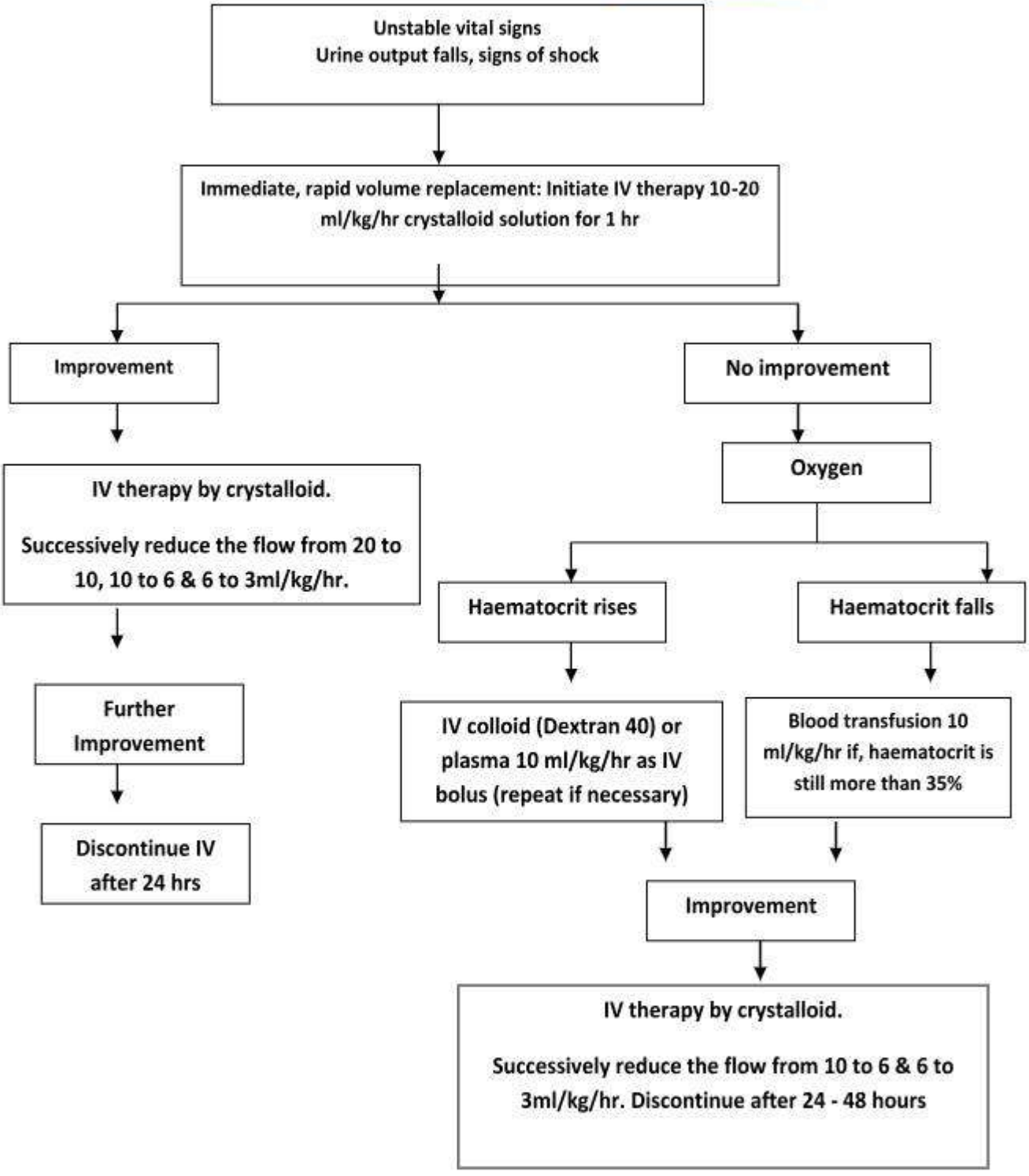


Improvement: Haematocrit falls, pulse rate & BP stable, urine output rises

No improvement: Haematocrit, pulse rate rises, pulse pressure falls below 20 mm Hg, urine output falls

Unstable vital signs: Urine output falls, signs of shock

Management of grade III & IV DHF - Volume replacement flow chart
(Detailed clinical management guidelines are available on www.nvbdcp.gov.in)



6.5.3. Chikungunya Fever

Chikungunya is rare form of viral fever caused by an alpha virus that is spread by Aedes aegypti mosquito. The name is derived from the Swahili word meaning "that which bends up". This is due to the stooped posture developed as a result of the arthritic symptoms of the disease. The disease is not considered to be fatal. The clinical diagnosis is confused with DF because Chikungunya virus circulates in region where dengue virus is also endemic.

In Maharashtra during 2003, there was an outbreak of Chikungunya in Barshi, District Solapur. In 2006, Malegaon & districts from Marathwada are affected due to this disease

Etiological agent

Chikungunya is caused by the Chikungunya virus, which is from Togaviridae, genus alpha virus.

Epidemiology

The disease occurs mainly in urban area. Epidemics are sustained by human – mosquito – human cycle. Mosquitoes transmit the disease by biting the infected person & then after the extrinsic incubation period is completed; mosquito become infective & can transmit the disease to other susceptible persons.

Vector for Chikungunya

The disease is transmitted by bite of an infected Aedes aegypti mosquito. Humans are the major source of Chikungunyavirus for mosquitoes. An infected person cannot spread the infection directly to other person.

Aedes aegypti breeds in variety of manmade containers like discarded tires, flowerpots, old oil drums, water storage vessels, etc. Details about the vector are in section on vector control.

Clinical manifestations

Time required from bite of an infected mosquito to development of symptoms ranges from 1 to 12 days.

- Chikungunya starts suddenly with fever, chills, headache, nausea, vomiting, joint pains & maculopapular rash.
- Severe joint pain (arthritis) is the most common feature of the disease. Joints of extremities typically in the knee, ankle & small joints of the extremities become swollen & painful to the touch. Although recovery is the expected outcome, some patients can suffer from persistent joint pain for months & may require analgesic for a longer time.

Standard case definition of Chikungunya

Sudden onset of fever as high as 104 degrees F.

- Headache, nausea, vomiting
- Polyarticular arthralgia, particularly affecting small joints & one or more major joints like wrist, elbow, and knee.
- Maculo-papular rash on face & neck on first day of illness, onset may be delayed

Laboratory diagnosis

Diagnosis is based on either virus isolation or demonstrating fourfold rise in antibody titre in paired sera collected during the illness.

- Serum sample should be collected after five days of onset of illness & sample should be sent to National Institute of Virology, Pune.

Clinical management

There is no specific treatment for Chikungunya. Illness is usually self-limiting & resolves with time. Supportive treatment that helps to relieve the symptoms, such as non-steroidal anti-inflammatory & analgesic drugs like Paracetamol, Diclofenac sodium or Ibuprofen should be given. Tab Ranitidine or antacid may be used along with this to relieve gastric irritation.

- In case of dehydration, depending on degree of dehydration, ORT or IV fluids should be given.
- Rest is beneficial.
- Use of antibiotics should be minimized & steroids should not be given.
- Infected persons should be isolated from mosquitoes in order to prevent the transmission of the disease.
- No vaccine is currently available for the disease.

6.5.4. Japanese Encephalitis

Japanese Encephalitis (JE) is a mosquito-borne zoonotic disease. It is a disease of public health importance because of high case fatality rate and permanent neurological sequelae in cured patients. The virus infects mainly animals and birds. Man is an incidental host. JE is primarily a disease of rural agricultural areas, where vector mosquitoes proliferate in close association with pigs and other animal reservoir.

Etiologic agent

JE is caused by a group B arbovirus (flavivirus). The virus is antigenically related to other flaviviruses including dengue and yellow fever viruses.

Epidemiology

JE virus has its natural cycle in water birds / animal's and mosquitoes. Water birds such as pond herons, cattle egrets, poultry birds and ducks play a significant role in the natural history of JE virus. The animal hosts include pigs, cattle and horses.

Pigs have special importance in JE epidemic. Infected pigs do not manifest any overt symptoms of disease; but develop tremendous viraemia, which in turn increase the concentration of virus in mosquitoes. Hence, pigs are called as amplifying hosts.

- Infection is transmitted through the bite of an infected culicine mosquito. In human beings, viraemia is mild and lasts for a short duration. Infection in man is the dead end of transmission. Man to man transmission has not been documented.
- Epidemics usually coincide with the monsoon and post monsoon period when the vector density is high. However, in endemic areas, sporadic cases may occur throughout the year.
- Risk factors for JE outbreak are high density of Culex mosquitoes, presence of amplifying hosts (pigs), and presence of JE virus in area.

The incubation period in man, following mosquito bite varies from 5 to 15 days

Vector of JE Culex vishnui group

Mosquitoes belonging to the Culex vishnui group (Culex vishnui, Culex pseudo vishnui, Culex tritaeniorhynchus) are the most important vector species in India.

- Culex mosquitoes generally breed in water bodies with luxuriant vegetation. Irrigated rice fields, shallow ditches and pools are common breeding places.
- Female mosquitoes get infected after feeding on a viraemic host. They can transmit the virus to other hosts after an extrinsic incubation period of 9 to 12 days. The mosquitoes remain infected for life.

Clinical manifestations

The clinical features of JE are those of encephalopathy. The patient gives history of acute fever and change in behaviour or sensorium lasting for more than 24 hours. Disturbances of sensorium are reflected as lethargy, somnolence, irritability, apathy or loss of consciousness. The patient may develop difficulty of speech and other neurological deficits like ocular palsies, hemiplegia, tremor and ataxia. Typical feature of neurological deficit in JE is its asymmetrical presentation. There may also be loss of bladder and bowel control. The focal neurological signs may be stationary or progressive.

In majority of cases, infection is mild with no overt clinical symptoms or with mild fever and headache. Individual's develop permanent immunity after infection.

Case fatality rate is high in severe cases, which may be 20to 40%. Patients who recover from acute episode may have neurological sequelae. These occur with variable frequency and depend on age and severity of the illness. Commonly observed sequelae are mental impairment, severe emotional instability, personality changes and paralysis.

Diagnosis:

Suspect case:

- High-grade fever of acute onset with at least two of the following
- Decrease in level of consciousness in dependent of convulsions
- Significant change in mental status either in behaviour or personality
- Convulsions

Probable case

- Suspected case of Japanese Encephalitis, and
- Usually not more than a few cases (1-2) in one village.
- With or without signs of meningeal irritation and varying degree of asymmetrical neurological deficits

Confirmed case

- High IgM antibody titre
- Fourfold rise of antibodies in paired serum samples.

Laboratory confirmation of diagnosis by serological tests

Diagnosis of JE can be confirmed by serological tests. Detection of IgM antibodies, which appear after first week of onset of symptoms and detectable for one to three months after the acute episode is the confirmatory test.

- A fourfold rise in IgG antibody titre in paired sera taken at an interval of 10 days or more is also confirmatory. IgG antibodies indicate previous infection and are useful for conducting sero-epidemiological studies to determine extent of silent infection and immunity levels in the local population.
- Each sample should be accompanied with the information about name, age, sex, address, name of the PHC sending the sample, date of onset, clinical findings, hospitalization, date of collection of sample, provisional diagnosis.

Clinical management

- There is no specific treatment of JE. However, supportive treatment and good nursing care can significantly reduce case fatality rate. It is, therefore, important that cases are referred to hospital with Medical Intensive Care Unit (MICU) facility as early as possible

if encephalitis is suspected. Treatment should be commenced without waiting for laboratory results.

- In acute phase, clinical management is directed at maintaining fluid and electrolyte balance. Keeping the airway open in a comatose patient is important. Patients with hypoxia may require oxygen If patient has convulsions, appropriate drugs are prescribed.

6.5.5 Chandipura Encephalitis

Epidemiological Factors

- Distribution predominantly rural.
- Many districts of Andhra Pradesh & Chhattisgarh involved.
- The case distribution is spotty, without clustering.
- Paediatric age group less than 15.
- Neurological sequelae rare in recovered children.
- Antibodies have been detected from humans from many parts of India, Sri Lanka and Africa.

Agent Factors

It is a new virus found in clinical samples was named as Chandipura Virus after the locality from which the samples were collected.

Chandipura Virus belongs to family Rhabdoviridae, genus, Vesiculo virus. Characterized by bullet shaped particles, 150-165 mm long, 50 -60 mm wide showing distinct surface projections 9 - 11 mm in size and a stain -filled canal at the base of the virus particles.

Viral infection spread through Sandfly bites. Sandflies are small insects, light or dark-brown in colour. They are smaller than mosquitoes, measuring 1.5 to 2.5 mm in length with their bodies and wings densely clothed with hair. Some 30 species of sand -flies have been recorded in India. The important ones are: Phlebotomus argentipes, P. papatasii, P. sergenti and Sergentomyiapunjabensis.

Sandflies are troublesome nocturnal pests. Their bite is irritating and painful, while their presence is scarcely observed. They infest dwellings during night, and take shelter during day in holes and crevices in walls, holes in trees, dark rooms, stables and store rooms. The females alone bite, as they require a blood meal every third or fourth day for oviposition. Sandflies are incapable of flying over long distances; they merely hop about from one place to another. Sandflies are generally confined to within 50 yards of their breeding places.

Host Factors

- Paediatric age group less than 15 year of age more likely to be infected. Pediatric age group from 0 months to 14 years involved.
- Neurological sequelae rare in recovered children.

Environmental Factors

Disease mostly noted in Rural area/Tribal Region.

Mode of Transmission
Through Sand flies -- Infection spread through Sandfly bites. The females alone bite, as they require a blood meal every third or fourth day for oviposition

Incubation Period
Few hours to 2-3 days

Clinical spectrum signs and symptoms
Acute onset of illness with high grade fever, headache, vomiting. A variable prodromal period followed by involvement of central nervous system with drowsiness and convulsions. Loss of consciousness for > 24 hours with variable neurological signs.

Confirmation by serology.
Diagnosis
Suspected case - Acute onset of fever with altered sensorium in paediatric age group less than 15 year of age.
Probable case - Acute onset of fever with altered sensorium with or without convulsions increased intra cranial pressure without neck stiffness / rigidity an absence of other probable causes of encephalitis in paediatric age group below 15 years.
Confirm Case - Laboratory confirmation by PCR, presence of IgM antibodies, Isolation of virus. The lab test for the disease is done in National Institute of Virology, Pune.
Treatment
The treatment of the patients may require, as follow:

- Management of Airways and Breathing.
- Management of Circulation.
- Control of Convulsion and Intracranial pressure
- Control of Temperature
- Fluid and Electrolytes and Calories/ Nutrition
- General management

6.5.6. Filariasis
Filariasis is a disease of lymphatic system. Although not fatal, it is responsible for considerable suffering, disability and deformity. It is transmitted by bite of infected mosquito and is caused by two important nematode worms Wuchereria bancrofti (Bancroftian filariasis) and Brugia Malayi (Brugian filariasis).

Etiologic agent
Filarial species present in India are Wuchereria bancrofti and Brugiamalayi. In Maharashtra, only W. Bancrofti is found.

Microfilaria have nocturnal periodicity. It is transmitted by a bite of infective culex mosquito during night. Appearance of microfilaria in peripheral blood of man synchronizes with biting period of vector mosquito.

Epidemiology of filariasis
Life cycle:
Filaria parasites develop in two hosts. Man is primary host (definitive host) whereas mosquito is secondary host (intermediate host). Development of parasite in man takes

a long time (5-18 months).

Adult worms live in lymphatic system. Female worms give birth to microfilaria which find their way into blood circulation. Mosquito cycle begins when microfilaria are picked up by vector mosquito during blood meal. Further development takes place in mosquito. After extrinsic incubation period of 10 to 14 days mosquito becomes infective. During bite of mosquito, larvae of filarial worm enter body & finds lymphatic system for rest. After developing into adult stage, it produces microfilaria.

Reservoir and host factors

Only human being is reservoir of filarial parasite W. Bancrofti. There are no animal reservoirs. Infected persons are microfilaria carriers. All ages can get infected, but rise in incidence is observed after twenty years of age. Small proportion of infected persons develops disease. Both sexes acquire disease equally. Industrialization, urbanization, population migration, outside sleeping habits increase risk.

Vector mosquito

Vector for W. bancrofti is Culex quinquifasciatus.

- Culex mosquito breeds in any accumulation of polluted/semi polluted water such as drainages, septic tanks, cesspools, etc.
- Culex is indoor rester (Endophilic) and midnight biter. (Peak biting between 12 to 2 in midnight). Biting period synchronizes with peak microfilariae density in human host. Culex mosquito rests on hanging object, clothes etc.

Clinical manifestations of filariasis

- Filariasis is a disease of lymphatic system. When filarial adult worms are lodged in lymphatics and in lymph glands, they obstruct mechanically flow of lymph and also produce inflammatory and allergic reactions.
- Time lag between entry of parasite and appearance of symptoms (incubation period) is 5-18 months.
- Lymphatic filariasis is characterized by a wide spectrum of clinical manifestations with signs and symptoms often differing from one endemic area to another. Clinical course of filariasis can be divided into asymptomatic, acute and chronic stages.
- **Asymptomatic stage** is characterized by presence of microfilaria in peripheral blood, although there are no clinical manifestations of filariasis
- In **Acute stage** clinical manifestations are characterized by fever with chills and rigors, headache, backache, bodyache and sweating. Acute manifestations are lymphadenitis i.e. painful, enlarged lymph glands at various places, lymphangitis which is acute inflammation of lymph channels, resulting in reddish streaks on skin and funiculitis which is an acute, painful inflammation of spermatic cord. There may be epididymo-orchitis and also tropical pulmonary eosinophilia.
- **Chronic stage** develops after age of 15years with chronic signs of filariasis and only a small proportion of infected community is affected. During chronic stage, microfilariae are usually absent from blood. Chronic manifestations are hydrocele, chyluria, lymphoedema leading to elephantiasis.

Diagnosis of filariasis

- **Clinical diagnosis**: It is based upon clinical signs and symptoms of disease. A clinical history of recurrent fever associated with adeno lymphangitis is strongly indicative of filariasis
- **Parasitological diagnosis**: Parasitological diagnosis is made by finding micro filariae (mf) in blood. Twenty microlitres of blood is taken from finger or ear lobe prick and spread as a thick film. Time of blood collection should baes close as possible to peak of microfilarial density.
- Blood may be collected after Diethylcarbamazine (DEC)provocative test. This provokes microfilaria in lung capillaries to invade peripheral blood. Method is used when night blood collection is not possible.

Treatment

Objective of treatment is to eliminate parasite from blood of patient that will halt spread of disease and prevent morbidity. Treatment consists of chemotherapy directed against adult worm and microfilaria.

Di-ethyl Carbamazine Citrate (DEC)

Di-ethyl Carbamazine Citrate (DEC) is the drug of choice for treatment of filariasis. It is cheap, safe and with least side effects. It kills almost all microfilaria as well as good proportion of adult worms.

Mode of action: Di-ethyl Carbamazine Citrate (DEC) exerts no direct lethal action on microfilaria but modifies them in such a way that phagocytes engulf them thereby removing them from circulation.

Dosage:

Di-ethyl Carbamazine Citrate (DEC) is administered as 6mg/kg body weight per day for 12 days. Age wise dose schedule of DEC is as follows-

Age wise Drug Doses

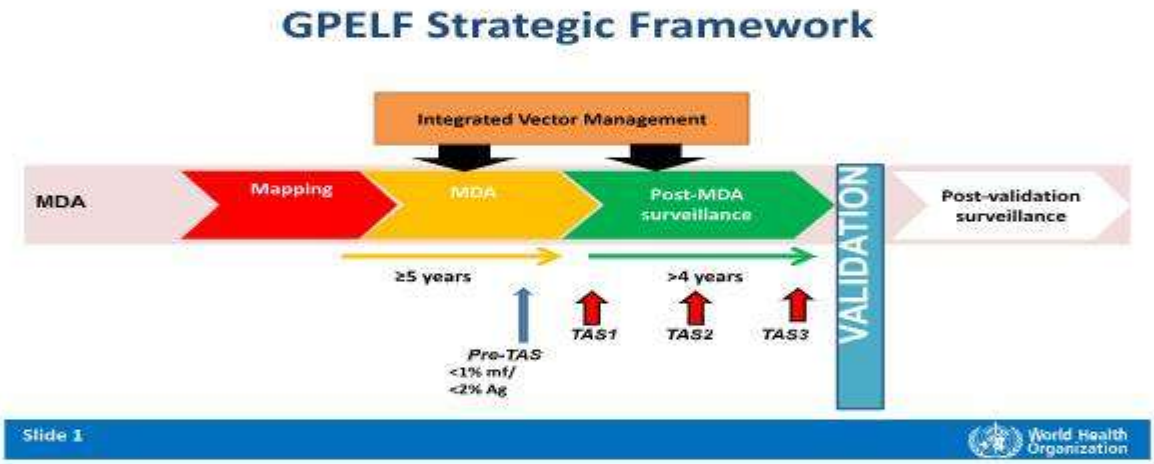
I.D.A Medicine Doses				
Height in cm	**Ivermectin (3 mg)**			
	Doses in mg		No. of Tablets (1Tablet 3 mg)	
90 – 119	3		1	
120 – 140	6		2	
141 – 158	9		3	
More than 159	12		4	
Age in Years	DEC 100 mg		Albendazole 400 mg	
	Doses in mg	No. of Tablets	Doses in mg	No. of Tablets
2 to 5	100	1	400	1
6 to 14	200	2	400	1
More than 15	300	3	400	1

Side effects:
Mild side effects like fever, headache, and body pain are found. Few patients especially healthy microfilaria carriers, may experience nausea, vomiting, allergic rashes, inflammation of lymph glands or slight oedema etc.

Precaution: Drug should not be given on empty stomach.

Revised strategy for elimination of filariasis
Aim of filariasis control is to bring down disease prevalence and infection at low level, reduce morbidity and interrupt transmission so that it is no longer a public health Problem.
Recently Govt. of India has recommended single day mass therapy with DEC at a dose of 6 mg/kg body weight annually in filaria endemic areas of state.
Following activities are suggested under revised strategy for elimination of filariasis.

- Single day mass therapy to all community members above2 years age
- Management of acute and chronic filariasis. Self-care by patients of filariasis
- IEC for preventive and control measures for filariasis. Vector control measures.
- The MF rate is monitored though periodic Transmission Assessment Survey (TAS) after MDA rounds.



Management of an acute attack: An acute attack is painful.
Management of acute Filarial attack is as follows:

- Use of oral antibiotics to shorten duration of attack.
- Paracetamol as analgesic and antipyretic for fever every six hourly.
- A cloth soaked in water and placed around leg can relieve pain. Alternatively, leg can be soaked in bucket of cold water.
- Patient should rest and elevate leg comfortably.
- Patient should not exercise during an acute attack.

Morbidity management and Disability Prevention. (MMDP)
Filaria patients with damaged lymphatic vessels have more bacteria& fungi on skin than normal healthy person. Large number of bacteria on skin, multiple skin lesions, slow lymph fluid movement and reduced ability of lymph nodes to filter bacteria cause inflammation characteristic of an acute attack. Repeated bacterial infections precipitate frequent acute attacks, which further damage lymphatic vessels in skin, reducing ability to drain fluid.
Wash legs thoroughly with water and soap daily, ideally at night before sleeping, covering all skin folds and between toes.

- Use anti-fungal and anti-bacterial creams for prevention of lesions.

- Elevate leg by using pillows or any other support.
- Perform exercise like walking short distances, standing on toes. Exercise helps by improving lymphatic drainage. Exercise should not be done during acute attack.
- Wear proper footwear which protects feet from injury.
- If patient develops lesion in spite of above-mentioned precautions, then he/she should be advised to consult doctor at earliest. Early lesions should be treated with oral antibiotics, topical antibiotics and anti-fungal cream.

Filariasis survey

- All persons in house should be examined. Record name, age, sex, and family relationship to head of household in survey proforma.
- Timing of blood collection should be in accordance with periodicity of microfilaria. For nocturnal periodicity, blood should be collected between 20.00 hrs to midnight.
- 20 micro litres of blood (5drops) from each person should be taken on a clean glass slide and made into a thick smear and slide should be numbered.
- From each person, history of fever, lymphangitis and other signs and symptoms of disease should be noted in form.
- Blood slides should be sent to laboratory for staining and examination for presence of micro filariae

6.5.7 Integrated Vector Management (IVM)

Characteristics of vector mosquito:

Anopheline mosquitoes

Anopheline mosquitoes are the important vectors of malaria in India. Three important species transmitting malaria in Maharashtra state are Anopheles culicifacies in rural areas, Anopheles stephensi in urban area and Anopheles flu viatilis in hilly areas. The characteristics of anopheles species are as below:

- They breed in stagnant water collections such as wells, cisterns, fountains, overhead tanks, seepages of canals etc.
- They have nocturnal biting habits i.e. they bite during night hours.
- After blood meal anopheles has habit to rest on the walls inside house (indoor resting). This habit is used as the basis for residual spraying of insecticides as an anti-adult mosquito measure.

Aedes aegypti

- DF is transmitted by bite of an infected Aedes aegypti female mosquito.
- Once the mosquito becomes infected, it remains so for life. Aedes aegypti has an average adult survival of 8 days. During the rainy season when survival is longer, the risk of virus transmission is greater.
- Aedes mosquito has characteristic white stripes on the back and legs, and therefore aedes are also known as “Tiger mosquito”.
- Aedes mosquito prefers to rest in dark, humid, secluded places inside houses or buildings including bedrooms, closets, bathrooms & kitchens. Preferred indoor resting surfaces are the underside of furniture, hanging objects such as clothes & curtains & on walls.
- Aedes mosquito is a domestic breeder. Breeding can occur in any artificial, clean water container such as desert coolers, flower vessels, overhead tanks, discarded buckets, half buried earthen pots (Ranjan), cement tanks, tyres, utensils, etc which are not emptied and cleaned periodically.

- Since water is essential during first 8 days in the life of mosquito, emptying containers once a week will greatly reduce risk of dengue fever.
- The mosquito has two periods of biting activity, one in the morning for several hours after daybreak & other in the afternoon for several hours before dark.
- Aedes mosquito can fly up to a limited distance of within 100 meters but can spread over vast distances mechanically in various types of vehicles used by man.

Culex vishnui group

- Mosquitoes belonging to the Culex vishnui group (Culex vishnui, Culex pseudovishnui, Culex tritaeniorhynchus) are the most important vector transmitting JE in India.
- Culex mosquitoes generally breed in water bodies with luxuriant vegetation. Irrigated rice fields, shallow ditches and pools are common breeding places.
- Culex mosquitoes are zoophilic, feeding primarily on animals and wild birds. They rest outdoors in vegetation and other shaded places but in summer may also rest indoors.
- The mosquitoes remain infected for life. Culex mosquitoes can fly for long distances (4-5 km).

Vector of filariasis Culex quinquifasciatus

- Vector for W. bancrofti is Culex quinquifasciatus, which breeds in any accumulation of polluted/semi polluted water such as drainages, septic tanks, cesspools, etc.
- It is indoor rester (Endophilic) and midnight biter.
- Mosquito rests on hanging objects, clothes etc.

Differences between anophelini (Anopheles) & culicini (Culex, Aedes & Mansonia)

No.	Anophelini (Anopheles)	Culicini (Culex, Aedes & Mansonia)
1	Larvae rest parallel to water surface	Suspended with head downwards at an angle to water surface
2	When at rest, inclined to an angle to surface	When at rest, the body exhibits a hunch back
3	Wings are spotted	Wings are un-spotted

Breeding Places of Vectors

Mosquito breeding places in and around houses can be divided into two main types –

Breeding sites with clean water that include potable water collections and rain filled water bodies which are suitable breeding sites for some *Anopheles* and *Aedes* mosquito species. Some *Anopheline* and *Aedes* species also breed in small collection of clean water in peri-domestic habitats.

Breeding sites with polluted water are the water bodies polluted/ contaminated with infective and parasitic agents, poisonous chemicals, industrial or other wastes or sewage material. Pollution and contamination are result of human activity. These types of breeding places are suitable for breeding of *Culex* species.

Integrated Vector Management (IVM) is beneficial for reducing vector population.

Integrated Vector Management (IVM) is being promoted for vector control in vector-borne disease control programme. IVM require thorough understanding of the local ecosystem vector bionomics and effective tools. Integrated Vector Management (IVM) encompasses IVM to widen the scope of awareness on vectors management and judicious use of chemicals (insecticides).

IVM comprises following five key elements

- Advocacy, social mobilization and legislation
- Collaboration within the health and non-health sectors
- Integrated approach to disease control
- Evidence-based decision-making
- Capacity building



Integrated vector control methods:

Environmental condition management

Environmental management is a modification or manipulation of environmental factors to prevent or minimize vector propagation and to reduce human-vector contact. This includes planning, organization, process and monitoring of all the activities involved. It also includes permanent or long-lasting physical transformation of land, water and vegetation to prevent, eliminate or reduce the breeding without causing undue adverse effects on the quality of human habitats. Recurrent activity should be planned so that temporary breeding conditions are made unfavourable for breeding of vectors.

Changes to human habitation or behaviour

- **Improved water supply:** Insufficient water supply during limited duration leading to water storage in various containers results in more breeding sites of mosquitoes. The proper supply of potable water will reduce storage practices and thus breeding as well.

- **Emptying water storage containers:** Water collection in flower pots, ant traps bird baths, pet's water bowls desert water coolers, refrigerators, air conditioners, drip trays etc. are also breeding sites for mosquitoes, therefore water collection in these should be cleaned, refilled after proper scrubbing cleaned once a week (weekly dry day).
- **Design of buildings:** Proper slope to prevent water stagnation at the rooftop, sunshades, porticos, gutters and flat roofs need to be ensured as stagnation of water is common in such areas which become breeding sites for mosquitoes.
- Proper drainage system, filling for elimination of water logged areas, minor engineering methods like construction of pucca drains, construction of soakage pits, filling up of unused wells will prevent water logging and thus prevent mosquito breeding.
- **Mandatory water storage:** Fire prevention regulations may require mandatory water storage (petrol pumps, public entertainment & assembly, hospitals, hotels, underground shopping complexes, timber merchants) such storage tanks, overhead tanks/cisterns/underground reservoirs/wells should be properly covered with tight lids or using wire mesh to prevent mosquito breeding.
- **Solid waste disposal:** Solid waste like tins, bottles, buckets or any other waste material scattered around houses should be removed or be turned upside down, to prevent the accumulation of rain water and treated as per solid waste management rules, 2016. Improperly stored or discarded tyres can be stored under a roof, kept covered to prevent the collection of rainwater or oil can be applied which kills larvae present in accumulated rainwater in tyres.to prevent the collection of rainwater.
- **Personal protections:** These are one of the important components under IVM. Long sleeves and long trousers with stockings can reduce the risk of mosquito biting. House hold insecticidal products such as mats, mosquito coils, liquid vaporizers and aerosols can be used. Repellents are used as topical application on exposed body parts, these are useful for plantation workers, army people, labours, etc.

Chemical control

It is considered as the most important component where water has to be conserved or stored because of scarcity of water. Chemicals have been used to control vector borne diseases by attacking both larvae and adults of the vector species.

A. Larvicides

Larval control measures are simple to carry out, effective and inexpensive. Important larval control measures are emptying and cleaning of all water containers in village weekly along with adult control measures will virtually eliminate all mosquitoes in the village.

In larval survey, house to house information is collected. The basic sampling unit is house or premise, which is systematically searched for water holding containers. Containers are examined for the presence of mosquito larvae.

Larvicides are used at an interval of week/fortnight to avoid emergence of adults because mosquito vector requires 7-14 days for its completion of life cycle depending on the temperature.

- Temephos is an organophosphorus compound with least mammalian toxicity. It is recommended to apply in stored water contaminated with Larvae. Imposing larvicide (Temephos or BTI) in water containers is called abating. These are recommended in permanent big water containers, where water has to be conserved or stored because of

scarcity or irregular & unreliable supply. Use of Temephos in the dose of 1ppm (1 mg per litre of water) is recommended.

- Insect Growth Regulators have extremely low mammalian toxicity. Two compounds i.e., pyriproxyfen (0.5%) granular and diflubenzuron (25%) Weightable Powder (WP) are recommended.
- Larvicides used under NVBDCP programme are:
  - Temephos (Abate) 50% EC for potable water.
  - Fenthion (Baytex) 82.5% W/V for polluted water.
  - Mosquito Larvicide Oil (MLO) for polluted stagnant water.

Calculate larval indices

Larval indices are calculated based on the information collected during house-to-house survey. This will help to know the impact of control measures

House Index: Percentage of houses positive for larvae of Aedes egypti.

$$\frac{\text{No. of houses with at least one container showing larval breeding}}{\text{Total number of houses examined}} \times 100$$

Container index: Percentage of containers positive for larval breeding.

$$\frac{\text{No. of containers with larval breeding}}{\text{Total number of containers examined}} \times 100$$

Breteau index: Number of positive containers for larval per 100 houses.

$$\frac{\text{Number of containers positive for larval}}{\text{Number of houses examined}} \times 100$$

Dosage and formulation of different larvicides (NVBDCP)

Sl. No	Name of larvicide	Class of insecticide	Commercial formulation	Preparation of ready to spray formulation	Dosage of suspension made for per			Frequency of application	Equipment required
					One sq. mtr.	**50 Linear mtr.**	**Hectare**		
1	MLO		100% Petroleum product	As it is	20 c.c.	1 litre	200 litres	Weekly	**Mopand bucket**
2	Temephos (EC)	Organophosphate	50%EC	2.5ccin10litres of potable water	20 c.c.	1 litre	200 litres	-Do-	**Knapsack/ Hand compression Sprayer**
	Diflubenz	Insect	25%	100 gms. (25gma.i.) in100 litres of water (10 g in			100 litres	Weekly	**Knapsack/ Hand compression Sprayer**

3	uron 25% WP	Growth Regulator	Wettable powder	10 litres)	-	-			
				200 gms (50gma.i.) in100 litres of water (20 g in 10 litres)			100 litres	Weekly	**Knapsack/ Hand compression Sprayer**
4	Pyriproxyfen GR	Insect Growth Regulator	0.5% Granular	Ready-to-use	-	-	2 kg **4 kg**	3 Weekly	**Manual**

B. Adulticides

Adulticides are applied either as residual surface treatments or as space treatments. The ***insecticide treated bed nets*** (ITNs), insecticide treated curtains and ***long-lasting insecticidal nets*** (LLINs) provide better and effective protection by keeping away mosquitoes as well as killing them. Thus, they are important tools to reduce the risk of indoor transmission. LLINs are mosquito nets which have the insecticide incorporated in their fibre, so these remain effective for as many as 20 washes.

The insecticide treated nets (ITNs) have limited utility in dengue control programme, since the vector species bites during the day but have maximum sustainability and effectiveness against malaria.

Insecticidal Residual Spray (IRS) is done in following situation:

- Areas with API more than 2.
- Focal spray: On detection of death case/outbreak of malaria, focal spray of 50 houses around the positive case is carried out.

It is one of the most cost-effective control measures for malaria and kala-azar in India. Its success depends on the planning and implementation. The objective of IRS is to ensure safe and standardized application (uniform and complete) of a residual insecticide on indoor surfaces of all houses and animal shelters selected in targeted areas so as to obtain a significant reduction in vector populations, and consequently a considerable reduction of disease transmission.

It is being carried out in selected villages during transmission season every year. Due to development of resistance in vector species in Maharashtra against DDT & Malathion, only synthetic Pyrethroids are used for IRS as below

Following chemicals are used for control of mosquito density.

- Deltamethrin 2.5% wp,
- Cyfluthrin 10% wp,
- Lambda Cyhalothrin 10% wp
- Alphacypermethrin 5% wp

Spraying

- All food, cooking utensils, bedding and clothes must be protected from the insecticide by taking them outside the house before spraying starts.

- The barrel of the stirrup pump remains dipped in the bucket containing the spray suspension. One man operates the pump and the other man sprays.
- Spray is done from roof to floor, using downward motion, to complete one swath then stepping sideways and spraying upwards from floor to roof. The spray should not drip to the floor. Spraying is done only on inner surfaces, including eaves and roofs. It takes about 5 minutes to spray a house with an average surface are of 50sq.meters.



1



2



3



4

Dosages for IRS

No.	Insecticide	Preparation of suspension in water	Dosage per q. meter of active ingredient	Residual effect in weeks	Area to be covered by 10 litres of suspension
1	**Deltamethrin 2.5% wp**	**400 gm / 10 litres**	**20 mg**	**10-12**	**500 sq. m.**
2	**Cyfluthrin 10% wp**	**125 gm / 10 litres**	**25 mg**	**10-12**	**500 sq. m.**
3	**Lambda Cyhalothrin 10% wp**	**125 gm / 10 litres**	**25 mg**	**10-12**	**500 sq. m.**
4	**Alphacypermethrin 5% wp**	**250 gm / 10 litres**	**25 mg**	**10-12**	**500 sq. m.**

Outdoor fogging

Fogging (**Aerosol space spray**) by knock down insecticide is effective. Weekly fogging by using pyrethrum for two days along with emptying and cleaning of all water collections leads to immediate decline in mosquito population.

An **outdoo**r spray technically a fog is liquid insecticide dispersed into the air in the form of hundreds of millions of tiny droplets It is only effective while the droplets remain air borne. **Indoor** space spray is recommended for control only in emergency situations to suppress an ongoing epidemic or to prevent an incipient one. The objective of space spray is the massive, rapid destruction of the adult vector population. Any control method that reduces the number of infective adult mosquitoes, even for a short time should reduce virus transmission during that time. Two rounds of indoor fogging with pyrethrum extract with 8 to 10 days interval. Fogging should be done between 8 to 10 AM & 3 to 5 PM.

Biological control

Biological control agents are effective against the larval stages of mosquitoes and they should be used in a sufficiently large number. Usually, the indigenous species should be given priority.

Larvivorous fish

The *Gambusia affinis* fish (Western Mosquito Fish) is a voracious feeder of mosquito larvae and if introduced in sufficient numbers in pools, ponds and marshes, it can consume large quantities of mosquito larvae and pupae. Another larvivorous fish commonly used for mosquito control is the *Poecilia reticulata* (Guppy Fish).



Western Mosquito Fish



Guppy Fish

Larvivorous fish are effective biological control agents and are now being used increasingly since last few years. This is environment friendly, effective and most economical among all other vector control methods. The fish once released in breeding sites multiply on their own and take care of breeding sites.

Gambusia fish is very hardy fish, can survive in all types of water bodies but does not tolerate very high organic pollution. Life span of Gambusia fish is 4 + 1 Years.

Single full-grown eats about 100 to 300 mosquito larvae per day. Itis a surface feeder, hence, it is suitable for feeding on both anophelines and culicines. It frequently occurs along the margins of the water containers, ponds or other ground water collections, except where there is dense vegetation at the margins of the water body.

Guppy fish is also an exotic fish which is easy to care for and it reproduces quickly and prolifically. A single fish eats about 80 to 100 mosquito larvae in 24 hours. It is a surface feeder. It is now widely distributed in India and is an important larvivorous fish. About 50 to 200 young ones are released by the female every four weeks.

Bacteria

Bacterial larvicides **(BL)** include products based on the insecticidal crystal proteins produced by *Bacillus thuringiensis* var. *israelensis* **(*Bti*)** and *Bacillus sphaericus* **(*Bs*).** Upon ingestion by mosquito larvae, these proteins are modified by enzymes in the larval midgut and then bind

with specific receptors on the midgut epithelium, resulting in spore formation and interruption of feeding and homeostasis.

Frequency of re-treatment with bacterial larvicides can range from 1 to 4 weeks for Anopheles depending on formulation, habitat, temperature, and species. Typical re-treatment intervals with Bti are 7–10 days.

Integrated Vector Management (IVM) in different situations

Malaria outbreaks need to be prevented because besides mortality, these inflict significant financial losses as well as time. In epidemic prone areas, it is essential that a close collaboration be established between the specialized anti-malarial services and the emergency preparedness teams. The specialized anti-malarial services can then assist in the identification of epidemic prone areas, the main risk factors, alarm signals, monitoring of risk factors, planning, implementation and evaluation of prevention or control measures. Measures for epidemic prevention and control can be implemented effectively by inter agency co- ordination, with well-trained personnel, with adequate supplies and equipment. The actions suggested are:

- Interrupt the transmission by undertaking Indoor Residual Spray (IRS) with suitable insecticide. If regular spraying is not possible, focal spraying may be carried out.
- Intensify IEC to increase awareness about malaria, its control, motivate community to adopt preventive measures like mosquito repellent creams, liquids, coils, mats etc, Screening of the houses with wire mesh, Use of bednets treated with insecticide, wearing clothes that cover maximum surface area of the body for vector control and to protect themselves from mosquito bite.
- Sensitizing and involving the community for detection of breeding places and their elimination, Create awareness among the community through various activities like padyatra, Gram sabha, prabhatpheri, workshop, training, Newspaper, handbills in local languages, wall painting, Akashwani, Doordarshan cable, T.V., gingles , etc. Celebration of World Malaria Day (25April), National Dengue Day (16May) NGO schemes involving them in programme strategies.
- In case of water logging, district administration may be approached to ensure drainage of the area immediately, taking help of concerned departments, since water standing beyond 7 to 10 days is likely to provide vector mosquito breeding.
- Close entomological monitoring may be done to assess the impact of intervention measures and vector bionomics (e.g., density, resting, feeding, breeding etc.). Daily



assessment through Integrated Health Information Platform (IHIP). Feedback to states on field observations for correction actions.

Important aspects for anti larval measures at PHC

- List all breeding places in PHC area: Plan survey of the breeding places of PHC during the months of May & October. As May is the hottest month in the state with water scarcity at its peak, breeding places found in May usually remain as active breeding places throughout year. Such breeding places are called "permanent breeding places".
- Give code number to all the permanent breeding places in PHC as described above. Fix responsibility of destroying permanent breeding places to specific HA (M) or MPW (M).
- Draining of water towards slope by digging the pitch or refilling water collection by stones, bricks etc till breeding place is drained and dried.
- If draining of water or refilling is not possible then release guppy fish in the water. Month and monthly thereafter. If number of guppy fish in the breeding place is reducing, release guppy fish again or contact DMO for alternative strategy like use of Temephos or biocides.
- Number of breeding places will start increasing as monsoon starts.

Summary of responsibilities of health staff for vector control

Sr.	Activity	Responsibility of PHC staff	
		Designation	**Responsibility**
1	Identification of breeding places, numbering and eliminating	MPW (M)	Identification of breeding places from area. Permanent breeding places should be identified on priority. Eliminating the breeding filling, guppy fish release or place by draining of water, other larvicide measures.
		HA (M)	Numbering the breeding places Advising about eliminating the breeding place.
2	Hatchery formation, maintenance and release of Guppy fish.	MPW (M)	Identification of suitable place for hatchery, formation of hatchery and maintenance of hatcher. Release of guppy fish to breeding places.
		HA (M)	Numbering the hatchery, regular supervision to inspect the hatchery. Coordination for breeding place elimination

Control measures for JE

- The preventive measures are directed at reducing the vector density and in taking personal protection against mosquito bites using insecticide treated mosquito nets. The

reduction in mosquito breeding requires eco-management, as the role of insecticides is limited.

- JE vaccine is produced in limited quantities at the Central Research Institute, Kasauli. Three doses of the vaccine provide immunity lasting a few years. The vaccine is procured directly by the state health authorities. Vaccination is not recommended as an outbreak control measure as it takes at least one month after second dose to develop antibodies at protective levels and the outbreaks are usually short lived.
- Isolation or destruction of the amplifying hosts (usually pigs), which are the main source of infection, is not practical as these animals do not show any overt signs of illness and it is not possible to identify infected animals.
- On confirmation of an outbreak of JE, take precautionary measures in other potentially high-risk pockets in the district.
- Isolation of patients and disinfection of secretions and excretions are not required, as JE virus is not transmitted from person to person.

Control of sandflies in Kala Azar

Sandflies are easily controlled because they do not move long distance from the place of their breeding.

- Insecticides: Spraying should be done in the human dwellings, cattle sheds and other places.
- Sanitation: Sanitation measures such as removal of shrubs and vegetation within 50 yards of human dwellings, filling up cracks and crevices in walls and floors, and location of cattle sheds and poultry houses at a fair distance from human habitations should receive attention.

Prevention & control approach of CHP is based on epidemiological principles of source reduction, interruption of transmission and protection of susceptible population. These approaches are supplemented by IEC activities, community participation, inter-sectoral co-ordination and training of field staff for improved case management.

- **Source Reduction:** Control of Sandflies
- Notification of Cases
- Interruption of transmission with vector control & eco-friendly measures.
- IEC activities using message to the community.

Community Participation in notification of cases and referrals, spray and support to rehabilitation activities.

Important aspects for anti larval measures at PHC:

Anti larval measures in PHC should be carried out as follows:

- The water collections where mosquitoes lay eggs are called breeding places.
- List all breeding places in PHC area: Plan survey of the breeding places of PHC during the months of May &October. As May is the hottest month in the state with water scarcity at its peak, breeding places found in May usually remain as active breeding places throughout year. Such breeding places are called “permanent breeding places”.
- Give code number to all the permanent breeding places in PHC as described above. Fix responsibility of destroying permanent breeding places to specific HA (M) or MPW (M).
- Steps for eliminating permanent breeding places:

- Draining of water towards slope by digging the pitch or refilling water collection by stones, bricks etc. This method is expensive. Inform Gram Panchayat about hazards of breeding place in writing and follow till breeding place is drained and dried.
- If draining of water or refilling is not possible then release guppy fish in the water. Release 6-10 guppy fish per linear meter. If frogs are present in water collection, double the number of guppy fish. Observe the sustainability of fish every week for one month and monthly thereafter. If number of guppy fish in the breeding place is reducing, release guppy fish again.
- If repeated release of guppy fish is not successful, make separate list of such permanent breeding places. Contact DMO for alternative strategy like use of Temephos or biocides.
- Number of breeding places will start increasing as monsoon starts. MPW must survey for appearance of new breeding places during fortnightly home visit and release guppy fish in new water collections.
- Release of guppy fish in water collections is a very effective and inexpensive method. MO PHC needs guppy fish in sufficient quantity to release in all breeding places in PHC area. There should be at least one guppy fish hatchery for each sub centre.

Anti adult measures: Indoor Residual Spraying

Residual spraying is being used for control of vector-borne diseases since inception of the malaria control programme. Insecticide is sprayed on walls, roof, corners, etc. of houses. Peculiar habit of Anopheles mosquito to rest on wall after blood meal is used for the strategy of indoor spray. Insecticides have residual effect. Mosquitoes having bite on an infective person will rest in the house, will pick up sufficient insecticide particles sprayed on the walls, other indoor surfaces and its longevity will be reduced so much so that it does not survive to become infective. It is extremely important to plan insecticide-spraying programme systematically and to supervise by MO. HA and MPW (M) of concerned area should remain present throughout spraying and MO should visit village being sprayed, at least for half hour daily for supervision.

Indication for spraying

- Spraying is done in following situation:
- Areas with API more than 2.
- Focal spray: On detection of death case/outbreak of malaria, focal spray of 50 houses around the positive case is carried out.
- DMO identifies areas and prepares plan of spraying. Information about village selected for spraying from PHC, spraying schedule, name of insecticides, total quantity required etc will be communicated by DMO well in advance. Detailed guidelines for dilution of insecticide, method of spray etc. will also be communicated. MO must read guidelines carefully before supervision of spraying.
- Target area: MO should ensure that, following areas are covered during spraying:
  - All the interior walls & ceilings of permanent human dwellings
  - Field huts where people sleep during planting or harvesting season.
  - Underside of furniture, back of doors, outside porch
  - Cattle sheds should not be sprayed. This will conserve insecticide & improve coverage of human dwellings. This prevents diversion of mosquitoes from sprayed cattle shades to human dwelling.
- Insecticides used: Due to development of resistance in vector species in Maharashtra against DDT &Malathion, only synthetic pyrethroids are used for IRS as below:

- Deltamethrin 2.5% wp
- Cyfluthrin 10% wp
- Lambda Cyhalothrin 10% wp
- Alphacypermethrin 5% wp

Planning of spraying

Following actions should be taken by MO

Storage of insecticide

Insecticide to be used for residual spray will be supplied by DMO office to PHC. Insecticide is very costly. It is the responsibility of MO to store the insecticide at safe place.

- Storing site should be away from food, children and animals.
- Insecticide should not be exposed to sunlight, rains or high temperature & should be stored in well-ventilated room.
- Empty container should be disposed of by deep burying or burning so that they are not used for storing food material or for other household purpose by any body.

Propaganda of the spraying

This is the key activity to be implemented by PHC related to insecticide spraying. Inform Gram panchayat in writing. Organize Gram Sabha for cooperation of community in spraying operation. This is essential to increase coverage of spraying.MO must attend the Gram Sabha. This should be followed by house-to-house visit by MPW and HA communicating about presence of at least one responsible member of family on the day of spraying and co-operate the squad for 100% coverage.

Supervising the spraying

All houses should be informed one day before spraying and again at least half hour before arrival of spraying squad, so that food grains, food stuff, water are covered properly. Spraying squad should provide plastic sheet to household at least 15minutes before arrival for covering household articles.

Important aspects of supervision

- Check that spray suspension is prepared just before the start of the spray operations every day.
- Check whether insecticide is diluted as per the guidelines. The procedure for the preparation of suspension is same irrespective of the insecticide used. However, the quantity of insecticide used for 10 litres will vary as per the insecticide.
- Observe method of preparation of suspension: See that required quantity of the insecticide is measured with aplastic mug & poured into 15-litre bucket. A paste is made with the small quantity of water. Remaining water is poured slowly into the bucket & mixture is stirred properly to get uniform suspension. The suspension is then poured into another bucket through a cloth sieve to remove any particulate matter that may clog the nozzle of the spray pump.
- Observe actual spraying: Check that the spray lance should kept 45 cm. (18 inches) away from the wall surface & nearly at 90 degrees to wall. The swath should be parallel. Spray is applied in vertical swath of 53 cm (21 inches) wide. Successive swaths should overlap by 7.5 cm (3inches). Spray is done from roof to floor, using downward motion to complete one swath, then stepping sideways & spraying upwards from floor to roof. Spray nozzle should not be directed against wind direction.

- Randomly examine discharge rate of few spray pumps: Discharge rate should be 750 to 850 ml per minute. To get this discharge rate pump man should give 20-26 strokes per minute with 10 - 15 cm. plunger movement at a pressure of 10 PSI at the nozzle tip. Check the discharge rate by asking spray man to spray in a bucket for one minute & measuring the quantity in a graduated mug whether the discharge rate is 750 - 850 ml/min. Nozzle tip should be discarded if discharge rate is more than 850 ml per min.
- See that spraying workers do not leave any room or part of room, without spraying.
- Spraying register is provided by DMO office to the spraying squad. Check register whether all columns are filled and information is correct.
- Supervisor will put stencil mark on the door of house indicating spraying status of house. Check whether stencilling is done as per the actual coverage of spraying. It takes about 5 minutes to spray a house with surface area of 150 square meters.
- Verify the quality & coverage of spray randomly. A good quality spray should give uniform deposits on walls &other sprayable surfaces. Deposits of synthetic pyrethroids are visible on wooden structures.
- MPW should remain present throughout the spraying activity and should prepare abstract of daily spraying report indicating insecticide used, number of houses sprayed, coverage etc and submit to MO.
- Observe spraying worker for:
  - Safe handling of insecticides – Use of gloves, masks while spraying. Thorough bathing and change of clothes after daily spraying are finished.
  - Spraying worker should not smoke or drink during spraying.
  - Avoid exposure to skin, eyes and face.
  - In case of accidental exposure of the eyes or skin, eyes should be flushed with clean water for 5 minutes& skin should be washed with clean water & soap.

Personal protection methods

Impregnated bed nets

Bed nets are impregnated with residual insecticides e.g. Synthetic pyrethroids like Deltamethrin, Cyfluthrin and are supplied in high risk and tribal areas. When mosquitoes are attracted towards man to get blood meal, they come in contact with insecticide impregnated bed net resulting in shortening of life span. Thus, impregnated bet nets provide personal protection from mosquito bites and at the same time expose mosquitoes to insecticides. Nylon nets are preferred over cotton nets because they are durable, quicker in drying after impregnation and insecticide stays longer on the surface of the nylon fibre.

Procedure for impregnating bed net with insecticide

- Measure length, breadth and height of bed net in meters.
- Calculate total surface area of net with help of equation given below:
  2 (length + breadth) × height + (length × breadth) = totalizator.
- Calculate dose of insecticide to be used. Two types of synthetic pyrethroid insecticides are in use. The doses are Deltamethrin - 25 mg per square meter and Cyfluthrin -50 mg per square meter.
- Take required quantity of water in bucket. Quantity of water should be such that, bed net should be soaked but water should not drip from net. Mix calculated quantity of insecticide in water and stir to make uniform solution.
- Dip bed net in the prepared solution. See that the solution gets applied to all parts of bed net. Keep this impregnated bed net on plastic sheet till it is half dried & then hang it in

the shade for complete drying. Do not hang bed net immediately after dipping otherwise water along with insecticide will drop from the bednet.

Important messages to be given to family

- All the family members should sleep in the bed net.
- Bed nets should be used daily, seven days a week.
- Bed nets have residual efficacy for six months. Do not wash bed nets for six months, as washing will lose the insecticide impregnation.

Precautions to be taken while impregnating bed net

- Persons impregnating net should wear rubber gloves.
- Avoid contamination of skin, eyes, mouth etc.
- If skin, eyes, mouth gets contaminated; wash with plenty of water and soap.

Table: Deltamethrin dose for bed nets impregnation

Type	Bed net	Approximate area	Approximate water requirement	Deltamethrin dose
Cotton Bednet	Single	10 sq. meter	2 lit	10 ml
	Double	15 sq. meter	3 lit	15 ml
Nylon Bednet	Single	10 sq. meter	750 ml	10 ml
	Double	15 sq. meter	1250 ml	15 ml

Summary of responsibilities of health staff for vector control

Sr.	Activity	Responsibility of PHC staff	
		Designation	**Responsibility**
1	Identification of breeding places, numbering and eliminating	MPW (M)	Identification of breeding places from area. Permanent breeding places should be identified on priority. Eliminating the breeding filling, guppy fish release or place by draining of water, other larvicide measures.
		HA (M)	Numbering the breeding places Advising about eliminating the breeding place.
2	Hatchery formation, maintenance and release of Guppy fish.	MPW (M)	Identification of suitable place for hatchery, formation of hatchery and maintenance of hatcher. Release of guppy fish to breeding places.
		HA (M)	Numbering the hatchery, regular supervision to inspect the hatchery. Coordination for breeding place elimination

6.5.8 Control of Outbreaks of Vector Borne Diseases

All important vector-borne diseases present with the common symptom of fever. It is most important to have clinical diagnosis of fever cases and confirmation whether cases are in excess than expected.

Characteristics of vector-borne diseases outbreak

- Disease is geographically distributed to the areas where vector is present
- Seasonal variation corresponds to the growth and density of vector species.
- Epidemic declines with decrease in vector species.
- Parasite / virus can be controlled by controlling the vector.
- Outbreak can be controlled by actions against the vector.
- All the important vector-borne diseases manifest as fever

Common causes for fever outbreak:

- Malaria
- Dengue fever/Dengue Haemorrhagic fever
- Chikungunya
- Japanese Encephalitis
- Influenza or any other acute viral fever
- Typhoid fever: This has been covered in the chapter on water-borne diseases.

Important steps for control of fever outbreak

Confirmation of outbreak

Malaria shows clear seasonal variation. The incidence increases during & following the monsoon rains. This variation should not be labelled as an outbreak. The incidence should be compared with the same period of last year to demonstrate clear increase.

- Keep watch on high risk areas e.g.
  - Arrival on block of non-immune population into a malaria endemic area e.g irrigation projects, sugar factoryworkers etc.
  - Mixture of large numbers of immune & non-immune population living in primitive condition.
  - Increase in breeding & density of mosquitoes.
- To define normal occurrence, plot the median or merely number of malaria cases for every calendar month for previous years.
- The third quartile of malaria incidence every calendar month of previous years is the normal range. Compare this with the current data & if it is clearly abnormal increase, label it as epidemic.
- To know the trend, plot the month wise malaria incidence for last two years & compare with this year. MO should analyse the data from village wise register of PHC (MF-9) for timely detection of outbreak.
- Other sources of information for early identification are
  - Increase in fever rate reaching to one third or more of new OPD cases in PHC.
  - Rise in malaria positivity rate in laboratory examination
  - Rising fever incidence reported by ASHA/ MPW, community leaders, press, panchayat members or private practitioners from the area.

Reporting of outbreak to DHO

- If number of fever cases is in excess than expected, inform DHO about outbreak by fastest means.

- Reporting should include name of village affected, number of cases and deaths, probable cause of fever, prominent symptoms, results of PBS examination if available, control measures started and any assistance required.
- If you have difficulty in diagnosis of the fever outbreak, request DHO to send Rapid Response Team from district level.

Fever survey of affected population

- Rapid fever survey: In case of an outbreak, every village in the suspected epidemic zone is covered in a short duration by deploying additional manpower. House to house visits are undertaken & all fever cases are screened by taking blood smears. These blood smears are to be examined at the earliest by establishing temporary field laboratory at the village level. Peripheral blood smears of all the fever cases should be collected by rapid survey. Depute one health worker for 1000 population. Complete the survey within 2 days.
- Divide the village among health workers. One MPW should survey at least 500 population in one day. If village has large population and cannot be covered by PHC staff within two days, request Taluka Health Officer to depute more staff from nearby PHCs.
- During fever survey ensure that all age groups are covered with special attention to children, pregnant women, migrants & investigate death case to confirm the cause of death.

Laboratory investigations during epidemic

- Simultaneously arrange for immediate examination of PBS. Establish laboratory to check PBS for malarial parasite in village itself. If less than 100 fever cases are expected, arrange PBS examination in nearby laboratory. If more than 100 cases are expected, shift the laboratory to affected village. If more than 150 fever cases are expected, request DMO for additional laboratory scientific officer.
- It is extremely important to examine all PBS on same day and get the results. Test all the PBS on same day evening. Laboratory scientific officer should start staining in after noon and should not leave the village till all the slides of that day are finished and result is communicated to MO.
- In case of positive PBS, Radical Treatment should be immediately given to patient after getting the results.
- When malaria is ruled out & you suspect cause of epidemics viral fever, serum samples of patients should be collected for diagnosis of viral fever.
- Collect sample from the cases within 3 days from onset for viral isolation. For serology collect sample after five days of starting disease. This is required to detect IgM antibodies, as at least five days are needed for formation of IgM antibodies. Collect second sample of same patient (paired sera) ten days after first sample for detection of rising titre.
- Collect 5 ml blood sample from the cases, separate serum and send to National Institute of Virology, Pune. Send the particulars of patient along with sample such as name, age, sex, address, presenting symptoms, date of onset of symptoms and condition at the time of blood sample collection to laboratory.
- Collect samples of 5% patients & maximum up to 10.
- At least ten days are required to get the results of serum sample. Do not wait for results of serum samples to start control measures. Start control measures on the basis of clinical diagnosis, result of PBS examination for MP and presence of Aedes mosquito larvae in village.

Entomological investigation

Entomological investigations should be carried out in vector-borne disease outbreaks, as they are useful to confirm or rule out the probable cause of the outbreak and also to implement the control measures.

Trained entomological assistants are available at DMO office. Contact DMO for entomological investigations.

Mosquitoes should be collected with the help of insect collector and transported to NIV Pune, contact DMO or DHO so that for this activity you will get help from them.

- If PBS is negative for malaria parasite, look for breeding of Aedes aegypti in small water collections like earthen pots, household cement tanks, flower vessels, cracked bottles, tyres, coconut shells, etc.
- If the outbreak is during monsoon season, examine water collection in small containers like broken bottles, coconut shells, old tyres on roof tops, garbage etc. for Aedes breeding.
- For outbreaks occurring in summer season, examine water storage containers, particularly half buried earthen pots, cement tanks and pots kept in cool dry place. Aedes larvae are never seen in drinking water containers as these containers are daily cleaned and fresh water is stored.
- Collect the larvae with some water in transparent glass. Allow the water to settle and observe the larvae on the surface of water. Disturb the water surface with small stick; Aedes larvae will go down by angular jerking movements.
- Use the format given below for larval survey.

Table: Form for larval survey during fever outbreak

Name of village_____

PHC_____

M No	Name of head of family	Water containers examined								Total	
		Earthen pots (Ranjan)		Cement tanks		Discarded material		Other containers			
		No. examined	Breeding +	No. examined	Breeding +	No. examined	Breeding +	No. examined	Breeding +	No. examined	Breeding +

Treatment of the cases

Malaria

- If you find PBS positive for malarial parasite in case off ever outbreak and if number is more than expected, consider the outbreak as of malaria.
- Administer Condensed Radical Treatment (CRT) to all fever cases without waiting for the result of PBS. Details are given in the chapter on Malaria.
- Dengue fever

- If all the PBS are negative for malaria parasite and there is breeding of Aedes mosquitoes in the village then suspect dengue fever.
- Collect 5 ml blood sample from the cases, separate serum and send to National Institute of Virology, Pune.
- Management of DF is symptomatic and supportive.
  - Bed rest is advised.
  - Antipyretics or sponging is required.
  - Never give salicylates (Aspirin), as they may cause bleeding in patients.
  - Home available fluids or ORS should be given for patients with excessive sweating, vomiting or diarrhoea.

Dengue Haemorrhagic Fever

- Management during febrile phase is same as above.
- IV fluid replacement by using DNS, Ringers lactate in the dose of 10-20 ml/kg/hr
- Blood transfusion is required in case of profound shock. Therefore, patient should be referred to such a place where this facility is available. While referring the patient continue the IV line, send ANM or HA (F) along with the patient.

Final reporting

Final report should be submitted to DHO within ten days in prescribed format after epidemic is over.

Investigation and control of Japanese Encephalitis outbreak

Confirmation of outbreak

- If a patient with high-grade fever, altered sensorium and/or convulsions is brought to PHC or reported, first examine PBS to rule out cerebral malaria.
- Examine the neurological signs. Asymmetrical neurological signs strongly suggest JE.
- Primary health centres do not have facility to treat JE. Immediately refer the patient to Sub District or District hospital where Medical ICU facility is available.

Investigation of JE outbreak

- Start active surveillance in affected village and surrounding villages. Survey high-risk pockets on priority (places where piggeries are commercially established). JE cases are scattered. You will not get more than 1-2 cases in one village.
- Investigation of JE outbreak is similar to other epidemic prone diseases. First principle is to confirm diagnosis and to take prompt measures for control of the outbreak.
- Line list of cases, including age, sex and address should be maintained. Active search should be made for more cases. Serum samples should be collected for laboratory confirmation of diagnosis.
- Vector surveillance should be immediately initiated and should include collection of adult mosquitoes, identification of mosquito species and assessing density and susceptibility of vectors to available insecticides with the help of DMO.
- Isolation of patients and disinfection of secretions and excretions are not required, as JE virus is not transmitted from person to person.
- After the outbreak is over, a detailed report of the outbreak must be submitted to DHO.

District level action plan for NVBDCP- (Refer Annexure 6.8 (Vol. II)).

6.5.9 Other Important Vector Borne Diseases

Zika virus

Zika Virus Disease

What is Zika Virus disease (Zika)?

Zika is a disease caused by Zika virus that is spread to people primarily through the bite of an infected Aedes species mosquito. The most common symptoms of Zika are fever, rash, joint pain, and conjunctivitis (red eyes). The illness is usually mild with symptoms lasting for several days to a week.

What are the symptoms of Zika?

About one in five people infected with Zika will get sick. For people who get sick, the illness is usually mild. For this reason, many people might not realize they have been infected.
The most common symptoms of Zika virus disease are fever, rash, joint pain, or conjunctivitis (red eyes). Symptoms typically begin 2 to 7 days after being bitten by an infected mosquito.

How is Zika transmitted?

Zika is primarily transmitted through the bite of infected Aedes mosquitoes. It can also be transmitted from a pregnant mother to her baby during pregnancy or around the time of birth. We do not know how often Zika is transmitted from mother to baby during pregnancy or around the time of birth.

Who is at risk of being infected?

Anyone who is living in or traveling to an area where Zika virus is found who has not already been infected with Zika virus is at risk for infection, including pregnant women

What is the treatment for Zika?

- There is no vaccine or specific medicine to treat Zika virus infections.
- Treat the symptoms:
- Get plenty of rest.
- Drink fluids to prevent dehydration.
- Take medicines such as acetaminophen or paracetamol to reduce fever and pain.
- Do not take aspirin or other non-steroidal anti-inflammatory drugs.
- If you are taking medicine for another medical condition, talk to your healthcare provider before taking additional medication.

How is Zika diagnosed?

- See your healthcare provider if you develop symptoms (fever, rash, joint pain, red eyes). If you have recently travelled, tell your healthcare provider.
- Your healthcare provider may order blood tests to look for Zika or other similar viral diseases like dengue or chikungunya.

What should I do if I have Zika?

- Treat the symptoms.
- Get plenty of rest.
- Drink fluids to prevent dehydration.
- Take medicines such as acetaminophen or paracetamol to reduce fever and pain.
- Do not take aspirin or another non-steroidal anti-inflammatory drug.

During the first week of infection, Zika virus can be found in the blood and passed from an infected person to another mosquito through mosquito bites. An infected mosquito can then spread the virus to other people. To help prevent others from getting sick, avoid mosquito bites during the first week of illness. See your healthcare provider if you are pregnant and develop a fever, rash, joint pain, or red eyes within 2 weeks after traveling to a country where Zika virus cases have been reported. Be sure to tell your health care provider where you travelled.

- Women who are pregnant (in any trimester):
  - Consider postponing travel to any area where Zika virus transmission is ongoing.
  - If you must travel to one of these areas, talk to your doctor first and strictly follow steps to prevent mosquito bites during your trip.
- Women who are trying to become pregnant:
  - Before you travel, talk to your doctor about your plans to become pregnant and the risk of Zika virus infection.
- Strictly follow steps to prevent mosquito bites during your trip.

Does Zika virus infection cause Guillain-Barre syndrome (GBS)?

Guillain-Barre syndrome (GBS) is a rare disorder where a person's own immune system damages the nerve cells, causing muscle weakness and sometimes, paralysis. These symptoms can last a few weeks or several months. While most people fully recover from GBS, some people have permanent damage and in rare cases, people have died.

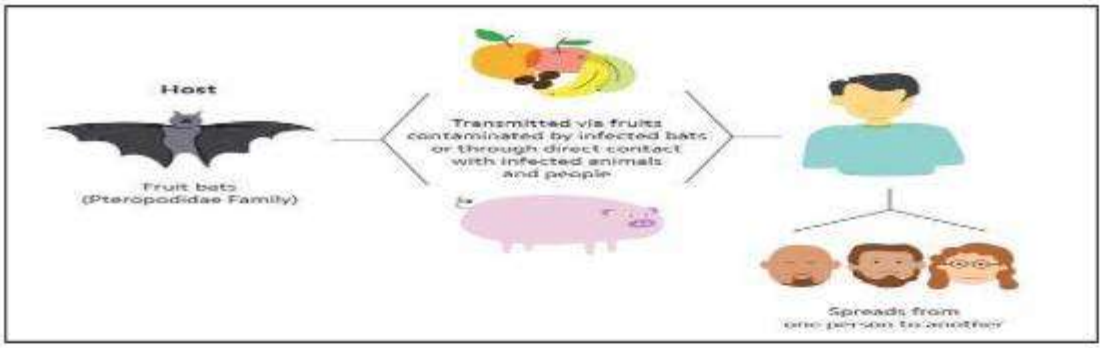
Nipah virus

What is Nipah virus?

According to the World Health Organisation (WHO), Nipah virus (NiV) is one of the "newly emerging zoonosis" (a disease that can spread from animals to humans) that can affect both humans and animals. This is a highly contagious and deadly virus for which there is currently no vaccine and treatment for humans, as well as animals.

Apart from animal to human and human to animal transmission of this virus, human to human transmission of this virus also occurs.

- The natural hosts of this virus are fruit bats who are symptomless carriers. And since fruit bats abound in South Asia, this infection occurs mostly in this region. Outbreaks of this virus have been reported from India, Bangladesh, Thailand, Cambodia, the Philippines, Laos, and Malaysia.
- The first outbreak of this disease occurs in Malaysia and Singapore in 1998. In this instance, pigs were the intermediate hosts who transmitted the virus to humans. In fact, the name Nipah comes from the village in Malaysia, where the person from whom the virus was first extracted and identified succumbed to the disease.
- Transmission of Nipah virus to humans may occur when one comes in direct contact with infected bats, infected pigs or infected people. The recent outbreak of Nipah virus in Kerala (May 2018), occurred when people consumed fruits bit by infected fruit bats. When bats carrying the virus bites into fruits, the virus enters the fruits and then infects the humans who consume it. Bats shed the virus in their excrement and secretions which can infect humans, as well as animals such as pigs, dogs, cows, etc who come into contact with the droppings.
- The Nipah virus is also suspected to get transmitted through coughing. This infection can also easily affect people who come in direct contact with contaminated bodies.



Symptoms of Nipah virus infection:

- NiV infection can progress silently in humans without showing any symptoms. However, people infected with this virus usually display influenza-like symptoms. Once a person is infected with Nipah virus, it usually takes five to 14 days for the symptoms of an infection to appear. The symptoms of Nipah virus infection include:
  - Acute respiratory infection, which can be mild to severe and cause interference in breathing
  - Fever
  - Muscle pain (myalgia)
  - Headaches
  - A sore throat
  - Nausea
  - Vomiting
  - Dizziness
  - Drowsiness
  - Mental confusion and disorientation
  - Atypical pneumonia
  - Brain swelling or fatal encephalitis
  - Gradual progression to coma within 24 to 48 hours.
  - People who survive the infection may suffer from long-term side effects such as convulsions and personality changes.

Diagnosis:

Nipah virus is diagnosed with a combination of tests such as:

- Throat and nasal swabs which are sent to the laboratory for testing
- Blood test
- Virus isolation and detection
- Cerebrospinal Fluid analysis
- Urine test

Treatment:

- Currently, there is no known treatment for Nipah virus. If any influenza-like symptoms appear, it would be wise to immediately consult a general physician, who may, in turn, refer you to an Infectious Disease Specialist, depending on the severity of your symptoms. The primary treatment is focused on managing the symptoms such as managing the fever and neurological symptoms if any.
- The only thing that can help a patient suffering from Nipah virus infection is intensive supportive care. The caretaker though needs to take precautions that the infection does not spread to him/her. Thus, whilst providing the necessary care and support, the

caretaker must take basic precautions like wearing a mask, cap, wearing gloves, and washing hands.

Symptoms:

- Fever within 3-14 days of contracting infection.
- Severe headache, disorientation, nausea, fainting, intense drowsiness.
- Stomach ache, fatigue, blurred vision, Respiratory discomfort.
- Above symptoms may lead to coma within 24-48 hrs.

Treatment:

- Nipah infection currently does not have a vaccine.
- Once contracted, intensive supportive care may help.

Nipah is know to have very high fatality rate.

Prevention is better than cure:

- Avoid coming in contact with an infected person, and wear mask if you must.
- Avoid food/beverages sourced from places inhabiting infected animals (toddy etc.)
- Wash hands, change clothes - maintain highest possible level of hygiene.

Rickettsial Diseases:

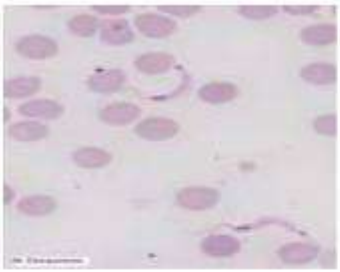
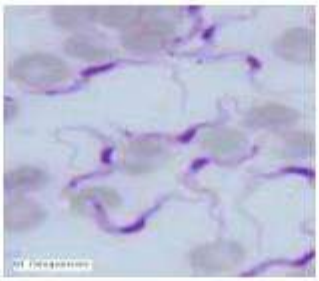
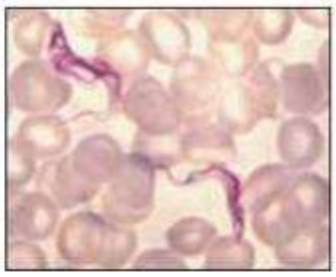
- Rickettsial diseases are infections that you can get from some tick bites.
- Ticks are tiny: Some are as small as a poppy seed. You may not even know you've been bitten by one, but the diseases they carry can make a big impact on your body.

Trypanosomiasis:

- The parasite are unicellular parasitic protozoa belonging to the Trypanosoma Genus of the Trypanosomatidae Class (Protozoa Kingdom). A large number of species and subspecies of trypanosomes have been described. Different species of trypanosomes infect a variety of different vertebrates, including animals and humans. Most species are transmitted by insects.
- Human African Trypanosomiasis or sleeping sickness. It is caused by two subspecies of Trypanosoma brucei brucei, namely Trypanosoma brucei gambiense and Trypanosoma brucei rhodesiense. Wild and domestic animals can host these parasites and may represent under particular conditions an important reservoir of infection for the tsetse flies.

Diagnosis:

- Trypanosomes are parasites living in blood, and can infect Human
- The 2 classical forms of the disease in Human are "sleeping sickness" in Africa, and "Chagas disease" in Latin America
- But Atypical human infections by animal trypanosomes were observed in Africa and Asia
- Trypanosomes can be observed in Giemsa stained blood smears at magnification X 400 or preferably x 1,000
- Trypanosome is an extra-cellular parasite, unicellular, and its morphology is characteristic including a plasma membrane, a nucleus, a kinetoplast and a flagellum.

Scrub Typhus

Scrub typhus or bush typhus is a form of typhus caused by the intracellular parasite Orientia tsutsugamushi, a Gram-negative α-proteobacterium of family Rickettsiaceae first isolated and identified in 1930 in Japan.

Transmission:

- Scrub typhus is transmitted by some species of trombiculid mites ("chiggers", particularly Leptotrombidium delicense), which are found in areas of heavy scrub vegetation.
- The bite of this mite leaves a characteristic black eschar that is useful to the doctor for making the diagnosis.

Clinical Features:

- Incubation Period: 1 to 3 wks. (usually 6 to 21 days.)
- Signs & symptoms:
- Fever (104 to 105 F) with chills
- Malaise.
- Conjunctival irritation.
- Maculopapular rash.
- Lymphadenopathy.
- Lymphocytosis.
- Headache, cough, myalgia.
- GIT symptoms.

(Typical Eschar Formation "5th day" of illness)



Scrub typhus
axillary eschar

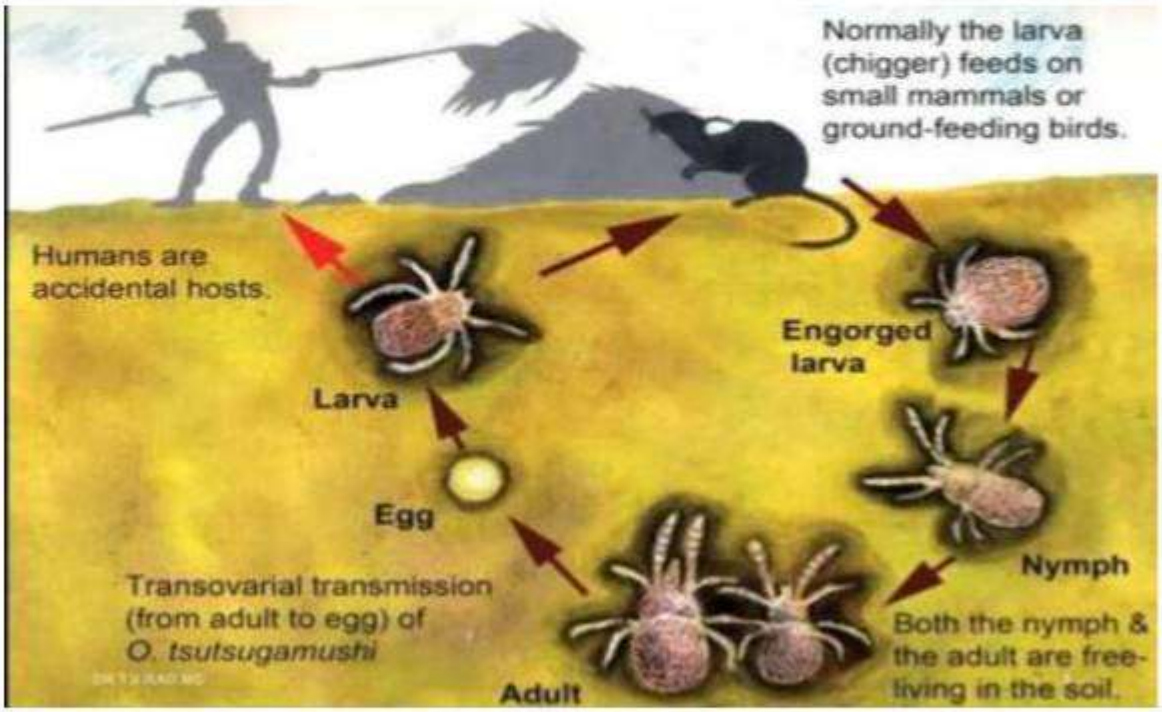


Scrub typhus
maculopapular rash on back

Escher of tick bite over the left side of the abdomen



Life cycle



Laboratory diagnosis:

- Isolation of the organism
- serology
- molecular diagnosis (PCR).

Investigation may reveal early lymphopenia with late lymphocytosis.

Albuminuria is a common laboratory finding. Thrombocytopenia is observed in more than half of the patients with epidemic typhus

Treatment:

- Prompt institution of effective antibiotic therapy against rickettsiae is the single most effective measure for preventing morbidity and mortality due to rickettsial diseases. Doxycycline in a dose of 100 mg twice daily (1-2 mg/kg/dose in children upto 14 years) for7-15 days or Chloramphenicol 500 mg four times a day PO for 7-15 days (for children 150mg/kg/day for 5 days) is recommended.

Prevention and Control:

- The foci of mites can be eliminated by treating the ground and vegetation with residual insecticides, reducing rodent populations, and destroying limited amounts of local vegetation. The mite vectors of scrub typhus are especially amenable to control because they are often found in distinct areas (Typhus Island). These foci can be eliminated by treating the ground and vegetation with residual insecticides, reducing rodent populations, and destroying limited amounts of local vegetation.

6.6 Zoonotic Diseases

6.7 6.6.1. Leptospirosis

Leptospirosis is a zoonotic infection caused by spirochetes having several serotypes called as Leptospira. This disease is known to occur in our country since long and is wide spread in India. Increasing number of Leptospirosis cases are being reported from Maharashtra state since last few years. Therefore, MO PHC should consider leptospirosis as one of the differential diagnoses for fever cases.

Etiologic Agent

Leptospira are small, thin, thread like organisms tightly coiled about their long axis. Actively motile Leptospira rotate on their long axis often with whip like motion and called as spirochetes.

- Primary reservoir: domestic animals like dogs, cattle, sheep, goats, horses, swine, rats and mice
- Most common reservoirs: Rats and small rodents
- Leptospira are excreted in urine of infected animals and can survive for weeks in soil and water causing high environmental contamination

Epidemiology

Healthy person can contract Leptospira from direct or indirect exposure to such contaminated environment.

Direct exposure means when a person walks barefoot through Leptospira contaminated soil, Leptospira pierces skin and enter human body. Direct exposure is common in occupational groups who have to work in muddy soil e.g. farm workers and sewage workers.

Indirect exposure- contaminated water without getting direct contact with urine of infected animal. Leptospira can gain entry through breaks in skin as well as via mucus membranes.

- Humans are dead-end hosts and person-to-person transmission is rare.
- Epidemic may occur as a result of heavy rainfall and consequent flooding.
- It is predominant disease of adult males due to risk of occupational exposure.

Clinical manifestations

- Disease varies from mild clinical form to severe form and sometimes fatal disease with lung, liver and kidney involvement.
- Common symptoms of disease are influenza like illness.

- Symptoms include:
  - Fever- biphasic, remittent with chills, moderate to severe
  - generalized enlargement of lymph glands,
  - a macular to maculopapular rash, particularly with pretibial distribution,
  - abdominal pain
  - Conjunctival suffusion- bilateral reddish colouration of conjunctiva most marked on palpebral conjunctiva
  - Headache- intense, common in frontal region, not relieved by analgesics
  - Myalgia- particularly in calf, abdominal and lumbo-sacral muscles
- Severe form affects lung, liver, kidney.
- Incubation period is usually 5- 14 days. (ref- National leptospirosis guidelines 2019)
- Involvement of organs like liver, kidneys, eyes, meninges become apparent in immune stage in some patients who develop severe form of leptospirosis (Weil's disease).
- Mortality is generally low but is higher for older persons and in those with jaundice.

Diagnosis

ELISA- IgM positive test is confirmatory

Isolation of Leptospira from blood during acute stage of illness and from urine after first week helps to confirm the diagnosis.

Treatment

- Suspected case- Penicillin G 1.5 million units every 6 hours IV or ampicillin500 to 1000 mg every 6 hours IV are appropriate for severe leptospirosis.
- In milder cases, doxycycline 100 mg twice daily or Ampicillin 500 to 750 mg four times per day or amoxicillin500 mg four times daily can be used.

Prevention and control

- All leptospirosis cases should be investigated to detect potential common source of outbreak.
- Rodent control measures are most effective in prevention of Leptospirosis.
- Wearing of rubber boots is recommended for sewer workers and agricultural workers who get exposed to water contaminated with rodent urine.
- Preventing drinking of contaminated water will reduce chances of getting indirect infection.

Case	Dose	Duration
Suspected Leptospirosis cases	• Doxycycline 100mg bd orally • Pregnant & lactating mothers- capsule ampicillin 500 mg every 6 hourly. • Children< 8 years: Amoxycillin/ Ampicillin 30-50 mg/kg/day in divided doses	7 days
Confirmed cases Leptospirosis (By ELISA)	• Inj. Crystalline Penicillin 20 lacs IU 6hrly IV • In children, 2-4 Lacs IU/Kg/day IV • Pregnant & lactating mothers- capsule ampicillin 500 mg every 6 hourly	7 Days
Prophylaxis*	Doxycycline orally 200 mg Once a week	For not more than 6 weeks

6.6.2. Plague

Plague is primarily a zoonotic disease caused by Yersinia pestis involving rodents and fleas. Whenever there is 'rat fall' observed in village, one must suspect possibility of plague outbreak & MO must keep in mind possibility of plague while examining patients.

In India since last reported case in 1966, there were no laboratory confirmed cases till its reappearance in 1994 when four persons were tested positive for bubonic plague in Beed, followed by apparent pneumonic plague in Surat (Gujrat). Recently (2004) few cases of pneumonic plague have been detected in Himachal Pradesh.

Etiologic agent

Plague is caused by gram negative bacillus Yersinia pestis.
Plague bacilli are found in buboes, blood, spleen and other viscera of infected persons and in sputum of cases of pneumonic plague.

Epidemiology

Fleas are the only arthropods known to transmit Y. Pestis in nature.
High vector flea densities on rodent hosts are associated with increased likelihood of spread of plague.

Commonest and most efficient vector of plague is Xenopsylla cheopis. Rodents are primary hosts for both enzootic (maintenance) and epizootic (amplification) plague. Fleas are primary source of spread. Other naturally involved mammals like rabbits, hares, gerbils and humans are incidental hosts that only occasionally serve as direct sources of infection to other animals or humans.

Characteristics of plague

- Plague first spreads among rodents and then humans, thus human plague is always seen after rat fall.
- Bubonic plague does not spread from person to person.
- Transmission of pneumonic plague requires close, direct contact with ill person.
- Plague infection responds rapidly to commonly available antibiotics.

Clinical manifestations

Human plague occurs in primary and secondary forms.

- Primary form: Classic human form of Y. pestis infection in humans, bubonic plague occurs in 90 percent of cases.
- Secondary form: Other clinical forms e.g. septicaemic, pneumonic, meningeal usually occur as a complication of bubonic plague.
- Clinical manifestations of bubonic plague
- fever
- chills, headache
- myalgia, arthralgia
- development of pain and tenderness in affected lymph nodes draining site of fleabite and eventually lymph node enlargement (Bubo).
- Septicaemia develops in untreated cases which lead to death.
- Secondary pneumonic plague results from hematogenous spread from bubonic or septicaemic plague. Such patient expels plague bacilli while coughing, which enter in

healthy persons through respiratory route resulting in development of Primary pneumonic plague.
- Symptoms of primary pneumonic plague are of severe respiratory infection and pneumonia.

Diagnosis and treatment
- For diagnosis of bubonic plague, culture of aspirated bubo material is essential. If aspiration is 'dry', sterile saline should be injected into node and aspirated.
- If clinical and epidemiological evidence is strong, initiate antibiotic therapy without waiting for laboratory tests.
- Antibiotic of choice is Streptomycin in a dose of 30 mg per kg. body weight IM daily, for 7 to 10 days.
- Other highly effective antibiotic is tetracycline in a dose of 30 – 40 mg per kg body weight daily for 7 – 10 days.
- Gentamycin and chloramphenicol are acceptable alternatives.
- Penicillin, cephalosporine, macrolides are not effective against Y. pestis and should not be used.

Care of cases and contacts
- Cases with bubonic and septicaemic plague may develop secondary pneumonic plague therefore should be placed in respiratory isolation for at least 48 hours after beginning specific antibiotic therapy.
- Household members and other sharing same environmental circumstances should be placed under surveillance because of possibility of exposure to same source.
- All persons who have had close contact with a pneumonic plague in a previous 6 days period should be given post exposure prophylaxis for 7 days. Drug of choice is tetracycline in dose of 500 mg 6 hourly.
- Doxycycline and Chloramphenicol are acceptable alternative prophylactic agents.
- Exposed persons should be kept under close observation including measurement of body temperature twice a day. If person develops fever, he should be immediately hospitalized and investigated.

Prevention and control
- Rapid identification and evaluation of any suspected human case of plague.
- Anti flea measures:
- Insecticide spraying is principal control measure.
- Rodent burrows, rodent runs and other places where rodents and fleas may be found should be sprayed or dusted with insecticide.
- Spraying is done covering entire floor area, bottom of all walls up to 3 feet height, back of doors, roofing, crevices in wall, rat runs etc.
- Community should use personal protective measures against fleas e.g. use of heighted beds, mosquito nets, full sleeves cloths, etc.

Anti rodent measures:
- Maintain living and working environment free from rodents.
- Environmental sanitation includes removal of garbage, removal of any rodent food source.
- Killing of rodents should start after flea nuisances controlled. Otherwise, fleas escaped from dying rodents may worsen epidemic situation.

- Rodent control is most effective method of plague prevention.

Role of PHC

If any of following three warning signals are noted in PHC area, MO should immediately visit village and investigate reason.

These signals include -

- Clinically suspected case of plague having fever with bubo, as per symptomatology given above.
- Rat fall: An unusual mortality among rodents in large number is known as "rat fall".
- Increased flea nuisance.

If you find presence of **any two of warning signals** during investigations, suspect plague and immediately start following activities –

- Inform DHO about plague outbreak and request for Rapid Response Team.
- Confirm that swelling is bubo of plague. Aspirate bubo of patient before giving antibiotics. This is extremely important for confirmation of diagnosis of patient.
- Treat patient with Streptomycin or tetracycline and isolate patient
- Administer Tetracycline to all contacts with patient. If itis small village, you can give tetracycline to all villagers.
- Request DMO to send team for entomological investigation, insecticide spray and dusting.
- Start ant rodent measures only after flea nuisance is reduced.

6.6.3. Rabies & Dog Bite

Rabies

Rabies is an acute viral infection affecting central nervous system. Major reservoir of rabies is wildlife, but it becomes a public health hazard because of its endemicity in dogs. Humans are only incidental hosts.

Rabies exists in nature in two epidemiological forms:

First is urban type in dogs and second is wildlife rabies in wild animals like jackals, wolves, foxes, mongoose, cat, bats etc. Urban rabies constitutes the main source of human infection. Under National Rabies Control Programme Government of India launched National Action Plan for Dog Mediated Rabies Elimination (NAPRE) by 2030.

Etiologic agent

Rabies virus is an enveloped, single stranded RNA virus belonging to rhabdo virus group. Glycoprotein on viral envelop binds to acetylcholine receptors and contributes to its neurovirulence.

Epidemiology

Rabies virus may be present in saliva 5 days before onset of symptoms in dogs and for longer interval in wildlife. Transmission among animals and from animals to man is mainly through bite. Respiratory transmission is possible in laboratory workers and in bat caves which is not seen in our country.

The disease

After inoculation into a wound, virus travels along nerves from peripheral site to central nervous system. Incubation period is variable and is determined by location of bite and

distance virus must travel to brain. Therefore, incubation period is short after facial bites and longer after bites on extremities. Typical incubation period is about 6 weeks, but extremes of 10 days to 15 months are reported.

Clinical manifestations

Rabies in humans runs its course within 1 week.

Salient points are:

- H/o animal bite
- Pain at the site of bite,
- paraesthesia
- Hydrophobia – The term derives from fact that swallowing of water is difficult because it produces reflex painful contraction of muscles of deglutition while passing through. Therefore, patient refuses to drink water. Fear becomes so intense that, mere sight of water induces contraction.
- Intolerance to light and noise
- Restlessness, extreme excitability
- Convulsions
- Paralysis
- Increased lacrimation and perspiration

Diagnosis

Diagnosis is based on clinical features as above along with animal bite.

Treatment

There is no cure for rabies and outcome is invariably fatal. Patient should be referred under sedation (preferably pethidine) to hospital where ICU facility is available.

Dog bite

Dog bite is commonest mode of transmission for rabies. As there is no cure for rabies, local wound care and prophylactic immunization should be started immediately after dog bite. Important aspects of dog bite treatment are:

- Local treatment of wound
- Classification of exposure
- Use of vaccine

Local treatment of wound

Immediate local treatment of bite wounds and scratches is most important step in management of dog bite. Proper wound treatment reduces risk of rabies significantly. Follow steps given below for local treatment of Dog bite:

- Flush and wash wound, scratches and adjoining area with plenty of soap and water preferably under running tap, at least for 10 minutes. This treatment is most effective when applied immediately after exposure. However, it should not be neglected even if several hours or days have passed after bite. Washing wound reduces chances of developing rabies by 80%.
- Chemical treatment - Apply Tincture or Povidone Iodine or any other virucidal agent to wound after cleaning. Do not use Savlon or Cetavelon as they are not effective.
- Do not suture wound. Additional trauma will facilitate attachment of rabies virus to nerve endings. If necessary, suturing should be done after 48 hours under cover of ARS with minimum number of stitches.

- Local anti-rabies serum - Local application or infiltration around wound after sensitivity test.
- If surgically unavoidable, after adequate cleansing, rabies immunoglobulin should be infiltrated in the depth and around the wound(s) and suturing should be delayed by a few hours. The delay in suturing allows diffusion of antibodies in the tissues.

Minimum loose sutures should be applied for arresting the bleeding in life threatening situations.

Do's	Act	Effect
Biological	Infiltrate immunoglobulin into the **depth and around the wound(s)** in Category III exposures 	Neutralization of the virus
Don'ts		
• **Don't Touch the wound(s) with the bare hands** • **Don't Apply irritants like soil, chilies, oil, lime, herbs, chalk, betel leaves, etc.**		

Table: Wound(s) Management

Do's	Act	Effect
Physical	Wash **all wounds** with running water 	Mechanical removal of virus from the wound
Chemical	Wash all wounds with **soap and water,** apply **antiseptic** 	Inactivation of the virus

Classification of exposure:

Table: Types of Contact, exposure and recommended post-exposure prophylaxis

Category of Exposure	Type of Exposure	Recommended Post-Exposure Prophylaxis
I	• Touching or feeding of animals • Licks on **intact skin** • Contact of **intact skin with** secretions/excretions of rabid animal/human case	• None, if reliable case history is available • Wash Exposed area with Water & Soap and apply Antiseptic
II	• Nibbling of uncovered skin • Minor scratches or abrasions **without bleeding** 	• Wound management • Rabies vaccine
III	• Single or multiple **transdermal** bites or scratches  • Licks on **broken skin** • Contamination of **mucous membrane** with saliva (i.e. licks) 	• Wound Management • Rabies Immunoglobulin • Rabies Vaccine

Note: Bites by **wild animals** and all bites in **forest areas** should be considered as **Category III** exposure and treated accordingly.

Use of vaccine

Use of nerve tissue vaccines is now discontinued. Presently cell culture vaccines are used for prevention of rabies. Cell culture vaccines are modern, highly potent vaccines with least side effects. Volume of these vaccines is much less; they are least painful and are given intramuscularly or intradermally. **Rabies is 100% fatal but 100% vaccine preventable**.

Important aspects of cell culture vaccine

- Vaccine should be given in deltoid region or in anterolateral aspect of thigh in case of small children. Never give vaccine intra-venously.
- Doses for adults and children are same. A protective antibody titre is achieved after a series of 3 injections.

- It is not necessary to observe interval with regard to other vaccinations.
- Immunization schedule should be followed exactly as recommended even if considerable time has elapsed since exposure.
- There is no any contraindication for post exposure prophylaxis as Rabies is a fatal disease. However, in case of known hypersensitivity appropriate precaution should be taken.
- Vaccine is safe during pregnancy.
- Vaccine should be stored in 20 to 80 c and should be used immediately after reconstitution.

Post exposure Prophylaxis

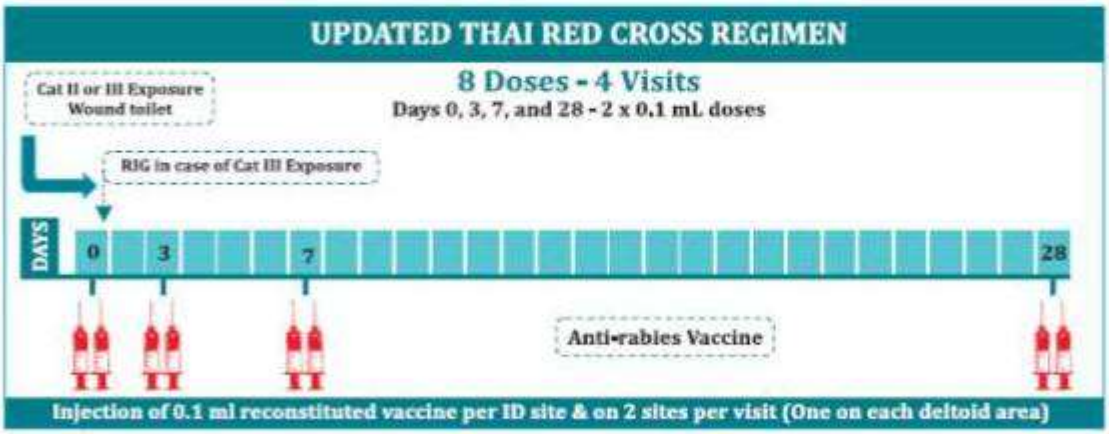
National rabies control program strongly advocates use of intradermal route of rabies vaccine. The use of the ID route leads to considerable saving in the total amount of vaccine needed to complete pre exposure and post exposure prophylaxis there by reducing the cost of active immunization.

Intradermal administration is not the preferred route of rabies vaccine administration for immuno- compromised individuals or individuals receiving chloroquine, hydroxy chloroquine or long term corticosteroid or other immuno- suppressive therapy.

As the value of an ID vaccine dose is lesser than that of an IM dose, the intradermal route is especially suitable for treating many patients at the same centre or where attendance of animal bite cases is more. However entire vial content should be utilised within 6 hours after reconstitution of the vaccine.

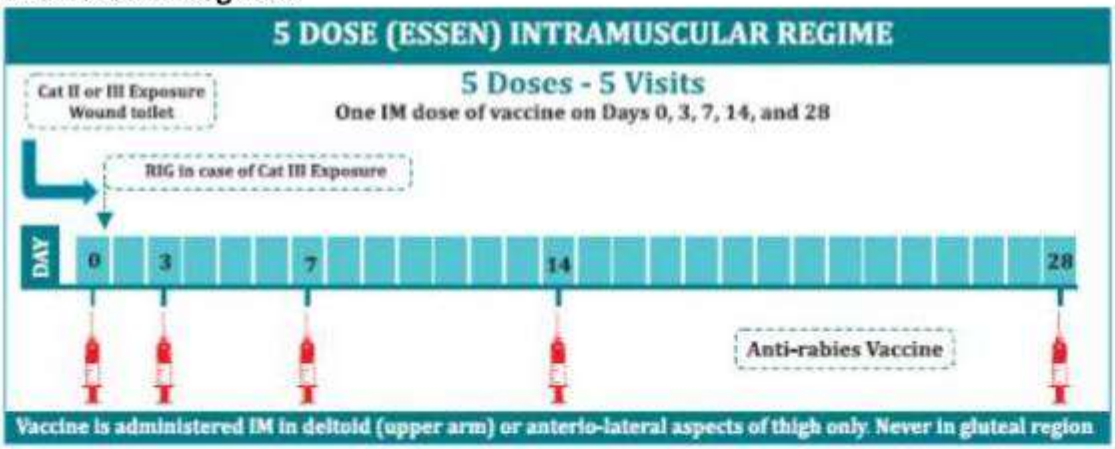
Updated Thai Red Cross Schedule (2-2-2-0-2)- INTRADERMAL

This involves injection of 0.1ml of reconstituted vaccine per ID site and on two sites per visit (one on each deltoid area, an inch above the insertion of deltoid muscle) on days 0, 3, 7 and 28. The day 0 is the date of first dose administration of anti-rabies vaccine and may not be the date of rabies exposure/animal bite.



This involves the injection of 0.1ml of reconstituted vaccine per ID site and on two sites per visit (one on each deltoid area, an inch above the insertion of deltoid muscle) on days 0, 3, 7 and 28. Day 0 is the date of administration of the first dose of Rabies Vaccine.

Intramuscular Regimen



Pre exposure immunization

- Pre exposure prophylaxis is recommended for high-risk group.
- Total three doses are recommended for pre-exposure prophylaxis.
- In case of IM route One full vial to be given on deltoid on day 0, 7, 21 or 28.
- In case of ID route 0.1 ml on one site to be given on days 0,7, 21 or 28.

Vaccinated individuals on being exposed to RABV after successful pre-exposure immunization would require only two booster injections of vaccine given in day 0 and day 3, there is NO NEED of RIG.

Side effects of cell culture vaccine

Usually there are no serious side effects, but sometimes redness, pain, headache, fever for short time may be observed.

Table: The summary of vaccination schedule as per route:

Type of prophylaxis	Route of administration	Dose of vaccine	Day of dose	Number of injections per visit	Total number of visits	Site of injection
Post-Exposure Prophylaxis	Intradermal	0.1ml per dose	Day 0, 3, 7 and 28	2	4	Adults: Deltoid Muscle Infants and Small Children: Anterolateral Thigh
	Intramuscular	1 entire vaccine vial	Day 0, 3, 7, 14 and 28	1	5	
Pre-Exposure Prophylaxis	Intradermal	0.1ml per dose	Day 0, 7, and 21 or 28	1	3	

	Intramuscular	1 entire vaccine vial	Day 0, 7, and 21 or 28	1	3	
Re-exposure (no vaccination needed if full PEP has been received in the last 3 months)	Intradermal	0.1ml per dose	Day 0 & 3	1	2	
	Intramuscular	1 entire vaccine vial	Day 0 & 3	1	2	

Anti Rabies Serum/ Rabies Immunoglobulin (RIG)

Anti rabies serum or immunoglobulin is indicated in class III exposures.

- Best results of anti-rabies serum are obtained if serum is administered immediately.
- It is not indicated beyond seventh day after first dose of rabies vaccine
- Maximum quantity of serum should be infiltrated into wound after cleaning thoroughly. As per the current recommendations of WHO, maximum serum (more than half) should be infiltrated around the bite wound.
- Horse Equine Anti Rabies Serum- dose of 40 IU/Kg body weight.
- Human Rabies Immunoglobulin a dose of **20 IU/kg body weight**.

For exposed or re-exposed patients who can document previous complete pre-exposure prophylaxis or post exposure prophylaxis the following guidelines would be applicable:

- proper wound management should be done
- There is no need for administration of RIG
- One site intradermal vaccine administration on days 0 and 3 or
- one site intramuscular administration of an entire vaccine vial on days 0 and 3
- Only adequate wound washing would be required in case of re exposure where animal bite victim has documented proof of complete post exposure prophylaxis or pre-exposure prophylaxis within last three months.

Important aspects to be remembered by MO

- Give inj. TT to all cases of dog bite.
- Rat bite is also very common in India especially in rural area. Worldwide literature reveals that, rats are very poor transmitters of rabies & hence it is not necessary to give ARV in patients with domestic rat bite.
- Always keep adequate stock of ARV. Indent ARV before complete stock is utilized and over.
- Maintain cold chain of vaccine.

- ARV should be administered by Medical Officer and not by para-medical staff.
- Keep patient under observation for half an hour after ARV / ARS is given.

6.6.4. Avian Influenza (Bird Flu)

Avian influenza or bird flu is a communicable disease caused by virus that normally infects only birds & less commonly pigs. While all bird species are thought to be susceptible to infection, domestic poultry flocks are especially vulnerable that can rapidly reach epidemic proportion.

The disease in the birds has two forms.

- The first causes mild illness, sometimes expressed as ruffled feathers or reduced egg production.
- Second form is known as "highly pathogenic avian influenza" (HPAI), which is characterized, by sudden severe illness & rapid death with a mortality that can reach100%. This has potential for more widespread infection in the human population.

Since December 2003, human infections with influenza (H5N1) have been reported in Vietnam, Thailand & also Cambodia, Indonesia & China.

Similarly, H5N1 outbreaks have been reported from Asian countries.

In the year 2006 Avian influenza was found in poultry birds in Nandurbar district &Jalgaon district of our state.

Agent

Avian influenza is part of family Orthomyxoviridae &belongs to type A. There are 16 avian influenza subtypes &amongst them H5N1 is of particular concern, as it mutates rapidly and it has propensity to acquire genes from viruses infecting other animal species.

High Risk Population- workers handling poultry in farms, markets & involved in culling activity, veterinary workers.

Epidemiology

Avian influenza A virus does not usually infect humans; however, some instances of human infections have been reported.

Influenza A virus undergoes major antigenic shift causing worldwide pandemics with high morbidity & mortality. They are genetically unstable & their behaviour cannot be predicted.

As these virus does not commonly infect humans, there is little or no immunity against the virus in humans.

Mode of transmission

Certain water birds such as waterfowls & migratory birds act as reservoir of influenza viruses by carrying the virus in their intestine and shedding it. Infected birds excrete the virus at least for 10 days orally and in faeces, thus facilitating further spread.

Direct contact with infected poultry or surfaces and objects contaminated by their faces is presently considered as the main route of human infection.

Exposure is considered most likely during slaughter, defeathering, butchering & preparation of poultry for cooking. There is no definite evidence of human-to-human transmission.

Clinical symptoms

The reported symptoms of avian influenza in humans are typical influenza-like symptoms (fever, cough, sore throat, myalgia), eye infection, pneumonia, acute respiratory distress and other severe and life-threatening complications.

The WHO definition of avian influenza in humans is as below:

Suspected case

- Fever (body temperature of 380 Celsius or higher); in addition to

- One of the following symptoms - bodyache, cough, abnormal breathing (unusual breathing difficulty) or suspected of pneumonia by physician, or influenza; in addition to
- H/o direct contact with infected/dead birds in the past 7days or occurrence of unusual death of birds in the community within the past 14 days; or contact with the pneumonia patient or another patient suspected of avian influenza.

Probable case

- The above mentioned symptoms of suspected case
  and
- Preliminary test shows infection of influenza group A, but cannot yet be confirmed whether it is influenza from humans or birds.
- Respiratory distress
- Death

Confirmed case

Suspected/probable case with final PCR test or virus isolation showing H5 strain of influenza group A, which is a bird strain.

Note: Diagnosis of suspected & probable case can be changed if confirmation tests show that the patient's infection was caused by other factors.

Specimen collection for laboratory diagnosis:

Following clinical samples are collected preferably within72 hours of illness & sent to the laboratory within 24 hours of collection.

- Nasopharyngeal swab/ or pharyngeal swab/ throat swab
- Serum sample

The samples are packed properly, labelled & sent to National Institute of Virology, Pune for examination.

Clinical management of avian influenza cases

Principles are as below

General & supportive treatment

- Hospitalize& isolate cases
- Monitor vital signs
- Maintain airway, breathing & circulation (ABC)
- Maintain hydration, electrolyte imbalance & nutrition
- Provide oxygen therapy, when indicated
- Manage fever symptomatically with Paracetamol

Specific treatment

- Antiviral drugs: In adults, Oseltamivir (Tamiflu) is to be given orally in the dose of 75 mg BD for 5 days. This drug reduces the severity & duration of the disease.
- Broad-spectrum antibiotics should be added to cover secondary pulmonary infection.

Public awareness

Public awareness in the community regarding various aspects of bird flu is important. Emphasis should be given on following aspects:

- Proper cooking at more than 700 C temperature for 30 minutes eliminates the virus & it is absolutely safe to consume properly cooked poultry meat. While cooking it should be ensured that no part of the chicken remains pink.
- Foe eggs obtained from affected area, outer surface of egg should be washed with soapy water & it should be thoroughly cooked. Do not use raw eggs in any cooked preparation.
- If areas from where bird flu has been reported from poultry, unnecessary contacts with live, sick, dead poultry should be avoided especially prevent children from coming in contact with poultry. In such area, avoid visiting local market where live & slaughtered chickens are sold.

Role of MO PHC

Though avian influenza is predominately disease of birds and quite rare in human population MO should start surveillance for ILI as outbreak response.

- Persons and families residing at poultry farm and involved in regular poultry care should be regularly surveyed for ILI and samples from suspected cases should be send to appropriate laboratory
- Infected zone (zero to 3 km radius area) there should be regular ILI surveillance by house-to-house visit
- Surveillance zone (3-10 km) weekly surveillance of ILI
- Coordination with private practitioner of infected and surveillance zone for timely reporting of ILI cases
- Isolation of ILI cases with all due precautions
- Action regarding high-risk individuals – care takers of poultry farm should be examined daily along with their family members. All individuals involved in culling action. All these individuals should be isolated for 14 days after completion of culling operation and oseltamivir should be administered in a prophylactic dose.

6.8 Air-Borne Infections

6.7.1. Tuberculosis (TB)

Introduction

Tuberculosis (TB) is an infectious disease caused predominantly by *Mycobacterium tuberculosis*. Tuberculosis is transmitted by inhalation of infected droplet nuclei which are discharged in the air when a patient with untreated TB coughs or sneezes. TB disease usually affects the lungs but can involve any part of the body. Pulmonary TB which affects lungs is an infectious form of disease. Extra-pulmonary TB can affect the lymph nodes, pleura, bones and joints, the genito-urinary tract, the nervous system (meningitis, tuberculoma), abdominal TB (intestines, mesentery, solid organs), skin, etc. All those who get infected do not necessarily develop TB disease. The lifetime risk of breaking down to disease among those infected with TB is 10–15%, which gets increased to 10% per year amongst those co-infected with HIV. Other determinants such as diabetes mellitus, smoking tobacco products, alcohol use and malnutrition also increase the risk of progression from infection to TB disease.

Burden of TB: Global and National Mandates for TB Elimination:

Table: TB burden: Global and India

Estimates of TB Burden (2022)	Global in Million (Rate Per lakh/Year)	India in Million (Rate Per lakh/Year)	% TB burden in India out of global burden
Incidence TB cases	10.6 M (133)	2.8 M (199)	27%
Mortality of TB (HIV Negative)	1.13 M (15)	0.3M (23)	27%
Incidence HIV TB	0.67 M (8.4)	0.048 (3.4)	7.1%
Mortality of HIV-TB	0.17 M (2.1)	0.011 (0.76)	6.4%
MDR-TB	0.41 M (5.2)	0.11M (8)	27%
Global TB Report 2023			

Table: End TB Strategy

END TB Strategy (2015)				
VISION	**A WORLD FREE OF TB** - Zero deaths, disease and suffering due to TB			
GOAL	**END THE GLOBAL TB EPIDEMIC**			
INDICATORS	**Milestones**		**Targets**	
	2020	2025	SDG 2030	End TB 2035
Reduction in number of TB deaths compared with 2015 (%)	35%	75%	90%	95%
Reduction in TB incidence rate compared with 2015 (%)	20% (<85/100,000)	50% (<55/100,000)	80% (<20/100,000)	90% (<10/100,000)
TB-affected family facing catastrophic costs due to TB (%)	0	0	0	0

TB free plan targets of India by 2025:

- India Planned to achieve SDG targets of 2030 by Yr 2025
- As per the National TB prevalence survey (Yr 2019-2021), the prevalence of TB in India is 312/lakh population/Year. It varies from state and state. As per this survey, Prevalence of TB in Maharashtra is 199. Prevalence of Latent TB infection in the general community in India is 31.4%.
-

Table: TB free plan targets of India by 2025

Vision	TB Free India *zero deaths, disease and suffering due to TB*	
Goal	**End the global TB epidemic**	
Indicators	**Milestones**	**Targets**

	2020	2022	2025 *
Percentage reduction in absolute number of TB deaths *(compared with 2015 baseline)*	35%	75%	90 %
Percentage reduction in TB incidence rate (compared with 2015 baseline)	20%	50%	80 %
Percentage of TB-affected households experiencing catastrophic costs due to TB (level in 2015 unknown)	0%	0%	0%

National Strategic Plan (NSP 2017- 25)

Vision: TB-Free India with zero deaths, disease, and poverty due to TB

Goal: To achieve a rapid decline in burden of TB, morbidity, and mortality to achieve the End TB goals of 80% reduction in incidence and 90% reduction in mortality by 2025 - five years earlier than the SDG targets of Yr. 2030.

Targets to be achieved by 2025.

- Incidence rate (per 100000 Pop) – 44 cases
- Mortality rate (per 100000 Pop) – 3 cases
- Zero Catastrophic cost for TB affected family.

Goal and Objectives-

The goal is to achieve universal access to quality TB diagnosis and treatment for all TB patients in the community. The objectives of the National Strategic Plan for NTEP are,

- To achieve 90% notification for all cases
- To achieve 90% success rate for all new and 85% for re-treatment cases
- To significantly improve the successful outcomes of treatment of DR-TB Cases
- To achieve decreased morbidity and mortality of HIV-associated TB
- To improve outcomes of TB care in the private sector

NTEP Milestones, structure, Diagnosis, Treatment & adherence

Milestones of TB programme:

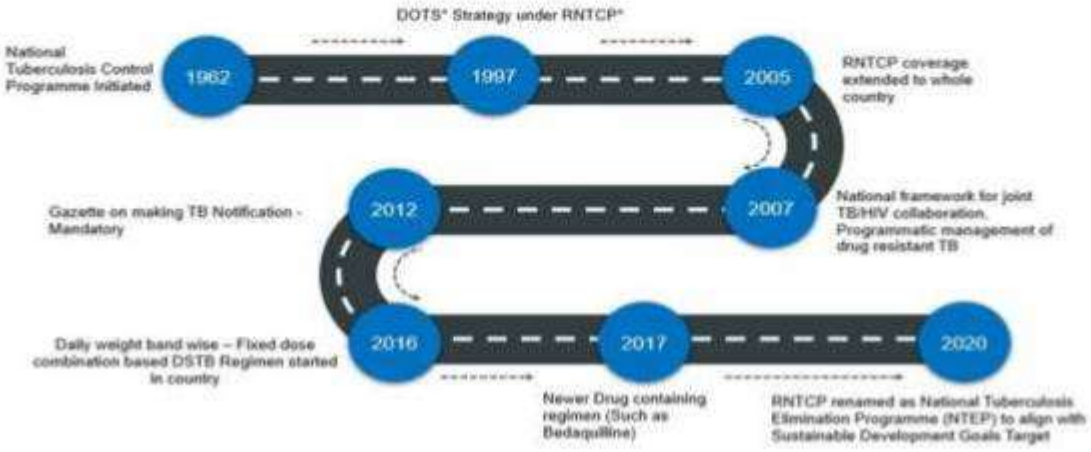


Figure:

Milestones TB Elimination Programme in India

NTEP organogram:

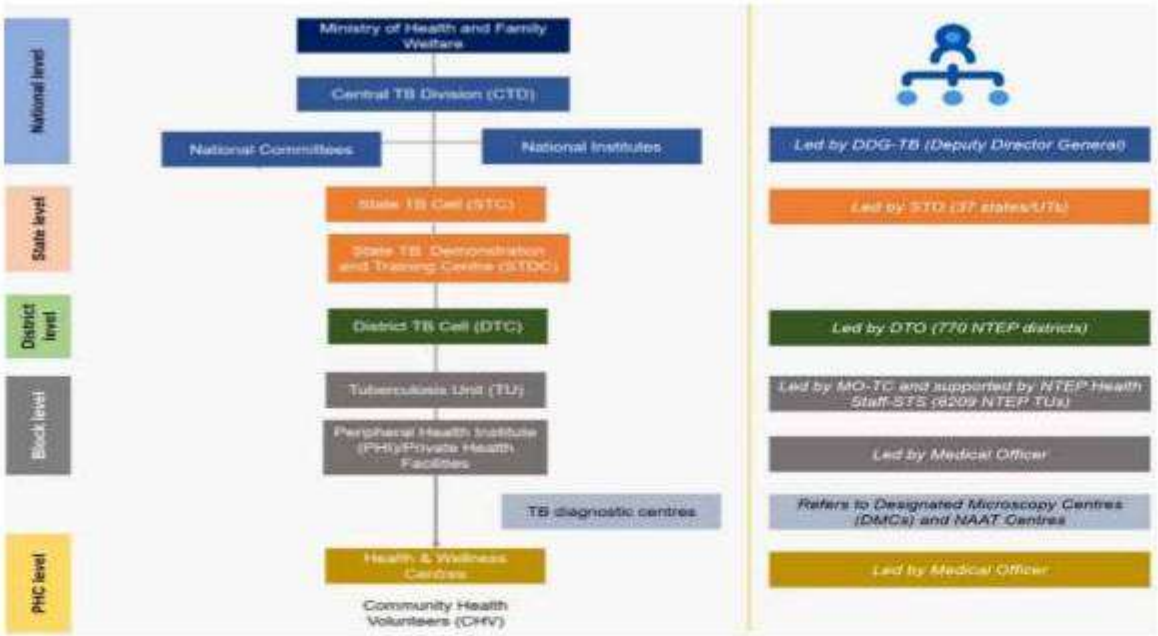


Figure: NTEP Organogram

Diagnostic services for TB:

Laboratory Services

The services of the laboratory are utilized for diagnosing TB & DR-TB cases and for monitoring of treatment of these patients. The Laboratory network under NTEP is a 3-tier system for provision of diagnostic services and maintaining its quality.

The peripheral laboratories are situated in the public sector like the dispensaries, PHCs, CHCs, referral hospitals, major hospitals, specialty clinics / other sector hospitals / TB hospitals / Medical colleges and in the private/NGO sectors. (DMC/ X ray etc.)

In addition, large hospitals and medical colleges have facilities of digital X-Ray, rapid molecular test (CBNAAT/ TrueNat & LPA), FNAC, histo-pathology, and culture & DST for diagnostic services of TB.

At the state level a nodal laboratory is designated as Intermediate reference laboratory (IRL) which is usually situated in the State TB Training and Demonstration Centre (STDC). The main functions of IRLs are monitoring of lab services across the state and maintenance of quality through external quality assurance. There are 3 IRLs (Pune, Mumbai, Nagpur in Maharashtra) with facilities for culture & DST using Phenotypic (Solid – LJ & Liquid Culture – MGIT) and Genotypic technology (LPA & CBNAAT/TrueNat).

Laboratory Quality Assurance

Quality Assurance (QA): A System designed to continuously improve the reliability and efficiency of laboratory services and includes internal quality control, external quality

assessment and quality improvement. The Quality Assurance activities include:

- Internal Quality Control (IQC),
- External Quality Assurance (EQA)
- Quality Improvement (QI)

The schematic representation of the EQA reporting process is shown below.

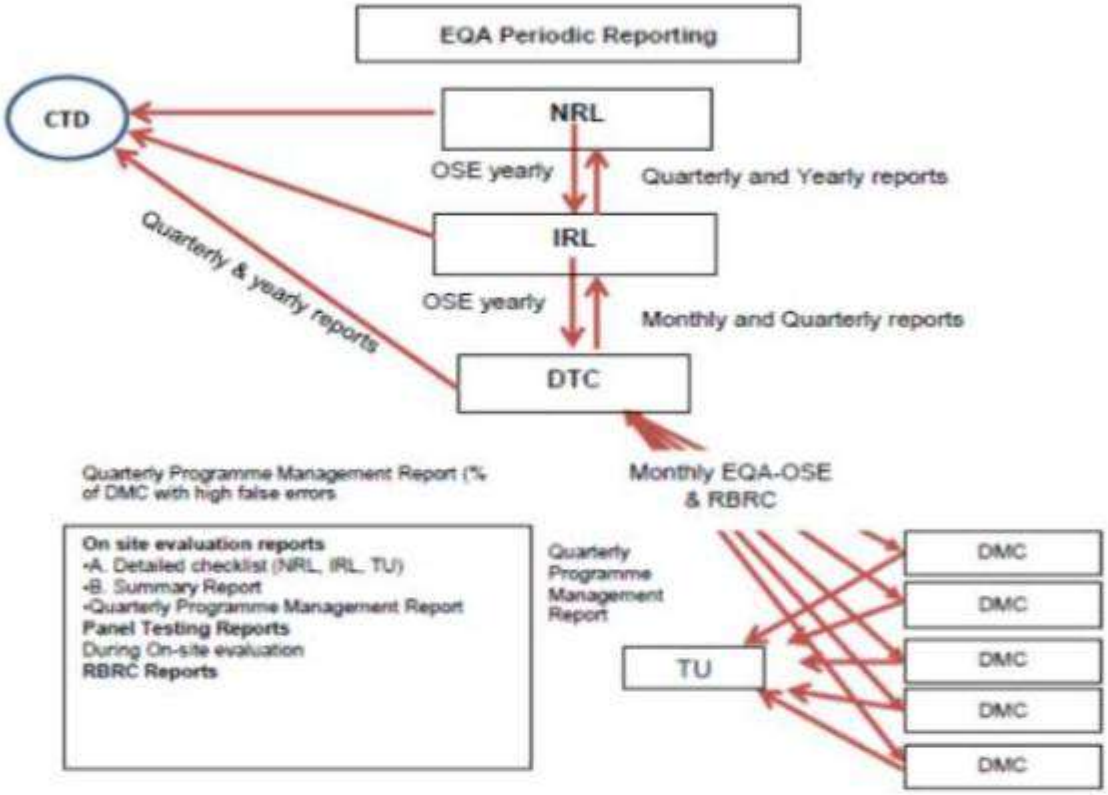


Figure: schematic representation of the EQA reporting process.

Diagnostic tools -National Policy for Diagnosis

Drug-Sensitive TB (DS TB)

Patients with Pulmonary TB are diagnosed using sputum smear microscopy/ Chest- X ray and NAAT (Nucleic Acid Amplification Tests). Replacement of Smear by NAAT and offer of upfront NAAT for diagnosis of TB has been prioritized by the Programme in phase wise manner. Response to Pulmonary DS TB treatment is monitored using sputum smear microscopy.

Drug-Resistant TB (DR TB)

All Diagnosed TB patients are offered NAAT for determining resistance to Rifampicin.
First Line LPA (Line Probe Assay) is offered to all TB patients with Rifampicin Sensitive (RS) to rule out Isoniazid resistance.

First & Second Line LPA is offered to Rifampicin-resistant (RR) and Isoniazid (H) resistant TB patients to rule out resistance to Fluroquinolones and injectable Second line drugs (Kanamycin, Capreomycin and Amikacin)

Liquid Culture (LC) & DST is performed for determining resistance to individual drugs as per programme guideline for modification of DRTB regime.

LC is used for monitoring response to DR TB treatment.

All efforts should be undertaken for microbiologically confirming the diagnosis in presumptive TB patients. Under NTEP, the acceptable methods for microbiological diagnosis of TB are-

- **Smear microscopy**, being the most used method for microbiological diagnosis of TB for the last several decades, has had enormous value in TB diagnosis but with limited sensitivity, more so in children and PLHIV.
- **Culture though highly sensitive and specific method for TB diagnosis**, requires 2-8 weeks to yield results & hence alone does not help in early diagnosis. However, culture will be used for following up of patients on drug resistant TB treatment to detect early recurrence as an indicator of relapse free cure.
- **Nucleic Acid Amplification Test (NAAT) like CBNAAT/ TrueNat** provides accurate and rapid diagnosis of TB by detecting Mycobacterium tuberculosis (M. tuberculosis) and Rifampicin (Rif) resistance conferring mutations, in sputum specimen as well as specimen from extra-pulmonary sites. Results by NAAT gets available within 2 hours.

Other screening tools

Radiography

- Chest X-ray (CXR) to be used as a screening tool to increase sensitivity of the diagnostic algorithm. Any abnormality in chest radiograph should further be evaluated for TB including microbiological confirmation. In the absence of microbiological confirmation, careful clinical assessment for TB diagnosis should be done. Diagnosis of TB based on X-ray will be termed as clinically diagnosed TB.
- Tuberculin Skin Test (TST) & Interferon Gamma Release Assay (IGRA)
- Standardized TST may be used as a complementary test in children in combination with microbiological investigations, history of contact, radiology, and symptoms.
- Interferon-Gamma Release Assays (IGRAs) are being used in place of skin test in low prevalence countries to detect TB infection. The exact advantage of IGRA in high burden countries like India is still not clear, hence these are not recommended for use for adults in diagnostic algorithm for tuberculosis in India. However, IGRA can be used for diagnosis of Latent TB Infection.
- Case finding and Diagnosis strategy.
- Case Finding:
- To achieve universal access to early accurate diagnosis of TB & enhancing case finding efficiency, identification of presumptive TB cases at the first point of care & linking them to the best available diagnostic tests is of paramount importance. Early case detection is vital to interrupt the transmission of TB.

Table: Case finding and Diagnosis strategy.

Passive Case Finding	Intensified Case Finding	Active Case Finding
Patients with symptoms of TB voluntarily seek health care.	This is a provider initiated. screening of outpatient clinic / hospital attendees for symptoms of TB.	Actively searching for TB patients among population at higher risk of TB in the community
The Medical Officer follows diagnostic algorithm for evaluating TB patients	TB screening for patients attending health facilities with comorbidities	

Table: Target population across case finding strategy.

Passive Case Finding	Active Case Finding (ACF)
Undertaken among • People who themselves seek care for symptoms suggestive of TB from PHIs • Referral of presumptive TB patients should be 2-3 % and 5% and above from PHCs and hospitals (RHs/SDHs/CH) respectively	**Undertaken among** • People who do not seek care because of barriers or do not perceive their health problem to require medical attention. • Targeted high-risk groups with or without symptoms suggestive of TB. • Periodically done (3 time is a year)
• Onus of contacting health system on the patient	• Onus is on the system

Definitions of Presumptive TB

- Presumptive Pulmonary TB refers to a person with any of the symptoms and signs suggestive of TB, including cough >2 weeks, fever > 2 weeks, significant weight loss, haemoptysis, any abnormality in chest radiograph.
  Note: In addition, contacts of microbiologically confirmed TB Patients, PLHIV, diabetics, malnourished, cancer patients, patients on immune-suppressants or steroid should be regularly screened for signs and symptoms of TB
- Presumptive Extra Pulmonary TB refers to the presence of organ-specific symptoms and signs like swelling of lymph node, pain and swelling in joints, neck stiffness, disorientation, etc and/or constitutional symptoms like significant weight loss, persistent fever for ≥2 weeks, night sweats.
- Presumptive paediatric TB refers to children with persistent fever and/ or cough for more than 2 weeks, loss of weight*/ no weight gain and/ or history of contact with infectious TB cases**.
  ** History of unexplained weight loss or no weight gain in past 3 months; loss of weight is defined as loss of more than 5% body weight as compared to highest weight recorded in last 3 months.*
  *** In a symptomatic child, contact with a person with any form of active TB with in last 2 years may be significant*
- Presumptive DR TB refers to the patient who is eligible for Rifampicin resistance screening at the time of diagnosis and/ or during treatment for DS TB or H mono/ poly. This includes following patients.
- All notified TB patients (public and private)
- Follow up positive on microscopy including treatment failures on standard first line treatment and all oral H mono/poly regimen.
- Any clinical non-responder including paediatric (if specimen available)

Diagnosis strategy

- Process of Biological Specimen Collection & testing for microscopy
- Medical Officers/ Consultant of health care facilities (governmental or non-governmental) should identify all presumptive TB from patients attending health facilities & refer them for examination using the NTEP request form for examination of biological specimen. Patients are given specimen containers with instructions to provide quality specimen which are then subjected for microscopy examination. There are two options-

In Designated microscopy centre

Two samples are to be collected for smear microscopy within a day or two consecutive days. One sample is collected on the spot under supervision and other is collected early in the morning OR 2 spot specimens collected with a gap of at least one hour (if the patient is coming from a long distance or s/he is unlikely to return to give the second specimen). The sputum containers should be labelled properly by writing the patient's laboratory serial number on the side of the sputum container and not on the lid. Sputum should be at least 2 ml in quantity and preferably mucopurulent. Results of sputum tests should be reported within a day. If needed, storage of sputum samples should be in cool place/ refrigerator. A smear is made, fixed and stained using the Ziehl-Neelsen staining / Fluorescence technique.

In Non-Designated Microscopy Centre (Non-DMC) PHIs

Arrangements for collection and transporting the specimens to the DMC to be done locally and for sending the results to the referring health centres. The specimens should be packed carefully in a box to avoid spillage. Before sending the sputum specimens to the DMC, the person should verify that the necessary information of patient is collected

- One NTEP request form for examination of biological specimen is to be enclosed for each patient.
- The health worker should mark the date of sputum collection and dispatch.
- Sputum specimens should be examined by microscopy not later than 2 days after collection. Once examined, the microscopy results should be reported on the same day.
- The containers along with the sample MUST be disinfected with 5% phenol solution and disposed as per guidelines after the sputum smears results are recorded in the laboratory Register.

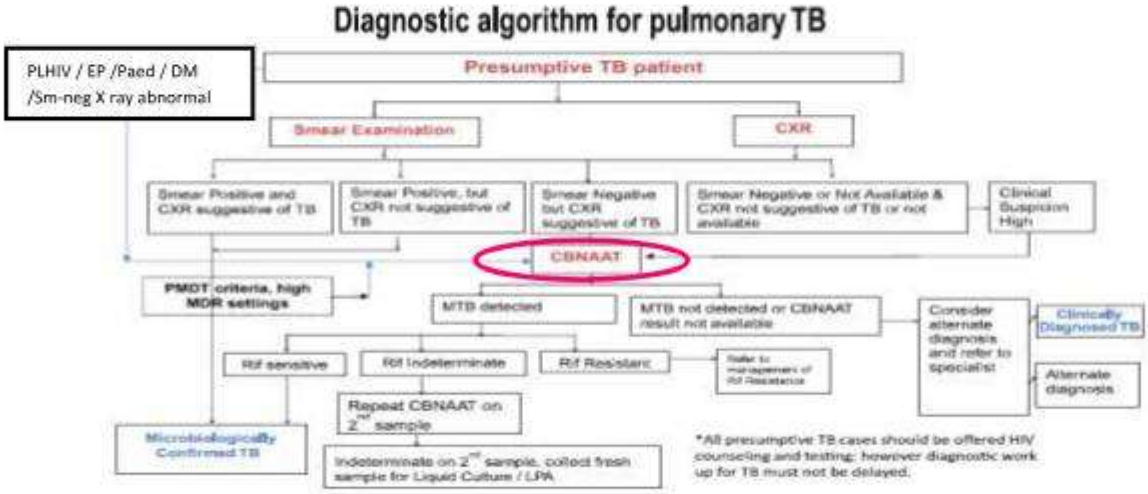


Figure: Diagnostic algorithm for pulmonary TB

All persons identified as presumptive TB patients in the health facility or those referred by other health care providers from the public / private health sector should be subjected to diagnostic tests as per the diagnostic algorithm.

- All presumptive TB (specifically for PTB symptoms) will undergo sputum smear examination (ZN/LEDFM) and chest Xray simultaneously. Two specimens will be collected (spot-early morning or spot-spot). If the first smear is positive and the patient is not at

risk for Drug Resistant (DR) TB, he will be categorized as microbiologically confirmed TB (sensitivity status not known)

- If the smear microscopy is negative and CXR is suggestive of TB then patients sample will be subjected to CBNAAT/TRU NAAT.
- All key population (PLHIV, Children, EPTB etc.) will preferentially get an upfront CBNAAT / TrueNat as per approved algorithm for PLHIV and TB HIV patients, paediatric TB and Extra pulmonary TB.
- Wherever NAAT facility is available and cartridges/chips are available in adequate quantity all sputum samples can be processed by NAAT directly (upfront NAAT testing)

Diagnostic algorithm for Extra-pulmonary TB:

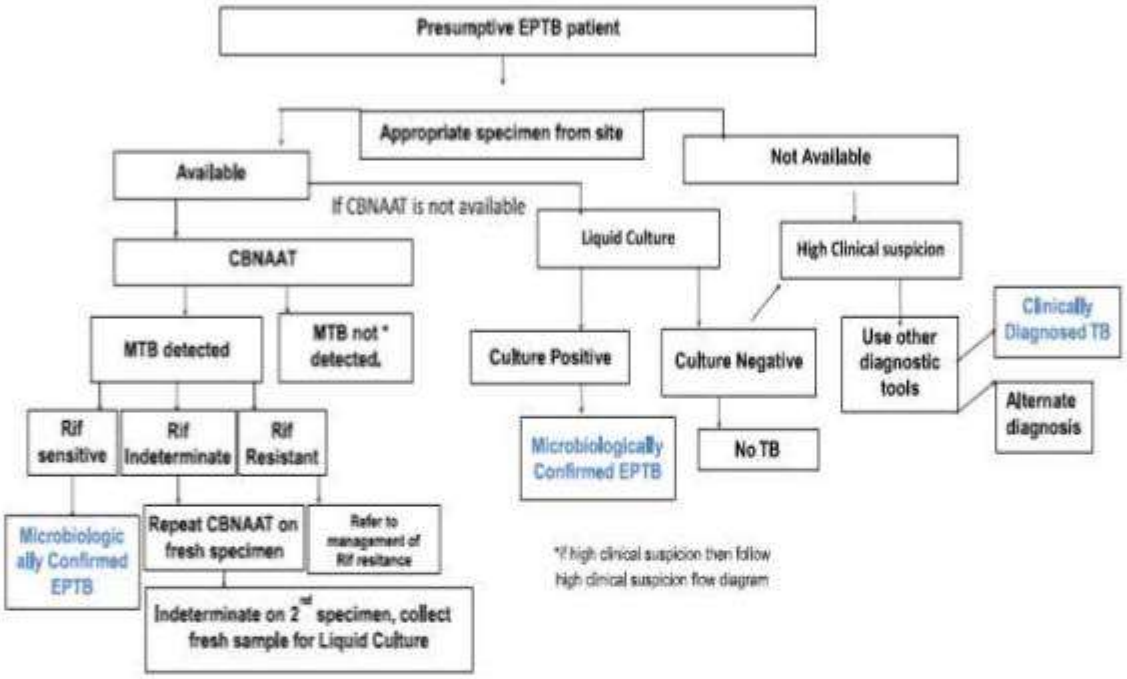


Figure: Diagnostic algorithm for Extra pulmonary TB

Extra pulmonary tuberculosis (EPTB)

Appropriate specimens from the presumed sites of involvement must be obtained from all presumptive EPTB patients for CBNAAT / TRUENAT/ Smear Microscopy / Culture & DST for *M. tuberculosis* / histo-pathological examination, based on type of specimen and availability of facilities. CBNAAT/TRUENAT is preferred over other tests. Chest X-ray, Ultrasonography, Computerized Tomography (CT) Scan, Magnetic resonance imaging (*MRI*) are other investigations which can be used as supporting tools for diagnosing EPTB.

Diagnosis of Paediatric TB

In children with presumptive paediatric TB, every attempt must be made to microbiologically prove diagnosis through examination of appropriate respiratory / non-respiratory specimens with quality assured diagnostic tests. Diagnosis of tuberculosis should not be made only on clinical features and further investigations are always necessary to establish the diagnosis.

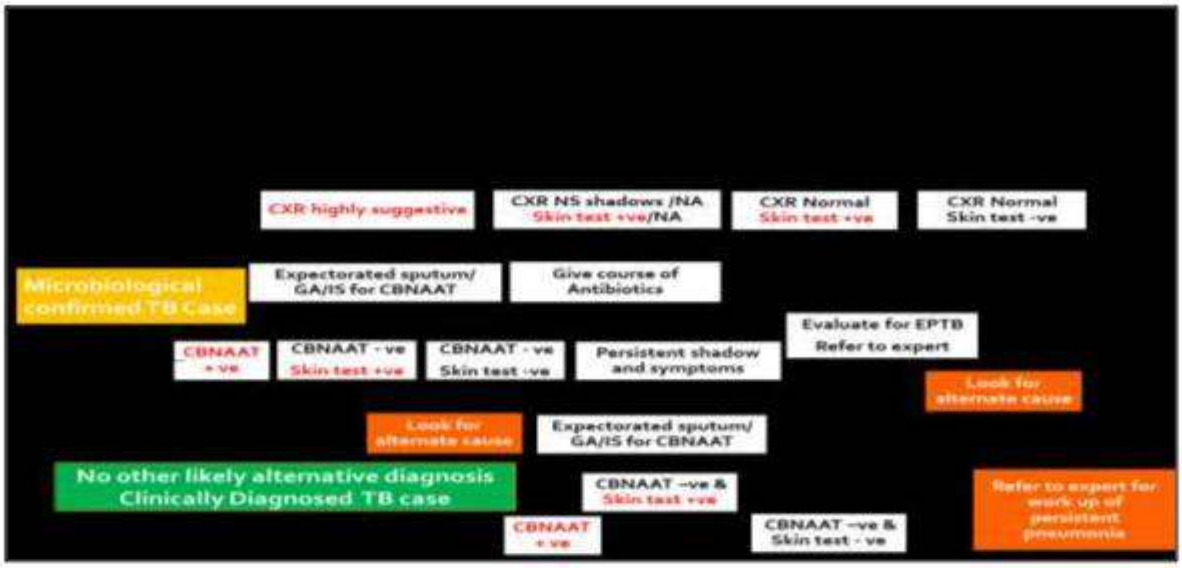


Figure: Diagnostic algorithm for paediatric TB

Diagnosis of Drug Resistant TB

Drug resistant TB is a laboratory-based diagnosis and is performed either by phenotypic Drug Susceptibility Testing using solid / liquid culture or genotypic testing for detection of resistance by Line Probe Assay / Cartridge Based Nucleic Acid Amplification Tests like Xpert MTB/Rif or TrueNat. CBNAAT/TrueNat detects resistance to only Rifampicin while Line Probe Assay (LPA) detects resistance to first line drugs Rifampicin, Isoniazid and second-line drugs fluoroquinolones and Second line injectables drugs. Genotypic testing is much faster than phenotypic methods, as these are not growth-based tests. DST results by Solid LJ media has a turnaround time (TAT) of up to 84 days, Liquid Culture (MGIT) up to 42 days, LPA up to 72 hours and CBNAAT/TrueNat by 2 hours. Under NTEP, access to either CBNAAT or LPA is available **and should be used for diagnosis of DR-TB.**

Operational process of specimen referral:

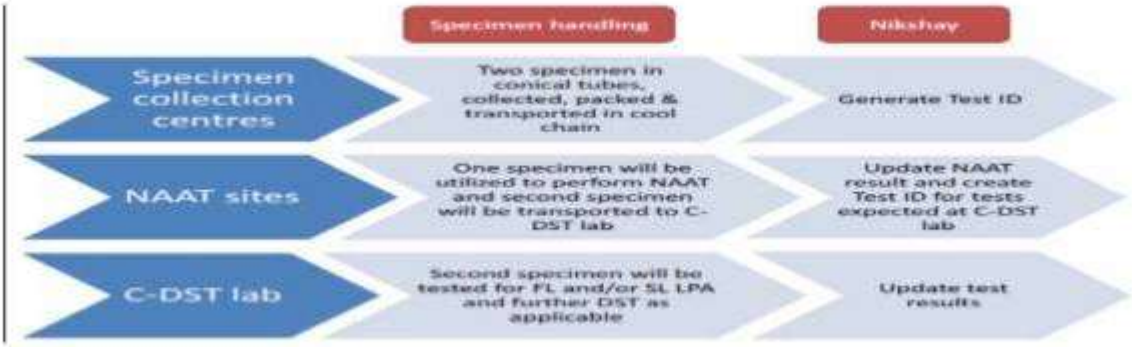


Figure: Operational process of specimen referral

Universal Diagnostic algorithm: all above algorithms have been combined to have universal one.



Scrub typhus
axillary eschar



Scrub typhus
maculopapular rash on back

Figure: Universal Diagnostic algorithm

Treatment services for TB:

Goal of TB Treatment

The goals of Tuberculosis treatment are:

- To decrease case fatality and morbidity by ensuring relapse free cure
- To minimize and prevent development of drug resistance.
- To render the patient non-infectious, break the chain of transmission and to decrease the pool of infection.

Case definitions of TB

Microbiologically confirmed TB **case** refers to a presumptive TB patient with biological specimen positive for acid fast bacilli, or positive for Mycobacterium tuberculosis on culture, or positive for tuberculosis through Quality Assured Rapid Diagnostic molecular test.

Clinically diagnosed TB case refers to a presumptive TB patient who is not microbiologically confirmed but has been diagnosed with active TB by a Medical Officer based on X-ray abnormalities, histopathology, or clinical signs with a decision to treat the patient with a full course of Anti-TB treatment.

In children, clinically diagnosed TB case is diagnosed based on the presence of abnormalities consistent with TB on radiography, a history of exposure to an infectious case, evidence of TB infection (positive TST) and clinical findings suggestive of TB in children in event of negative or unavailable microbiological results.

Classification of TB

Microbiologically confirmed or clinically diagnosed cases of TB are also classified according to:

- Anatomical site of disease.
- History of previous treatment.
- Drug resistance.

Classification based on anatomical site of disease.

- Pulmonary tuberculosis (PTB) refers to any microbiologically confirmed or clinically diagnosed case of TB involving lung parenchyma or the trachea-bronchial tree.

- Extra Pulmonary tuberculosis (EPTB)refers to any microbiologically confirmed or clinically diagnosed case of TB involving organs other than the lungs such as pleura, lymph nodes, intestine, genitourinary tract, joint and bones, meninges of the brain etc.
- Miliary TB is classified as PTB because there are lesions in the lungs. A patient with both pulmonary *and extrapulmonary TB should be classified as a case of PTB.*

Classification based on history of previous TB treatment.

- **New case** - A TB patient who has never had treatment for TB or has taken anti-TB drugs for less than one month is considered as a new case.
- **Previously treated patients** have received 1 month or more of anti-TB drugs in the past.
  - Recurrent TB case - A TB Patient previously declared as successfully treated (cured/treatment completed) and is subsequently found to be microbiologically confirmed TB case is a recurrent TB case.
  - Treatment After failure patients are those who have previously been treated for TB and whose treatment failed at the end of their most recent course of treatment.
  - Treatment after lost to follow-up A TB patient previously treated for TB for 1 month or more and was declared lost to follow-up in their most recent course of treatment and subsequently found microbiologically confirmed TB case.
- **Other previously treated patients** are those who have previously been treated for TB but whose outcome after their most recent course of treatment is unknown or undocumented.

Classification based on drug resistance.

- **Mono-resistance (MR):** A TB patient, whose biological specimen is resistant to one first-line anti-TB drug only.
- **Poly-Drug Resistance (PDR):** A TB patient, whose biological specimen is resistant to more than one first-line anti-TB drug, other than both INH and Rifampicin.
- **Multi Drug Resistance (MDR):** A TB patient, whose biological specimen is resistant to both isoniazid and rifampicin with or without resistance to other first line drugs, based on the results from a quality assured laboratory.
- **Rifampicin Resistance (RR):** resistance to rifampicin detected using phenotypic or genotypic methods, with or without resistance to other anti-TB drugs excluding INH. Patients, who have any Rifampicin resistance, should also be managed as if they are an MDR TB case.
- **Pre-extensively drug resistant TB (Pre-XDR-TB):** TB caused by Mycobacterium tuberculosis strains that fulfil the definition of MDR/RR-TB and are also resistant to any fluoroquinolone.
- **Extensively drug resistant TB (XDR-TB):** TB caused by Mycobacterium tuberculosis strains that fulfil the definition of MDR/RR-TB and are also resistant to any fluoroquinolone (levofloxacin or moxifloxacin) and at least one additional Group A drug (presently to either bedaquiline or linezolid [or both]).

Drug regimens for TB:

Drug sensitive TB:

Table: Drug regimens for drug sensitive TB

Type of TB Case	Treatment regimen in IP	Treatment regimen CP
New/ Previously treated	(2) HRZE	(4) HRE

- Prefix to the drugs stands for number of months. H- Isoniazid, R- Rifampicin, Z- Pyrazinamide, E- Ethambutol
- Fixed Dose Combination (FDC) tablets are used. Loose Drugs would be needed as substitutions in case of adverse drug reaction or with co-morbid conditions.
- No need for extension of IP. CP may be extended by 12-24 weeks in certain forms of TB like CNS TB, Skeletal TB, Disseminated TB etc. based on clinical decision of the treating physician.
- Extension beyond 12 weeks should only be on recommendation of experts of the concerned field.

Table: Drug Dosage for Adult TB cases (>18Yrs) based on FDC formulation

Weight bands	**Number of tablets (FDCs)**	
	Intensive phase	**Continuation phase**
	HRZE	**HRE**
	75/150/400/275	**75/150/275**
25-34 kg	2	2
35-49 kg	3	3
50-64 kg	4	4
65-75 kg	5	5
>75 kg	6	6
**Patient >75kg may receive 5 tablets/day if they do not tolerate Dose to be adjusted by treating physician in individual cases if required.*		

For adult TB patients whose weight increases or decreases by 5 kg or more compared to baseline weight & crosses the current weight band during the treatment, the **weight band must be changed** at the time of next strip issue to the treatment supporter of the patient.

Table: Drug Dosage for Paediatric TB (Up to 18 years of Age)

Weight bands	**Number of tablets (dispersible FDCs)**			
	Intensive phase		**Continuation phase**	
	HRZ	**E**	**HR**	**E**
	50/75/150	**100**	**50/75/100**	**100**
4-7 kg	1	1	1	1
8-11 kg	2	2	2	2
12-15 kg	3	3	3	3
16-24 kg	4	4	4	4
25-29 kg	3 + 1A*	3	3 + 1A*	3
30-39 kg	2 + 2A*	2	2 + 2A*	2

A=Adult FDC (HRZE = 75/150/400/275; HRE = 75/150/275)

For Children TB patients whose weight increases or decreases by 5 kg or more compared to baseline weight during the treatment, the **weight band must be changed** at the time of next strip issue to the treatment supporter of the patient.

Table: Drug doses for first line anti TB drugs

Drugs	Adult	Children	Maximum in Children
Isoniazid	5 mg/kg daily (4 to 6 mg/kg daily)	10 mg/kg daily (7-15 mg/kg daily)	300 mg
Rifampicin	10 mg/kg daily (8-12 mg/kg daily)	15 mg/kg daily (10-20 mg/kg daily)	600 mg
Pyrazinamide	25 mg/kg daily (20-30 mg/kg daily)	35 mg/kg daily (30-40 mg/kg daily)	2000 mg
Ethambutol**	15 mg/kg daily (12-18 mg/kg daily)	20 mg/kg daily (15-25 mg/kg daily)	1500 mg
Streptomycin*	15 mg/kg daily (15-20 mg/kg daily)	20 mg/kg daily (15-20 mg/kg daily)	1000 mg

Streptomycin is administered only in certain situations, such as TB meningitis or if any first-line drug needs to be replaced due to adverse drug reactions (ADRs), as per weight of the patient

**Ethambutol is given separately for children to monitor ophthalmic ADR.

How to manage TB patients based on age and weight?

Table: Drug dosage across weigh bands (Drug Sensitive TB)

TB Patients	Drug dosage requirement
<18 years & up to 39 Kg	As per appropriate weight bands available for children
>18 years & ≥40 Kg	As per appropriate weight bands available for adults
Any age & ≥40 Kg	As per appropriate weight bands available for adults

Drug Resistant TB

Treatment initiation

While waiting for the results of DST as detailed above, all patients diagnosed as MDR-TB/RR-TB using various technologies will be initiated on standard regimen for MDR-TB as per NTEP PMDT Guidelines. Once the results of baseline DST are available, the patients eligible for DST guided BDQ containing regimen will be identified and an appropriate regimen will be designed by the DR TB centre committee.

All eligible patients need to be offered counselling along with a patient education booklet which will give details of the nature and duration of treatment including information on the drugs; need for regular treatment; possible side-effects of these drugs; drug-drug interaction and the consequences of irregular treatment or premature termination of treatment. Female patients will receive special counselling on family planning.

All measures for airborne infection control must be implemented as per the national AIC guidelines while managing all TB patients. The NTEP PMDT treatment register must be updated.

DR TB Regimen type (with or without newer drugs) PMDT 2021 guideline

Designing a regimen is the prerogative of the DR-TB Centre Committee. The regimen could be with or without inclusion of newer drugs like BDQ/DLM and would be classified into the following types:

Table: Drug Regimens for Drug Resistant TB

Regimen class	Intensive phase	Continuation phase
H mono/poly DR TB (R resistance not detected and H resistance)		
• All oral H mono-poly DR TB regimen@	(6) Lfx R E Z	
MDR/RR TB		
• Shorter oral bedaquiline containing MDR TB regimen@	(4-6) bdq(6 M) Lfx^h Eto Cfz Z H^h E	(5) Lfx^h Cfz Z E
• All oral longer MDR TB regimen@	(18-20) Bdq(6) Lfx $Lzd^{\#}$ Cfz Cs	

Lfx- Levofloxacin, Bdq- Bedaquiline, Eto-Ethionamide, Cfz- Clofazimine, Hh- High dose Isoniazid,Lzd- Linezolid, Cs- Cycloserine, R- Rifampicin, E- Ethambutol, Z- Pyrazinamide,

 # Reduce Lzd to 300 mg/day after 6 to 8 months.

@ Pyridoxin to be given to all DR TB patients as per weight band.

Table: Criteria for patients to receive standard DR TB regimen-

Standard DR TB regimen	Inclusion criteria	Exclusion criteria
Isoniazid (H) mono/poly DR-TB regimen	Isoniazid-resistant TB with confirmed result for Rifampicin-resistance not detected (RS)	No specific criteria except drug interaction/intolerability with any other drug used concomitantly
Shorter oral Bedaquiline-containing MDR/RR-TB regimen	Rifampicin resistance detected/inferred. • MDR/RR-TB with H resistance detected/inferred based on InhA mutation only or based on KatG mutation only (not both) • MDR/RR-TB with FQ resistance not detected	**Exclusion criteria** **1.** DST based exclusion criteria • MDR/RR-TB patients with H resistance detected with both KatG and InhA mutation; MDR/RR-TB patients with FQ resistance detected. • 2. Other exclusion criteria • If result for FL-LPA, SL-LPA and DST to Z, BDQ* & Cfz* is not available after pre-treatment evaluation is completed and it is a time to initiate the first dose of the regimen, then, exclude those with history of exposure for > 1 month to Bdq, Lfx, Eto or Cfz; • Intolerance to any drug or risk of toxicity from a drug in shorter oral Bedaquiline containing MDR/RR-TB regimen (e.g. drug–drug interactions); • Extensive TB disease was found in presence of bilateral cavitary disease or extensive parenchymal damage on chest radiography. In children aged under 15 years, presence. of cavities or bilateral disease on chest radiography. • Severe EP-TB disease where there is a presence of miliary TB or TB meningitis or central nervous

		system (CNS) TB. In children aged under 15 years, extrapulmonary forms of disease other than lymphadenopathy (peripheral nodes or isolated mediastinal mass without compression); • Pregnant and lactating women • Children below 5 years.
All oral longer regimen for MDR/ RR TB	Longer oral M/XDR-TB regimen is recommended for MDR/RR-TB patients who are excluded from shorter oral Bedaquiline-containing MDR/RR-TB regimen including for the XDR-TB patients.	None

Operational guidelines for treatment initiation

- Health facilities that diagnose patients who do not reside in their service delivery area have to refer the patient to the facility where the patient would undergo monitoring of treatment.
- All TB patients are offered quality assured anti-TB drugs under NTEP.
- The Medical Officer should record the weight of the patient. It is ideal to record the height also, to assess the Body Mass Index (BMI), which would provide a good indicator for prognosis of the disease. The patients should be given dosages depending on body weight in weight bands.
- All DR-TB patients should be treated with in consultation of DR-TB centre.

Pre-treatment evaluation for DR-TB patients

- All eligible patients would be subjected to a thorough pre-treatment evaluation at the DR-TB centers as per the NTEP PMDT Guidelines 2021. In addition, some additional pre-treatment evaluations would be added for patients eligible for BDQ/DLM containing regimen:
- Each of the DR-TB centres must ensure that the necessary laboratory capacity and consultancy services from various specialists are available in the sites, either in-house or through an outsourced mechanism supported under institutional/state govt. mechanisms. **(Investigations are to be done according to the regimen types)**

The pre-treatment evaluation includes-

- Detailed history (including screening for mental illness, seizer disorder, drug/alcohol abuse etc.)
- Weight /Height

- Complete Blood Count with platelets count /Blood sugar to screen for Diabetes Mellitus
- Liver Function Tests
- Blood Urea and S. Creatinine to assess the Kidney function.
- TSH levels to assess the thyroid function (TSH levels alone are usually sufficient to assess the thyroid function of the patient)
- Urine examination – Routine and Microscopic
- Pregnancy test (for all women in the childbearing age group)
- Chest X-Ray
- ECG (if Moxifloxacin is to be used)
- Serum electrolytes (if Capreomycin is to be used)

Patient Flow in case of Drug Sensitive - TB patients

- Before initiating the treatment, all the TB patients should be counselled thoroughly. It is advisable to involve close family members during the counselling since family support is an essential component in the management.
- Educate the patient and family members about the disease (type of disease and mode of spread) and the treatment (dosage schedule, duration, common side-effects, and methods to prevent them).
- Counsel the patient and family members to ensure treatment adherence (importance of need for regular treatment and consequences of irregular treatment or premature cessation of treatment, monitoring of progress until completion of treatment).
- Explain patients on prevention of transmission of disease (cover cough, proper disposal of sputum) and encourage him to get all his close contacts (especially household contacts) screened at the earliest.
- It is also important to look for co-morbidities like HIV, diabetes, tobacco, malnutrition, silicosis as well as liver or renal diseases, neurological disorders etc. It is also important to look for substance abuse, especially tobacco (in any form) & alcohol. The socioeconomic status of the patient may be assessed to link him/her with appropriate treatment support schemes.
- The Medical Officer needs to open a treatment card (in duplicate when required) for each patient at the time of initiation of treatment. Each patient must be given a TB Identity Card.
- Drugs should be made available at the treatment centre along with the TB treatment Card. Appropriate treatment adherence and monitoring mechanisms be planned by the MO at the time of treatment initiation in consultation with the patient and the peripheral health worker who is responsible for monitoring treatment adherence.
- Assure the patient that s/he will be supported during the entire course of treatment by the MO and peripheral health care workers.
- Medical officers should make efforts to get HIV/ Diabetes testing done in all cases of TB. This is important to ensure all HIV positive TB patients receive ART and CPT. Ideally all presumptive TB patients must undergo HIV screening. If not, offer HIV screening. All HIV positive TB patients must be referred to ART centre for initiation of ART and CPT.

Patient Flow in case of DR-TB patients

NDR TBC (Nodal DR TB Centre) / DDR-TBC (District DR TB Centre) are involved actively in management of all DR-TB patients.

Pre-treatment evaluation will be done.

Treatment card of DR-TB patients admitted at DR-TB centre will be opened by Medical Officer of DR-TB Centre.

In case, a patient is evaluated at DDR-TB centre, and not initiated on treatment, results of the pre-treatment evaluation will be communicated to the NDR-TB Centre committee for a decision to initiate the patient on treatment.

On receiving confirmation from the NDR-TB Centre committee the DTO will open the treatment card and start the patient on treatment.

Treatment card will be kept at DDR-TB Centre for their record and registration in the PMDT register.

After pre-treatment evaluation and initiation of treatment, the patient should be referred back to the residence district / PHI with up to a maximum of one week's supply of drugs with a copy of the treatment card and referral / transfer form.

Drugs provided to the patients to cover for transit period may be counted as unsupervised doses. However, as far as possible efforts should be made by the district staff to restrict these transit doses.

The DTO/CTO arranges for availability of the monthly IP drug box (from the TU) and the patient records at the identified DOT Centre with information to the respective MO-PHI.

This MO-PHI is responsible for monitoring the treatment records and the drugs to the designated Treatment supporter. The MO-PHI will need to make suitable arrangements during the intensive phase of the treatment.

The overall responsibility of the patient on treatment including follow up is with the MO-PHI from where the patient is taking the treatment.

Treatment support program for TB

A good treatment support plan should be developed at the time of initiation of treatment. This plan should include initial and frequent follow-up counselling of the patient and family members, supervision of treatment by a trained treatment supporter (a health worker or community volunteer), locally managed additional nutritional support, retrieval of treatment interrupters, screening for adverse reactions, psycho-social support, co-morbidity management and follow up laboratory investigations.

Direct observation of treatment (DOT)

- DOT is one of the best practices to promote adherence. It ensures that the patient consumes every dose of the treatment before a trained health worker and provides additional opportunity to support treatment. However, the principle of direct observation is to be applied logically and judiciously.
- A treatment supporter who is acceptable, accessible to the patient and accountable to the health system should be identified and trained. A health worker in the hospital/ health centre may be the best person to provide all the envisaged components of treatment support program.
- Family treatment supporter -Wherever appropriate, a family member can also be assigned with the responsibility of observing treatment. Such situations may arise with sick and bedridden patients, children, long-day workers etc.
- Each patient and his/her treatment supporter should be supervised by a health worker.
- Observing treatment is one of the best modalities of promoting treatment, other modalities also may be deployed to further enhance adherence to treatment. Intelligent deployment of information communication technologies (ICT) is an example of such modalities.
- A patient may require mobility support if s/he prefers observation of treatment outside his residence. Counselling may be required to quit substance abuse. Nutritional

assessment & support, ancillary drugs, co-morbidity management, compensation for lost wages etc. are some other requirements.

Direct Benefit Transfer (DBT) Schemes/ Incentives to patients and providers

- Since 1st April 2018 as per GOI directions, Maharashtra state implementing Direct Beneficiary Transfer under National TB Elimination Programme. Direct Beneficiary Transfer is given to TB Patients, Treatment supporters such as ASHA/Private Practitioners/ chemist & Druggist (excluding salaried person).
- Diagnosed Patients under NTEP will get Rs 500/- per month until completion of treatment for nutritional support under Nikshay Poshan Yojana. TB patients need to give Bank details, if bank account is not available NTEP staff should make an effort for opening account of TB patient.
- Under the programme, compensation is provided for transport costs incurred by DR TB patient for for travel to DR-TB centre for treatment initiation and follow up visits.
- TB patients residing in notified tribal areas get Rs. 750 after treatment initiation for travel support
- Treatment supporters are also provided incentive to ensure completion of treatment as below: Rs 1000 per patient for DSTB and H mono/Poly DRTB cases and Rs 5000 per MDR/XDR TB cases.
- TPT incentive: Rs 250 are provided to ASHA/Community volunteer who supports for treatment adherence of TPT beneficiary.
- Bank account collection: Rs 50 are provided to ASHA/Community volunteer who collects and provides bank details to NTEP.
- Private provider incentive Rs. 500/- for notification and Rs. 500/- for outcome of patient after completion of treatment.
- Informant incentive: Rs 500 are given to ASHA/Community volunteer/Private practitioners who have referred case to govt hospitals and it got diagnosed. If nobody has referred case then patient himself/herself is also eligible to get informant incentive.

Follow up of Treatment.

- Clinical follow-up should be done at least monthly. Improvement on chest symptoms, increase in weight etc. may indicate good prognosis. Control of co-morbid conditions like HIV and diabetes by appropriate treatment is essential for getting a better prognosis to TB treatment. Symptoms and signs of adverse reactions to drugs should be specifically asked.

Laboratory investigations may be those to assess the prognosis of the disease or to manage co-morbidities or adverse reaction. In case of pulmonary tuberculosis, sputum smear microscopy should be done at the end of IP and end of treatment. A negative sputum smear microscopy result at the end of IP may indicate good prognosis. At completion of treatment, a sputum smear and/or culture should be done for every pulmonary TB patient.

Chest x-ray may be a good tool to assess the progress and it is to be offered to drug sensitive pulmonary TB patients whenever required and available. For drug resistant TB patients, it is to be carried out at end of IP, at end of treatment and whenever required.

- **Response to treatment in extrapulmonary TB** may be best assessed clinically. Help of radiological and other relevant investigations may be taken.
- **Response to treatment in children:** In children in their early ages are unable to produce sputum, the response to treatment among them may be assessed clinically. The help of radiological and other relevant investigations may also be taken.

- **Long term follows ups:** After completion of treatment, the patients should be followed up at the end of 6, 12, 18 & 24 months. In presence of any clinical symptoms and/or cough, sputum microscopy and/or culture should be considered. This is important in detecting recurrence of TB at the earliest.
- **In the case of DR-TB patients**, ensure regular follow up and referral to DRTB centre. Follow up examination by smear microscopy or Culture is done as per the protocol given in PMDT guidelines 2021.

TB Comorbidities

There are five comorbid conditions given special consideration are HIV-TB; TB-Diabetes; TB-Tobacco; TB-Nutrition and TB – Silicosis.

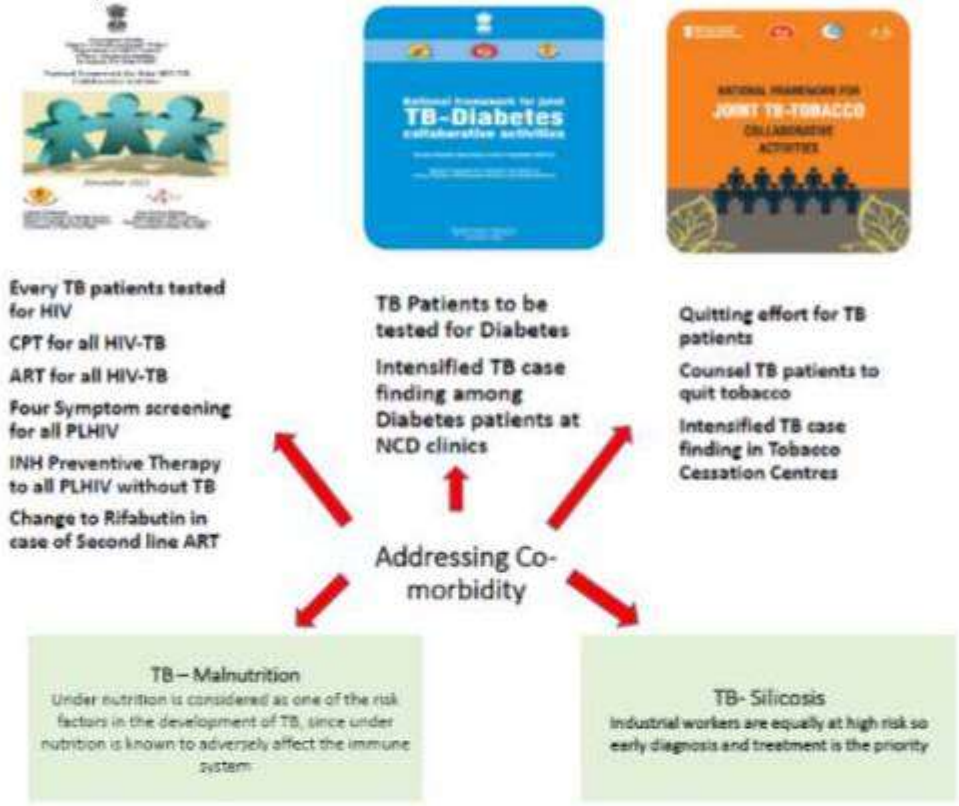


Figure: Inter-programme collaboration for comorbidities management under NTEP

Prevention and management of adverse drug reactions:

Table: Adverse drug effects of first line Anti TB drugs

Drug	Main effects	Rare effects
Isoniazid	Peripheral neuropathy Skin rash Hepatitis Sleepiness and lethargy	Convulsions Psychosis Arthralgia Anaemia
Rifampicin	Gastrointestinal: abdominal pain, nausea, vomiting Hepatitis Generalized cutaneous reactions. Thrombocytopenic purpura	Osteomalacia Pseudomemberanous colitis Pseudoadrenal crisis Acute renal failure Haemolytic anaemia
Pyrazinamide	Arthralgia Hepatitis Gastrointestinal	Cutaneous reactions Sideroblastic anaemia

Ethambutol	Retrobulbar neuritis	Generalised cutaneous reactions. Arthralgia Peripheral neuropathy Hepatitis (very rare)

Following table shows the side effects-of second line anti TB drugs: -

Table: Adverse drug effects-of second line anti TB drugs

Drugs	Side effects
Injectables – Kanamycin / Capreomycin	• Ototoxicity (6,7) • Nephrotoxicity • Vertigo • Electrolyte imbalance
Quinolones – Ofloxacin, Levofloxicin, Moxifloxacin	• Gastrointestinal symptoms: diarrhoea, vomiting, and abdominal pain • Central nervous system (CNS): dizziness and convulsions • Phototoxicity and photosensitivity • Tendinopathy and tendinitis • Skin rash • Cardiotoxicity – QT prolongation • Arthralgia
Ethionamide	• Gastro-intestinal: epigastric discomfort, anorexia, nausea, metallic taste, vomiting, • excessive salivation, and sulfurous belching • Psychiatric: hallucination and depression • Hepatitis • Hypothyroidism and goiter with prolonged administration • Gynecomastia, menstrual disturbances, impotence, acne, headache, and peripheral • Neuropathy
Cycloserine	• CNS: dizziness, slurred speech, convulsions, headache, tremor, and insomnia • Psychiatric: confusion, depression, altered behaviour, and suicidal tendency • Hypersensitivity reaction
PAS	• Gastro-intestinal: anorexia, nausea, vomiting, and abdominal discomfort • Skin rash • Hepatic dysfunction • Hypokalemia • Hypothyroidism and goitre with prolonged administration

Treatment outcomes for drug-susceptible TB patients

- Cured: Microbiologically confirmed TB patients at the beginning of treatment who was smear or culture negative at the end of the complete treatment
- Treatment completed: A TB patient who completed treatment without evidence of failure or clinical deterioration BUT with no record to show that the smear or culture results of biological specimen in the last month of treatment was negative, either because test was not done or because result is unavailable.

- Treatment Success: TB patients either cured or treatment completed are accounted in treatment success.
- Failure: A TB patient whose biological specimen is positive by smear or culture at end of treatment.
- Failure to Respond A case of paediatric TB who fails to have microbiological conversion to negative status or fails to respond clinically / or deteriorates after 12 weeks of compliant intensive phase shall be deemed to have failed response provided alternative diagnoses/ reasons for non-response have been ruled out.
- Lost to follow up: A TB patient whose treatment was interrupted for 1 consecutive month or more.
- Not Evaluated - A TB Patient for whom no treatment outcome is assigned. This includes former "transfer-out."
- Treatment Regimen Changed - A TB patient who is on first line regimen and has been diagnosed as having DRTB and switched to drug resistant TB regimen prior to being declared as failed.
- Died: A patient who has died during anti-TB treatment

The MO of the PHI should record the treatment outcome in the treatment card and sign it and report it in Ni-kshay portal.

Recording & Reporting-

Table: Standardized records are used in the NTEP

Forms	Registers
Referral Slip NTEP Request form for examination of biological specimen for TB Tuberculosis Treatment Card NTEP PMDT Treatment Card Patient's TB Identity Card DR-TB patient identity card Referral / Transfer form for treatment NTEP PMDT Referral for treatment form NTEP PMTPT Treatment Card	Tuberculosis Laboratory Register Culture and DST Laboratory Register Tuberculosis Notification Register Stock Register Reconstitution Register PMTPT Register

Newer initiatives under NTEP

Programmatic Management of Tuberculosis Preventive Treatment (PMTPT) in India

Prevention of TB disease by treatment of TBI is a critical component of the National Strategic Plan 2017-25 for Ending TB (NSP) in India by 2025.

Scaling up TPT would be key to hasten the decline in rate of TB incidence from 2.5% at present to 10% required annually.

Rigorous, expansive, and accountable "TB contact tracing and investigation" for secondary TB patient detection and treatment coupled with active screening for TB among HRGs and TPT is one of the key activities under the "Prevent" component of the NSP.

The aim is to have significant impact on an individual's health as well as to reduce TB burden and transmission. In the cascade of care approach, reach out to all target population who are

at-risk of developing TB disease screened for TB disease and Provide TPT after ruling out TB disease.

Table: Target population and regimen for PMTPT

Target population	Target population
• People living with HIV (+ ART) o Adults and children >12 months o Infants <12 months with HIV in contact with active TB • HHC below 5 years of pulmonary* TB patients	• 6-months daily isoniazid (6H) • 3-month weekly Isoniazid and Rifapentine (3HP) in persons older than 2 years
• HHC 5 years and above of pulmonary* TB patients#	• 3-month weekly Isoniazid and Rifapentine (3HP) • 6-months daily isoniazid (6H)
• Children/adult on immunosuppressive therapy, silicosis, anti-TNF treatment, dialysis, transplantation	• 3-month weekly Isoniazid and Rifapentine (3HP) • 6-months daily isoniazid (6H)

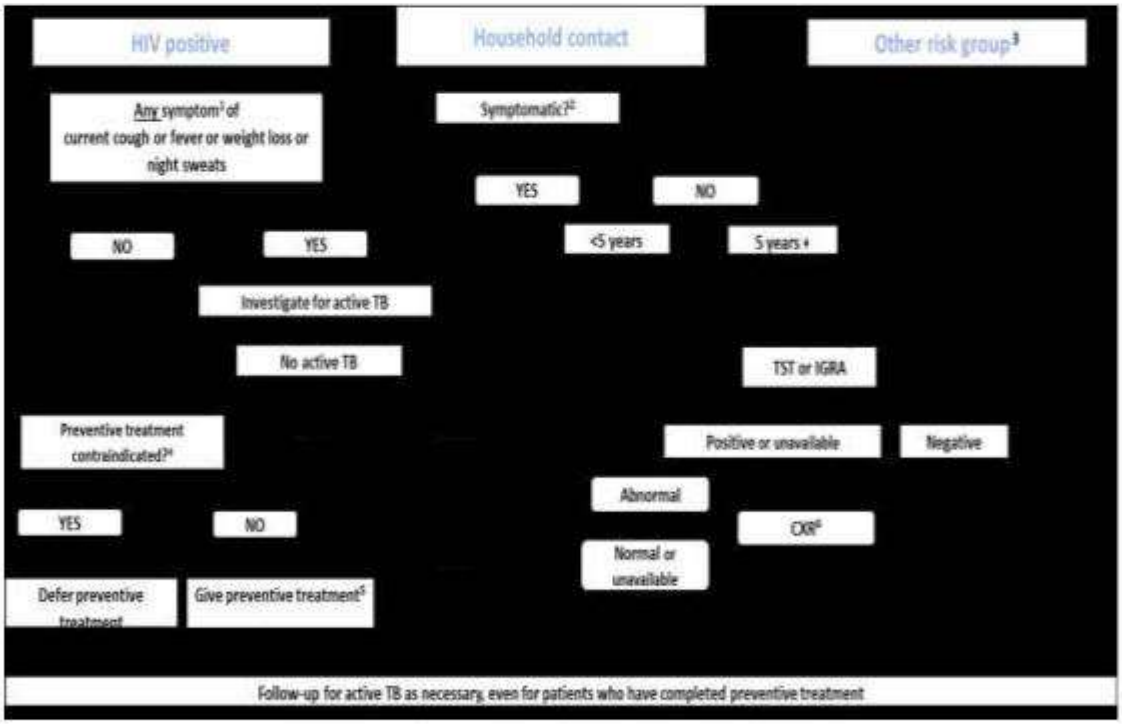


Figure: Schematic presentation of for screening & provision of PMTPT

Surveillance-TB Notification Gazette:

Notification of TB patients

Under surveillance of Tuberculosis, ensure quality of care, reduce TB transmission, and address the problem of emergence of spread of drug resistant TB, it is essential to have complete information of all TB cases. Government of India has declared Tuberculosis a notifiable disease in May 2012. Henceforth, all health care providers in public and private

sectors have the public health responsibility to notify TB cases diagnosed and/or treated by them.

As per the *Gazette of India, dated 19th March 2018*, all laboratories, medical practitioners, Clinics, Hospitals, Nursing homes, Chemists and druggists shall notify TB cases as per standard NTEP notification formats . They can also notify manually, through Nikshay uploading or by informing to call centre on toll free no. **1800116666.**
The Clinical Establishment, Pharmacy, Chemist and Druggist, failing to notify a tuberculosis patient to the nodal officer and local public health staff of general health system of rural or urban local bodies, not taking appropriate public health action on receiving tuberculosis patient notification may attract the provisions of sections 269 and 270 of the Indian Penal Code as the case may be, as below:

- IPC 269- Negligent act likely to spread infection of disease dangerous to life. That shall be punished with imprisonment of either description for a term which may extend to six months, or with fine, or with both.
- IPC 270- Malignant act likely to spread infection of disease dangerous to life. That shall be punished with imprisonment of either description for a term which may extend to two years, or with fine, or with both.

Ni-kshay
Ni-kshay is the platform for the National Tuberculosis Programme Surveillance System. Nikshay envisages to establish ICT enabled state-of-art surveillance system with system utilization by 100% stakeholders and ensuring 100% notification of TB cases at diagnosis (microbiologically confirmed & clinically diagnosed). The programme also envisions continuous monitoring and treatment adherence for all TB patients registered with Ni-kshay, enable tracking of all registered TB patients across TB control lifecycle, geographies, transfers, and referrals.

The first step is to ensure registration of all healthcare establishments across public and private sector in Ni-kshay.

Details of all presumptive TB patient must be entered in Ni-kshay along with diagnosis and treatment. Ni-kshay logins are available at different level starting from National level upto public/private health facilities. Each patient gets unique Nikshay ID from Nikshay after enrolment. All health establishments must report all TB cases and their treatment outcomes to public health authorities (District Nodal Officer for Notification).

Ni-kshay Aushadhi
Ni-kshay Aushadhi is a web-based application which deals with the management of stock of various Anti TB Drugs and items required by various State-Drug Stores, District Drug Stores, TUs and Sub stores (PHIs) of Nation. Ni-kshay Aushadhi helps to determine the needs of various sub stores such that all the required drugs are continuously issued by State Drug Stores to its sub stores without delay. Ni-kshay Aushadi module "issue to patient" has now been integrated and is now available in Ni-kshay as "Dispensation Module". Each Pharmacist should be sensitized for both Ni-kshay Aushadi and Ni-khsay Dispensation Module and it should be used.

TB Arogya Saathi App

The App is aimed at augmenting the initiatives of the Central TB Division, Government of India in proactively increasing awareness among the citizens about TB. It provides all information related to TB disease, TB diagnostic facility available different initiatives by NTEP, social welfare schemes available for TB etc. This Mobile Application has a new functionality of TB Screening tool in the same application. TB patients can login by using their mobile number and they can track their treatment.

Pradhan Matri TB Mukt Bharat Abhiyan (PMTBMBA)

The Central TB Division, MoHFW has initiated a program "Pradhan Mantri TB Mukt Bharat Abhiyan (PMTBMBA)". The objectives of the initiative are as follows:

- Provide additional patient support to improve treatment outcome of TB patients.
- Augment community involvement in meeting India's commitment to end TB by 2025
- Leverage the avenues for Corporate Social Responsibility (CSR).

The Launch of Pradhan Mantri TB Mukt Bharat Abhiyan was done by HON'BLE PRESIDENT OF INDIA on 9th Sept. 2022 and as per guidelines all the Hon. Governors of states are reviewing their progress of PMTBMBA.

Nik-shay Mitra is a donor ready to support TB patients under PMTBMBA. Any individual, co-operative societies, corporate, elected representatives, institutions, non-governmental organizations, political parties, partners etc can adopt TB patients and function as Ni-kshay Mitra.

Following Supports can be given to TB Patients under PMTBMBA by Nikshay mitra: -
Nutritional Support (Mandatory- 6 Months to 3 Years)
Diagnostic support
Vocational support
Additional Nutritional Supplements

TB Mukt Panchayat Initiative

TB Mukt Panchayat is a novel initiative, which was launched by Hon'ble Prime Minster on 24th March 2023. The objective of "TB Mukt Panchayat" is to empower the Panchayati Raj Institutions to realize the extent and magnitude of problems associated with TB, take necessary actions towards addressing these problems, create healthy competition amongst Panchayats to eliminate TB and to publicly appreciate their contribution.

Panchayati Raj institute (PRI) is local government of villages that plays a significant role in its development. There are 6 indicators based on which each panchayat will be assessed for TB free status (Presumption examination rate, TB notification, UDST, Treatment success rate, NPY, Nutrition support)

STEPS TO DECLARE ANY PANCHAYAT TB MUKT:

- Introductory meetings of panchayats
- Preparations for TB mukt panchayat status
- Verification of claims by district TB team
- TB mukt panchayat declaration
- Issuance of certification

Sub-National Certification (SNC) of Progress towards TB Free Status

Sub-National Certification of Progress Towards TB Free Status - an initiative by the Ministry for incentivizing the State/UT/Districts for achieving graded milestones towards the SDG Goal of 80% reduction in TB incidence by 2025 and understanding the district level disease burden. As per the approvals by Mission Steering Group (MSG) of National Health Mission (NHM) in 2018, forTuberculosis, a District or a State\UT will be recognized for "Progress towards TB Free Status" based on the criteria outlined below.

Table: Criteria for Certification TB Free Status and

Achievement of reduction in TB incidence as compared to 2015 incidence rate (in terms of number of incident TB cases per lakh population)	Award / Status
20%	**Bronze**
40%	**Silver**
60%	**Gold**
>80%	**TB Free District / State**

Role of Medical Officer in NTEP

- Ensure proper identification of each presumptive TB patient from OPD / IPD / ICTC / School health examination / Outreach sessions, contact tracing and their referral for sputum examination.
- Referral of presumptive TB patients should be 3 % from PHCs/UPHCs /Subcenter and 5% from hospitals (RHs/SDHs/CH/UCHCs/Medical Colleges) against the new adult OPD.
- Refer presumptive TB patients or ensure transport of quality sputum samples to DMC/NAAT site in time.
- Do Chest X-ray of Presumptive TB cases as per local availability or available linkages.
- Treatment supporter is to be identified in consultation with the patient, who can be ASHA, AWW, Health worker, or any community volunteer, Family member as per convenience of patient.
- Elicit proper history of patients, counsel them and start Treatment early.
- Every TB patient should have regular and timely sputum & clinical follow up.
- Ensure complete, correct, and timely entry of episodes in Nikshay and subsequent all cascade events till treatment completion.
- Ensure that samples of all patients are sent for Universal DST to nearest NAAT lab.
- Ensure that samples of all drugs sensitive TB patients are sent to nearest C&DST lab for 1st line LPA.
- Ensure that samples of Rif resistant patients are sent for 1st line and 2nd line LPA to nearest C&DST Lab.
- Ensure that contacts of all TB patients should be screened to rule out active TB.
- All pulmonary DSTB patient's eligible contacts should offer TPT after ruling out active TB disease.
- Offer HIV test to all presumptive TB patients-PITC (provider-initiated testing & counselling) and diagnosed TB patients. Ensure CPT, ART to all TB/HIV patients.

- Ensure that all TB patients are tested for Blood sugar.
- Ensure strong partnership with private health providers in area by regular continuing medical education (CME), one to one sensitization etc. their registration in Nikshay and ensure each TB episode is notified by private provider.
- MO PHC/CHC should ensure death audit of TB patients.
- Effective Monitoring of training and ACSM activities.
- Ensure supervision & Monitoring of NTEP Activities
- Ensure TB patients, Treatment supporters & Private providers are getting eligible incentives timely
- Visit & Supervise HWCs

For additional information refer: TB modules/guidelines at end of this section in references.

6.7.2 Leprosy

Leprosy is the oldest disease known to mankind and has been described in various ancient literatures in India. Patients with leprosy have been subjected to worst prejudice compared to any other human ailment. Leprosy has predominant psychosocial aspects/ social stigma due to miss beliefs / misconceptions/ taboos /ignorance.

Before the advent of Multi Drug Therapy (MDT), there was no reliable cure and the only available drug against leprosy was Dapsone which was to be consumed even life-long in several cases. Year 1981 was the turning point in the history of leprosy as MDT was officially incorporated in Anti Leprosy Programme in several countries world over. MDT provided a certain cure against leprosy, the case load of leprosy dramatically declined since 1981

Leprosy should not be regarded only as skin disease since it also affects peripheral nerves and involves several organs including mucosa of respiratory tract.

Etiology:

Causative Agent-

- Leprosy is caused by an acid-fast bacillus Mycobacterium leprae. Though it is the first organism to be associated with disease in medical history, it is not yet possible to culture the organism in laboratory; there is no potent vaccine against leprosy yet. Mycobacterium leprae is an obligate intracellular and one of the slowest growing bacteria of medical importance.
- Mycobacterium leprae is the only bacillus that can invade nerves causing disabilities and deformities. It does not produce any toxins.
- M. leprae is an obligatory intra-cellular parasite. It is very slow growing. One bacillus takes 15 to 20 days to multiply.
- Extremely slow generation time results in:
  - Long incubation period
  - A very slow development of pathology
  - A slow and insidious clinical evolution
  - An unclear epidemiological pattern
  - Low infectivity.





Epidemiology

Man is the only host reservoir of leprosy. Leprosy is transmitted from one untreated MB patient to another person via respiratory tract i.e. by droplet infections.

The major sites from which bacilli escape from the body of an infectious patient are nose and mouth. Infectious patient spreads disease through coughing and sneezing.

Leprosy can affect all age groups, however, children are more susceptible.

Risk of infection in household contacts of a paucibacillary and multibacillary case in family is two times and four times more as compared to those without a case of leprosy in family.

Nearly 95 to 98% of the population have natural immunity & they will not get leprosy even if exposed to infection with M.leprae.

Only few of those who are exposed to leprosy develop clinical sings of leprosy. Type of disease which develops in infected person is dependent upon immunity status of person.

The immunological status (resistance) varies from person to person and responds as follows when exposed to infection,

- Natural resistance - No disease will occur.
- High resistance - Localized disease (Tuberculoid)
- Moderate - Disease fairly localized (Borderline Tuberculoid)
- Low resistance - Fairly wide spread (Borderline Lepromatous)
- No resistance - Wide spread disease (Lepromatous)

Incubation period

Incubation period of Leprosy varies from six months to 30 years with an average of 2 - 5 years. Despite harbouring bacilli, affected person feels perfectly fit for a long time, hence delays in seeking medical advice.

Diagnosis of Leprosy

A case of leprosy is diagnosed by eliciting cardinal signs (very important signs) of leprosy through systematic clinical examination. Following cardinal signs must be present for diagnosis of leprosy.

- A hypopigmented patch (skin patch lighter in colour than surrounding skin but not de-pigmented completely) or reddish skin lesion(s) with definite loss of sensation over patch and \or
- Involvement of peripheral nerves as demonstrated by definite thickening of nerve with loss of sensation and weakness of muscles supplied by affected nerves.
- As per recent WHO guidelines it is not necessary to go for bacteriological examination for diagnosis of leprosy.





Leprosy Elimination Strategy

- Early case detection and providing high quality MDT drugs free of cost to all patients.
- Reducing disease burden (prevalence) to very low level will lead in course of time to reduction in transmission of infection and subsequently reduction in disease incidence.
- Number of relapse cases remains low at about 0.1% per year.
- Enabling all health facilities to diagnose and treat leprosy and its complications which will promote early case detection, increase geographical coverage of MDT services, reduce disabilities, improve case management, case holding and cure rate.
- Reducing stigma of leprosy in community through IEC and advocacy.

Programme Implementation

Prevalence of leprosy has been reduced drastically since introduction of MDT. Effective IEC activities, early case detection through voluntary reporting, prompt and regular treatment, disability prevention, and rehabilitation will improve situation further and ultimately lead to elimination of leprosy. Steps to be followed for NLEP implementation are as follows

Identification of suspected leprosy case

Suspected leprosy case will be reported to health facility as follows -

- Voluntary reporting by patient of skin lesion (most important)
- Identified by MPW/HA during field visit
- Identification of patient in OPD who has come for some other complaints.
- Through active search under LCDC.
- Referral from private practitioner

If a patient with skin lesion is detected by MPW or HA, he/she should first examine skin lesion and look for following aspects -

- Skin lesion is hypo-pigmented, i.e. lighter than surrounding skin and/or erythematous i.e. reddish coloured patches, but not totally depigmented as in case of Leukoderma.
- Skin lesion has loss of sensation (important)
- Duration of skin lesion. It cannot be leprosy if -
  - Lesion is since birth
  - Lesion is of recent origin - few days
- Ask patient whether lesion comes and goes. If answer is yes then it is not leprosy
- Lesion is itching and patient gets relief with topical application of cream/lotion – lesion cannot be leprosy

If MPW suspects that skin lesion is of leprosy, patient should be referred to MO PHC for diagnosis. Even if MPW is not sure about cause of skin lesion, still case should be referred to MO PHC.

Confirmation of diagnosis by MO PHC

Medical officer may get referred cases of skin lesion from MPW/HA or patient may attend PHC voluntarily for treatment of skin lesion.

Leprosy is disease with stigma, so diagnosis of leprosy should be done cautiously and promptly. As per WHO guidelines, it is not necessary to carry out bacteriological examination of suspected leprosy patient to confirm diagnosis routinely. Cardinal signs are sufficient to diagnose a leprosy case. Diagnosis is mainly based on presence of clinical cardinal signs. If diagnosis cannot be confirmed, refer the patient to specialist.

Clinical examination for diagnosis of Leprosy

Clinical examination of leprosy includes careful interview of patient for detailed history (case history), skin examination and nerve examination. This should be followed by ascertaining presence of any deformities.

Case history

Collect case information on following points -

- Name, age, sex, address and occupation of patient.
- Presenting complaints and their duration - a patch of few days or since birth is unlikely to be of leprosy.
- History of recurrence - lesion that "comes and goes" will not be due to leprosy.
- Any deformity, its time of onset, and nature of its progress.
- Treatment history – Which medicines and for how long patient has taken for treatment of present complaint. Specifically ask patient whether he has taken any MDT in past. Show a blister calendar pack (BCP) of MDT (MB and PB pack) to patient to ensure that he has understood question well.
- Any other associated illness (jaundice, cough, swelling of feet, etc)
- Any other person in family having similar disease or had disease and was treated. This will give a clue about family history of leprosy.

Skin examination

Remember cardinal signs while examination of skin – You are searching for hypo-pigmented or reddish skin lesion(s) with definite loss of sensation.

Principles of skin examination

- Patient should be examined in a room where sufficient natural light is available and where privacy can be ensured.
- Examine patient from head to foot completely (Leprosy patches situated on back and on gluteal region are usually missed, especially in case of female patients).
- Use same order of examination every time you examine patient with skin lesion so that you do not forget to examine any part of body.

Examination of skin lesion

Once it is sure that patch is not since birth or not very recent and does not come and go frequently then you must examine patch thoroughly. Following features must be noted when examining patch on skin.

- Site - Note site of lesion, this is useful for follow up. Any new lesion appearing on other sites will not be missed during follow up.

- Number - Number of lesions indicates severity of disease. This is also useful for classification and follow up.
- Colour - Colour of skin lesion may be hypo pigmented (lighter in colour than rest of skin) or erythematous (red). Lesions of leprosy are never de-pigmented. Erythematous lesions suggest disease activity or reaction, as active lesions or lesions in reaction are often red.
- Sensory loss-Loss of sensation is a cardinal sign of leprosy.
- Tenderness on gentle tapping- This is seen in reactional state.
- Presence of infiltration-This term refers to skin which is thickened, shiny and erythematous. All three features must be present in same area. This may be seen in severe form of leprosy.

How to test for sensation?

Next important step after examination of skin lesion is to test for sensations. It is very important for Medical Officer and PHC staff to acquire skill of eliciting sensory loss in skin patch, as this is the cardinal sign of leprosy.

Following steps should be carried out for testing sensation.

- Use a ball point pen for testing
- Explain what exactly you are going to do and that it causes no harm to patient.
- Touch first normal area of skin with pen while patient's eyes are open and ask patient to count number of time sensations are felt. Do this exercise two or three times till patient has understood procedure.
- Now ask patient to close eyes and repeat procedure, first on normal skin. Once you are sure that patient is responding correctly to your stimulus, start testing sensation of skin patch. Go on alternatively touching normal skin and skin patch.
- If patient is not able to locate stimulus on patch, then loss of sensation is definitely present.

Remember

- Testing sensation is most crucial part of clinical examination of patient in diagnosing leprosy. Do not keep on asking patient hurriedly whether he feels objects e.g. pen or not. Keep patience otherwise you may get misleading results.
- When testing sensation, touch skin lightly. Do not stroke.
- Always proceed from normal to abnormal (except in children).
- Give one stimulus at a time; allow patient to count and then go for another stimulus.

Examination of nerves

Once you are sure that skin lesion has definite loss of sensation, examine nerves of patient. Involvement of peripheral nerves is indicated by demonstration of definite thickening of nerve with loss of sensation and weakness of muscles of are a supplied by involved nerve, e.g. hands, feet or face.

Nerve examination involves two aspects,

- palpation of nerves and
- assessment of nerve function.

Palpation of nerves

- While palpating nerves, look for three things- thickening, tenderness and consistency.
- Palpate across course of nerve. Feel along nerve as far as possible in both directions.
- Look at patient's face while palpating nerve to elicit tenderness
- Palpate gently with pulp of finger and not tip.

Nerves to be palpated

Following nerves should be palpated in patients of leprosy, starting from nerve supplying to area of skin lesion.

Ulnar nerve (At elbow joint)

Radial nerve (lower half of Upper arm)

Median nerve

Lateral popliteal nerve (At knee joint in popliteal fossa)

Posterior tibial nerve (Ankle joint)

Greater auricular (On side of neck)

Assessment of nerve function

Nerve function assessment includes testing for sensory loss in area supplied by nerve i.e. Sensory Testing (ST) and involvement of muscles supplied by nerve i.e. Voluntary Muscle Testing (VMT). Both ST and VMT should be done for all patients with nerve thickening and all patients diagnosed as Multi Bacillary (MB) leprosy. Sensory testing is already described in skin lesion sensation testing. Procedure for VMT is described below

Voluntary muscle testing (VMT)

Principles of VMT

VMT is done by first checking range of movement of muscles supplied by particular nerve to see whether movement is normal, reduced or absent due to paralysis.

If movement is normal, a test for resistance is then done. Press gently in opposite direction while asking patient to maintain position, resisting pressure as long as possible. Then gradually press more firmly and judge whether resistance is normal, reduced or absent.

Do grading of resistance as follows -

S - Strong: Able to perform movement against full resistance

W - Weak: Able to perform movement but not against full resistance

P - Paralysed: Not able to perform movement at all.

Record grading of resistance for all commonly involved nerves. Always compare side of examination with normal side.

VMT for important and commonly involved nerves:

Facial nerve

- Ask patient to close eyes and keep them tightly closed.
- If there is visible gap between upper and lower eyelids, it is called lagophthalmos. Measure gap in millimeters and record.
- If there is no gap try to pull lower lid down and see whether patient can keep his eyes closed against resistance. Grade resistance as shown above. Always grade resistance as P when there is lagophtholmos.

Ulnar nerve

- Ask patient to spread palm and push his little finger outwards in same plane.
- Try to push little finger towards palm while patient tries to hold it in test position.
- Grade power as 'S', 'W' or 'P'as described above.

Median nerve

- Ask patient to hold his thumb at 900 to palm vertically.
- Try to push thumb downwards while patient tries to hold it in testing position.
- Grade power as 'S', 'W' or 'P'as described above.

Radial nerve

- Ask patient to hold hand parallel and facing towards floor.
- Hold wrist of patient firmly with your left hand and ask patient for extension from wrist joint.
- Try to resist movement with your right hand. Grade power as 'S', 'W' or 'P'as described above.

Popliteal nerve

- Ask patient to pull up his foot fully at ankle joint.
- Try to push foot downwards while patient tries to hold itin test position.
- Grade power as 'S', 'W' or 'P'as described above.

Examination of eye

Eye can be affected by nerve and muscle impairment that can result in inability to close eye (lagophthalmos) and loss of corneal sensation. Eyes can also be affected during reactions. All this can lead to damaged eyesight.

Examine eye for following conditions

- Loss of eyebrows.
- Unblinking stare.
- Lid gap when patient attempts to close eyes.
- Eyelids turned abnormally outwards or inwards.
- Eyelashes turned inwards and touching cornea.
- Redness around margins of cornea or white spots on cornea.
- Corneal sensation, there will be loss of sensation.
- Decrease in diameter and irregular shape of pupil

If there is eye involvement, refer patient to ophthalmologist.

Classify diagnosed leprosy patients (grouping)

Once you diagnose leprosy by clinical examination, next step is to classify leprosy patient. Treatment of leprosy (MDT)depends upon type of leprosy, so it is essential to correctly classify patient.

Classification of Leprosy has been simplified and there are two types depending upon number of patches and nerve involvement as indicated below

Paucibacillary (PB): 1-5 Skin patches with definite sensory deficit and/or one definite thickened or tender peripheral nerve.

Multibacillary (MB): 6 and above skin patches with definite sensory deficit and/or more than one definite thickened and tender peripheral nerves.

Note: Patient is no more diagnosed as suffering from Single Skin lesion (SSL) case. All such cases are diagnosed as PB cases and treated accordingly.

Registration of patient

- Ask for h/o previous leprosy treatment and register patient accordingly.
- Registration and treatment course of leprosy patient depends upon h/o previous leprosy treatment.
- After diagnosis is confirmed, MO should clarify from patient (after taking detailed history) whether patient is anew case i.e. reported for first time for treatment or is a defaulter patient who is seeking re-treatment.

- All new cases will be registered in Patient Treatment Register and a proper serial number will be given. (New serial number will start from 1st April)
- Defaulter case is one who has not collected drugs for 12consecutive months (WHO definition). While this is to be followed for deletion of case from record, for practical purpose, a person will be considered defaulting even if he/she does not collect MDT for one day. Action should be initiated to retrieve patient immediately and motivate him to continue the treatment. If during enquiry, it is learned that reason for defaulting is of permanent nature like death of patient or permanent shifting of residence, patient's name should be deleted from record.

Treatment of Leprosy patient

Following important points should be covered before starting treatment -

- Identify any associated conditions which may make patient unfit for treatment, like jaundice or anaemia. If patient has jaundice let it subside and then start treatment. If patient has anaemia, treat leprosy and anaemia simultaneously.
- Identify any other medical complications and treat them first.
- Assure and counsel patient that treatment should be taken regularly for full course. There should be no gap in treatment.
- In case patient is going out of area of health facility and has difficulty in procuring MDT drugs in new area, then he is entitled to collect more than one month's treatment (Accompanied MDT) for period of ABSENCE FROMAREA.
- Patient should even be permitted to collect full course of treatment, with an instruction that in case of any complications, he should contact MO in nearest health facility where he is located. This should be clearly explained to patient so that his treatment schedule is not disturbed.

Treatment schedule

Leprosy treatment has been simplified very much. Treatment is in the form of Multi Drug Therapy (MDT), which is combination of two or three drugs. It is highly effective, even one dose makes patient non-infectious. Relapse rates are low and there is no reported resistance to MDT. Based on diagnosis, patient can be given any one of the standard MDT regimens mentioned below. Monthly calendar packs are available which makes it convenient for dispensing and consumption by patient

Standard Adult Treatment:

Table: Multi Drug Treatment for PB leprosy

Drug	Adult	Children 10-14 yrs	Children below 10 years	Frequency
Rifampicin	600 mg	450 mg	Reduce doses appropriately as per weight of child	Once a month
Dapsone	100 mg	50 mg		
Dapsone	100 mg	50 mg	Reduce doses appropriately as per weight of child	Daily

Table: Multi Drug Treatment for MB leprosy

Drug	Adult	Children 10-14 yrs	Children below 10 years	Frequency
Rifampicin	600 mg	450 mg	Reduce doses appropriately as per weight of child	Once a month
Dapsone	100 mg	50 mg		
Clofazimine	300 mg	150 mg		
Dapsone	100 mg	50 mg	Reduce doses appropriately as per weight of child	Daily
Clofazimine	50 mg (Daily)	50 mg (Alternate day)		Daily/ Alternate day

Starting of treatment:

- Treatment should always be started at PHC/RH as MO has to diagnose case of leprosy.
- After diagnosing new patient, Medical Officer fills up patient card and initiates treatment with first dose of MDT.
- Send this card to nearest sub centre as per convenience of patient.
- Inform patient about name of MPW, place and address from whom he can collect MDT blister packs subsequently.

Subsequent doses to patient

- Patient treatment card should be maintained at PHC and sub centre by MPW (M)
- MPW (M) should indent one-month requirement of MDT blister packs on the basis of number of patients in his sub centre area and collect it during monthly MIS meeting.
- MPW should enter dose collection dates by patient on treatment card.
- MPW should discharge patient after last dose is finished, sign card and keep card at sub centre for future reference.
- ASHA get Rs 400/- for completion of treatment of each PB cases and Rs 600/- for each MB case for close monitoring and treatment compliance

Treatment of defaulters (not collecting drugs for consecutive 12 months)

- If patient does not turn to SC or PHC, MPW must visit patient's house and motivate him for taking regular treatment.
- All defaulter patients residing in jurisdiction of health facility will be registered but will not be given a serial number. They can continue treatment after thorough re-examination.
- In case patient resides in some other area but has reported for treatment in this health facility, then he may be given one dose of MDT drug and then advised to report to his respective health facility for further treatment.

Important aspects of treatment

- Timely stoppage of treatment is important. Sometimes patients are continued on treatment even after completion of prescribed duration of treatment due to no change

in patch. This results in over-reporting of prevalence and prolonging unnecessary work burden.

- Sometimes patient tries to hide the history of previous treatment, more so in case of MB cases. Very careful enquiry with the patient, appraisal of previous records will help MO in such cases.

Side effects of anti-leprosy drugs:

Table: Side effects of Anti Leprosy drugs

Common side effects	Signs and symptoms	What MO should do if side effect appears
DAPSONE		
Anaemia	Paleness of lower eyelids, mouth and fingernails.Tiredness, oedema of feet and breathlessness	Give anti-worm treatment and iron tablets. Continue Dapsone
Severe skin complications	Extensive scaling, itching, ulcers in mouth and eyes, jaundice, exfoliative dermatitis	Stop Dapsone. Refer to hospital immediately. Never restart Dapsone.
Liver damage	Jaundice, loss of appetite and vomiting	Stop Dapsone. Refer to hospital. Restart after jaundice subsides.
Kidney damage	Oedema of face and feet. , Reduced urine output	Stop Dapsone. Refer to hospital.
RIFAMPICIN		
Reddish coloured urine		Reassure patient
Hepatitis (Liver damage)	Jaundice, loss of appetite, vomiting	Stop Rifampicin. Refer to specialist. Restart after jaundice subsides
Flu like illness	Fever, malaise and body ache	Symptomatic treatment, Stop Rifampicin
Allergy	Skin rash	Stop Rifampicin
CLOFAZIMINE		

	Brownish red coloration of skin, urine and body fluids	Reassure patient, it will go after completion of treatment
Ichthyosis	Dryness and thickening of skin, itching	Apply oil to skin, reassure patient

Reactions in leprosy

Lepra Reactions are acute inflammatory events occurring in course of disease. Reaction can occur at any time before, during or after treatment. It must be promptly diagnosed and treated to prevent any disability. Lepra reactions are more likely to develop
in case of patients with multiple lesions, lesions close to nerves, lesions on face and in pregnant patients.

There are two types of reactions, viz. Type I and Type II Type I Lepra Reaction or Reversal Reaction occurs both in MB and PB patients

Type II Lepra Reaction or Erythema Nodosum Leprosum (ENL) occurs only in severe form of MB leprosy.

Features of Lepra Reaction

Table: Lepra reactions

Features	Type – I	Type-II
Skin	Existing lesions suddenly become red, swollen, warm and tender. New lesions may appear. When subsiding, may show scales on surface	Red, painful, tender, subcutaneous (deep) nodules (ENL) appear commonly on face, arms and legs. They appear in groups and subside within a few days.
Nerves	Nerves close to skin become enlarged, tender and painful with loss of nerve function.	Nerves may be affected but not as common as in Type-I reaction
Other organs	Not common	Fever, joint pains fatigue

Treatment of Lepra Reaction (Type-I and Type II)

In addition to rest, analgesics and other symptomatic treatment, patient will need Corticosteroids. Prednisolone is drug of choice. Suggested schedule is as follows:

40 mg once a day for first 2 weeks, then
30 mg once a day for weeks 3 and 4
20 mg once a day for weeks 5 and 6
15 mg once a day for weeks 7 and 8
10 mg once a day for weeks 9 and 10

05mg once a day for weeks 11 and 12

Note- MDT should be continued during reaction as it has been shown that MDT reduces severity and frequency of reactions of both types. For a patient who has already completed his course of MDT, no further MDT is necessary.

Is MDT safe during pregnancy and lactation?

MDT should be continued during pregnancy and lactation. All evidence so far indicates that MDT is safe during pregnancy. Small quantities of anti leprosy drugs are excreted through breast milk but there is no evidence of adverse reaction except for mild discoloration of infant's skin caused by Clofazimine.

Prevention of disability

Social stigma attached to leprosy is due to development of deformities and therefore prevention of occurrence of deformity and prevention of worsening of existing deformities is important aspect of Leprosy treatment and rehabilitation. Damage to peripheral nerves causes loss of motor, sensory and autonomic nerve functions of affected area leading in turn to deformity. Secondary deformity results from repeated trauma to affected part of body due to loss of sensation. Secondary deformity also results due to dryness and cracking of skin.

WHO Grading of disability

Grading	Hands and feet	Eyes
Grade - I	Anaesthesia present but no visible deformity	Eye problem due to leprosy but vision not severely affected (Vision 6/60)
Grade -II	Visible deformity or damage	Severe visual impairment (Vision worse than 6/60) lagophthalmos, iridocyclitis, corneal opacities.

Prevention of deformity

Educate patient about self-care on following points for prevention of deformity

- Inspect daily limbs with sensory and motor impairment for signs of injury and infection.
- Do not ignore injury, immediately start treatment of injuries.
- Regularly exercise to prevent joint stiffness.
- Soak limbs in water for 15 minutes and put oil to minimize drying of skin. Dry skin may crack and lead to infection and ulcer formation.
- Use of protective clothing, adapted tools, use of footwear for individual with sensory impairment of plantar surface of foot.
- Always protect eyes from foreign body, as due to loss of corneal sensation patient may not recognize foreign body and damage to eye may result.
- Think of surgical correction of deformities to improve function.

Rehabilitation

Rehabilitation is classified as physical, economical and psychological.

- Physical - Reconstructive surgery, distribution of MCR chappals, goggles, splints, treatment of trophic ulcers, physiotherapy.
- Economical - Vocational training is given to leprosy patients, which includes - training in dairy, carpentry, cobbler, financial support under Sanjay Gandhi NiradharYojana, houses under Indira Awas Yojana etc.
- Psychological/social - Counselling to leprosy patients, their relatives and community

Reconstructive surgery

List leprosy patients with deformity from your PHC and inform Assistant Director (Leprosy) of your district to arrange reconstructive surgery camps. Inform patients about camp dates and arrange for their transport if possible. Alternatively you can directly refer patients with deformity to district hospital/ medical college hospital or one of following institutions which is suitable to your patients:

- Acworth Leprosy Hospital, Mumbai
- J.J.Hospital, Mumbai
- Richardson Leprosy Hospital , Miraj, Sangli
- Maharogi Seva Samiti ,Chandrapur.
- Dr. Bandorwala Leprosy Hospital, Kondhwa, Pune.
- Leprosy Mission Hospital ,Kothara ,Amaravati.
- Vimala Dermatological Center ,Mumbai.

Leprosy Case Detection Campaign (LCDC)

LCDC is organized in all high endemic districts as per the guidelines of Central Leprosy Division (CLD) at least once in a year .The campaign is of 14 working days and is implemented through search teams .Each search team is comprised of a female and male volunteer. Search teams identify suspect leprosy cases and referred to PHC/RH for confirmation

Objectives of LCDC

- To detect all hidden cases from the community
- Immediate and complete treatment of confirmed leprosy cases
- IEC regarding leprosy

Implementation of LCDC

- **Microplanning of LCDC**
  - All PHCs have to prepare village wise action plan of LCDC
  - The campaign is of 14 working days
  - Survey during LCDC is carried out by search teams (One female and One male volunteer)
  - Each search team have to visit 20 houses per day in rural area and 25 houses in urban area and screen all members in the family for suspect leprosy case
  - Refer all suspect cases to nearby PHC/RH for confirmation
  - Each supervisor (ANM/MPW) has to monitor five search teams for quality implementation of LCDC
  - Training of all search teams, ANM, MPW, HA(M/F), MO, DLS and DLOs
  - Daily reporting

Important job responsibilities under integration

MPW (M/F)–

- Impart IEC activities in sub centre area and suspect leprosy cases during home visit.
- Include leprosy work in his daily activities with emphasis on IEC, identification of suspect cases, defaulter identification and advice about Prevention of Deformity (POD) services.
- Treatment, follow up will be carried out every month at village and sub centre level.

Health Assistant (M/F)

- Monitor above stated activities during field visit and implement.

- Collecting information on suspected cases and referring to M.O PHC, Para Medical Worker (PMW) and Non-Medical Supervisor (NMS) from vertical programme will be appointed in blocks with high endemic pockets for guidance and support.

MO PHC

- MO PHC will diagnose and treat leprosy patients attending health centres on daily basis.
- Counselling of patients and their family members.
- MO will also diagnose and manage patients presenting with lepra reaction and relapse cases.
- Training and retraining of MPWs about suspecting cases, assessing regularity of treatment, IEC, etc.
- Plan and implement POD and Rehabilitation activities in PHC area.
- Develop IEC Plan for the entire PHC and implement it involving health workers, NGOs, local leaders etc.
- Maintenance of quality records and reports.

Records and Reports

Records and reports to be maintained under National Leprosy Eradication Programme have been simplified in recent years. New record system is easy to understand and has been devised considering integration of leprosy programme into general health services.

Records under NLEP

Maintenance of correct data is most essential element of a sound information system. Three records are to be maintained under Simplified Information System under NLEP. These are -

L.F. 01 - Patient Card

L.F. 02 - Treatment Record

L.F. 03 - MDT Drug Stock Register

Patient Card

- This card includes clinical and treatment information of diagnosed leprosy patient.
- Leprosy Patient card is to be filled by MO immediately after diagnosis of leprosy patient. Treatment Record register should also be filled up and card is given serial number as per register. New number on treatment register should start from 1st April of year.
- After completing card, MO should initiate treatment with1st dose of MDT to patient and hand over one month medicine to patient. Decide by discussion with patient about subcentre MPW from whom subsequent doses are to be collected.
- MO should put his signature on card and send card to concerned MPW(M) for further recording of treatment and any other significant finding.
- Leprosy Patient Card should be maintained at sub centre, where MPW will enter subsequent monthly doses collected by patient, till last dose is consumed.
- After completing treatment, MPW should discharge patient from treatment and note treatment completion on card, sign patient card and preserve card at Sub Centre for future reference.
- MPW (M) should also keep informing about treatment progress of patients from his area to MO indicating due date of monthly dose, date of actual collection of MDT drugs and date of completion of treatment.
- Treatment register at PHC should be completed by HA(M)on the basis of information received from MPW(M).

Guidelines to fill up Patient Card

Registration number: Running number of treatment register starting from 1st April of year.
Classification: PB - 1 to 5 patches and/or 1 nerve affected.
MB - 6 and more patches and /or 2 or more nerves affected.
New case: Leprosy patient who has not taken MDT drugs anytime earlier
Other type Immigrant, Relapse, Referral or Restart of treatment
End Status RFT - Release from Treatment

Treatment Record Register

Treatment record of all patients from PHC should be kept in a register and labelled as Treatment Record Register.

- After filling up of Patient Card, MO should enter patient information in Treatment Record Register. Annual serial number should be given only to new cases. For other cases, record name and details of patient but do not give serial number ("0" no. cases). Name of new patient written once must not be repeated in the treatment register.
- Monthly abstract must be calculated in the format provided by ADHS Leprosy.
- HA(M) should be given responsibility of updating register. He should get information of all patients (treatment and RFT) from MPW(s) and update register.
- MPW(M) should immediately inform HA(M) about default of leprosy patient. HA should visit leprosy patient's house and take corrective action, should also inform MO about treatment default and ensure record updating.
- Treatment Record Register is retained at PHC for further reference.

Leprosy MDT Drug Stock Record

- MDT drug stock record should be maintained at all PHCs by Pharmacist.
- Information regarding supply, expenditure and balance of MDT drugs should be maintained in this register and updated immediately after every transaction.
- Separate pages should be used for each of the four types of blister packs supplied, viz. MB(Adult), MB(Child), PB(Adult), PB(Child). Drug expiry dates should be monitored regularly to avoid wastage. Expired drugs with justification should be handed over to DLO.
- Drug stock register is important document and should not be changed annually. Same register should be used till it is completely used.
- It should not be used for any other purposes.
- Drug stock record should be retained at PHC.

Suspect Case Register: In addition to above, entries of all suspect cases of leprosy sent by health workers are to be made and monitored worker wise in the suspect case register. This register should be maintained worker wise and no. of cases referred by every worker should be reviewed at every meeting with the workers. All suspect cases of leprosy must be examined within a week by MO to confirm the diagnosis of leprosy or otherwise.

Cleaning of records

New leprosy cases are registered immediately after diagnosis. When last dose of MDT is handed over to patient (6^{th}dose in PB and 12th in MB), such a case should be deleted from registers by encircling the Sr. no. and a line to scratch his details by red ball pen only once. In practice, it has been observed that such cases are not deleted for months together which results in stagnation of cases and calculation of high prevalence rate. Medical officer should

check records of all sub centres monthly and ensure deletion of cases to whom last dose has been given. Instead of periodical "cleaning of registers" practice of regular maintenance of clean records should be owned and practiced at Sub-centre and PHC level.

To assist PHC staff in making right decisions and keep records clean, frequently raised issues are clarified below:

New leprosy case

Only new leprosy case(s) should be registered. Definition of new case is "A patient with skin patch(es) with definite sensory deficit and /or definite thickened and tender nerve(s), who never received any leprosy treatment (including dapsone monotherapy anywhere in past". This definition of new leprosy case should be strictly followed.

Not leprosy case

Patient having patch(es) without definite sensory deficit, no definite thickened and tender nerve(s) is not likely to be a case of leprosy. Such "not leprosy cases" are likely to be wrongly labelled as leprosy. Sensory (touch, pain and temperature) deficit may be either partial (hypoasthesia) or total (anaesthesia) and should be properly elicited as per prescribed procedure before coming to final conclusion about diagnosis.

Grouping of leprosy cases

Diagnosed leprosy case should be grouped only as Paucibacillary (PB) or Multibacillary (MB).

Treatment completion

For PB cases, 6 Blister Calendar Packs (BCPs) should be taken in six months and for MB cases 12 BCPs should be taken in 12 months.

RFT (Released from treatment): Earlier cases were released from treatment on treatment completion only.

But from January 2005 as per Kathmandu Recommendations, patients are to be released from treatment at the time of giving6th dose in PB and 12th dose in MB.

Defaulter case

WHO definition of defaulter case is one who has not collected treatment for 12 consecutive months. While this is to be followed for deletion of case from record, for treatment purpose a person will be considered defaulting even he/she does not collect MDT for one day. Action should be initiated to retrieve patient immediately. If during enquiry, it is learnt that reason for defaulting is of permanent nature like death of patient or permanent shifting of residence elsewhere, patient should be deleted from record.

Restart of treatment

Defaulter case returning at any time to health center for treatment need to be reassessed and on seeing signs of active leprosy lesions only, a new course of MDT should be restarted. For registration purpose, returning defaulters are not considered as new cases.

Re-registered case

Any patient who was registered earlier anywhere in country and received a full course of treatment with MDT, if registered again for same complaints.

Relapse case

Some patients may have relapse of disease after some months or years of RFT as cured. In such cases, if type (PB/MB) is same as earlier, restart appropriate treatment (MDT) for another course but do not register the patient as a new case. In case disease is of other type, case should be registered as new case

Referred case

Any patient who has been sent by any other health centre of any district/state, along with referral slip, should be given treatment for remaining period. Such case will not be registered as a new case again.

Migratory patient

A patient who is not likely to be available in place of treatment for duration of course, should be given full course of Accompanied MDT (A-MDT) with a written guidance about drug intake, likely problems, action to be taken by patient in case of any such problem and to report back at the end of treatment. Such patient should be made RFT at the time of giving accompanied treatment if last dose is also given as AMDT.

Updating of records

PHC treatment should be updated every month with inputs provided by sub centre staff on their visit(s) to PHC. Updating record has a direct bearing on monthly reports prepared at PHC and therefore should be carried out without fail.

Deletion from records

Any patient who does not qualify to remain on record after considering above mentioned issues, should be immediately deleted. MO PHC is authorized to make deletion under his signature at any time whenever deficiency comes to his/her notice.

Reports under NLEP

Data recorded in patient cards and registers is periodically updated and submitted to DHO in prescribed formats called reports. Formats prepared for reporting are called reporting formats. Under Simplified Information System one form called as L. F. 04 - NLEP Monthly Reporting Form: PHC information should be filled in the form. This form should be filled up on the basis of data available in Treatment Record Register and MDT drug stock record register.

MDT Stock in health facilities

Medical officer should keep a total of two months stock of MDT drugs, for the types of patients under treatment at PHC should be maintained at PHC. MDT drug stock calculation and keeping sufficient stock is responsibility of Pharmacist of PHC. If MDT drugs are provided at Sub Centre, only one-month requirement should be kept at Sub Centre. Medical Officer must keep in mind that there should not be any chance for discontinuation of treatment by patient due to unavailability of MDT blister packs. In PHCs where no patients are registered for continuous six months, no MDT stocks should be kept and MOs should ensure that balance MDT stocks are immediately returned to Dist. Stores.

How to calculate MDT blister pack requirement for PHC

There should be sufficient stock of MDT drugs so as all patients will get treatment without interruption. At the same time there should not be overstock as these costly drugs have expiry dates and it will cause unnecessary wastage of scarce resources.MO PHC should follow

instructions given below carefully and calculate demand properly as mentioned below (modified in October 2005 and then send indent.

Table: Calculation of monthly MDT requirement at the health facility level

Sr	Steps in calculation	MB(A)	MB(C)	PB(A)	PB(C)
1	No. of cases under treatment at PHC				
2	Stock of MDT BCPs available at PHC				
3	Availability of MDT BCP in patients months at PHC (2/1)				
4	Total MDT BCP requirement to maintain 2 months stock at PHC (1X2 month)				
5	Net requirement of MDT drug as on date (4-2)				
6	Quantity of MDT Drugs stock expiring in next 2 month				

If MDT stock is calculated and demanded monthly in this manner there should be neither shortage nor excess of MDT drugs at any time. This is common lapse noted in most of health facilities. MOs somehow miss this issue totally, resulting in situations where patient goes without MDT drugs due to mismanagement of MDT stock or the stock unnecessarily Expires

Essential indicators and their significance

Essentials indicators should be calculated every month in each health facility so that MO PHC knows as to which way disease is heading and what corrective measures should be taken. Suitable graph s should be prepared in health facility to understand situation properly. Essentials indicators are:

Prevalence Rate or PR

It is total number of cases on treatment at a given point of time in an area

Total number of cases on treatment) *10,000

Total population in given area

Interpretation:

Elimination target is defined as prevalence rate below one per 10,000 population. High prevalence may indicate high transmission in area. High prevalence can also be

as a result of intensified elimination activities viz LCDC etc. or due to over-diagnosis of patients or as a result of recycling of patients. If data for prevalence of past years are available, see the trend to assess progress being made towards leprosy elimination. If PR is increasing then some intensification of NLEP activities will have to be taken in villages\sub centres from where maximum number of cases are reported.

Annual New Case Detection Rate

Total number of cases newly detected (and never treated before) at a given point of time in an area

$$\frac{\text{Total Number of cases newly detected} * 100000}{\text{Total population in a given time in a given area}}$$

A high new case detection rate indicates

- High transmission in the given area
- Result of intensified elimination activities
- Result of over diagnosis
- Result of recycling of old patients
- Increasing community awareness

If data are available for past years, trend should be analysed. This will help to measure impact of special activities such as LCDC etc.

Decreasing trend can indicate following possibilities:

- Transmission is decreasing
- New case detection services are becoming less active
- Community participation in leprosy needs improvement

Proportion of Child cases among New Cases Detected

Proportion of new leprosy patients, up to 14 years of age, among newly detected patients.

$$\frac{\text{Total number of 0-14 years new leprosy cases in year} *100}{\text{Total number of newly detected cases during same period}}$$

A high proportion can be as a result of elimination activities targeted to this age group, such as school surveys and IEC in schools or high leprosy transmission in area.

- A low proportion can be as a result of low awareness among population or low transmission in recent areas

Proportion of Visible Deformity among New Cases Detected

$$\frac{\text{Number of newly detected cases with deformity in year}*100}{\text{Total number of newly detected cases in same year}}$$

It should be close to zero. If it is higher, it may be due to low community awareness and late reporting of cases. IEC activities should be strengthened to reduce proportion of deformity in newly detected patient.

Proportion of MB case among New Cases Detected

$$\frac{\text{Number of MB patients among new cases detected} *100}{\text{Total number of cases among whom grouping has been recorded}}$$

A high MB rate indicates delay in diagnosis, lack of awareness among community or wrong grouping or re registration of cases.

Proportion of Females among New Cases Detected

$$\frac{\text{Total number of new female patients in year } 100}{}$$

Total number of newly detected cases in same year

This should be close to 50%. If less than 50% it indicates that coverage of female population is inadequate. To improve new case detection among females, intensify IEC to this segment of population and involve female workers/women group in programme.

SC New Case Detection Rate (SC NCDR)

Total Number of Leprosy cases detected among Scheduled Caste population in a given time in an area.

Total number of SC cases newly detected * 100000
Total SC population in an area

ST New Case Detection Rate (ST NCDR)

Total Number of Leprosy cases detected among Scheduled Tribes population in a given time in an area.

Total number of ST cases newly detected * 100000
Total ST Population in an area

NCDR among SC and ST population should be close to NCDR among general population. If it is less, it may indicate inadequate coverage of this population. Special efforts like IEC, LCDC may be implemented in such communities.

Patient month BCPs Stock: Stock of BCPs in months, according to the number of patients expected to be treated in the next quarter.

Calculation =
No. of Blister Packs of each category [PB(A/C),MB(A/C)]
No. of cases detected during the previous 3 months, in each category [PB(A/C), MB(A/C)]

Proportion of Health Sub Centre providing MDT:

Proportion (%) of Health Sub Centres providing MDT treatment, among all functional Health Sub Centres in a given area.
Calculation =
Functional Health Sub Centres providing MDT
Treatment x 100
Total no. of functional health sub centres in a given area

Absolute No. of Cases released from treatment: Total no. of cases released from treatment every month.

In addition to above 11 SIS indicators, following indicator needs to be monitored at PHCs:
Prevalence/Case detection Ratio (PD Ratio)

Prevalence Rate Annual
New Case detection Rate

Interpretation: This ratio should be less than 1,
PD ratio more than 1 indicates:-

- That patients are on register for more than prescribed period
- Or there is re-registration

This will require cleaning of registers to remove all cases who have completed treatment so that they should no more be accounted for.

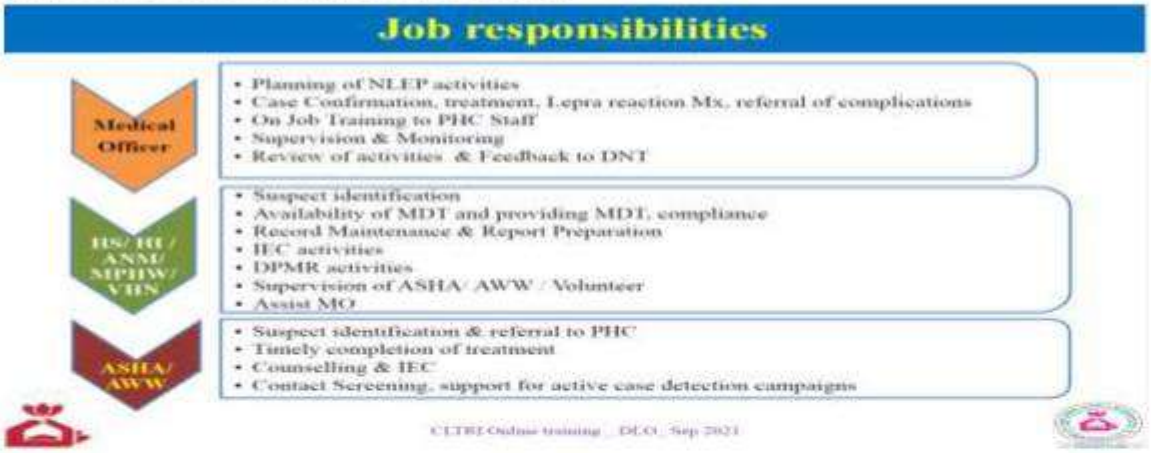
Summary of responsibility of health staff under NLEP: (Refer Annexure 6.9 (Vol. II))

Job responsibilities of LT/NMS after integration:

After integration of NLEP into General Health Care it is expected that the routine programme responsibilities shall be discharged by GHC staff and the existing vertical staff viz. LT, NMS shall be utilized for capacity building of GHC staff, IEC, special activities under NLEP viz. MLEC, SAPEL, BLAC etc along with responsibilities of other health programmes.

Reporting system for leprosy

For the ease of reporting and data management of registered leprosy cases, central leprosy division has launched Nikusth 2.0 software.







For additional information Refer:

Links for resource material related to NLEP	QR Code
https://cltri.gov.in/AboutLeprosy/default.html	

https://dghs.gov.in/content/1349_3_NationalLeprosyEradicationProgramme.aspx	

6.9 Sexually Transmitted and Blood Borne Infections

6.8.1. HIV Infection and AIDS

The National AIDS Control Programme aims to reduce annual new HIV Infections by 80% and to reduce AIDS related mortalities by 80% by 2025-26 from the baseline value of 2010.

Overview of HIV /AIDS Epidemic in 2020

Indicator	Value
Adult (15-19 Yrs.) Prevalence (in %)	0.22 (0.17 - 0.29)
Number of people living with HIV (in lakh)	23.18 (18.33 - 29.78)
HIV incidence per 1000 uninfected population	0.04(0.02-0.09)
New HIV Infections (In Lakh)	0.58(0.29-1.14)
Change in new HIV Infections since 2010 (in %)	-47.89
AIDS related mortalities (In lakh)	0.32(0.20 - 0.52)
Change in AIDS related mortalities since 2010 (In %)	-82.24

Ref: National AIDS and STD Control Programme phase-V (2021-26)

Etiologic agent

Human immunodeficiency virus is a lentivirus, one of a sub family of retroviruses. Two types are recognized, HIV-1and HIV-2. These viruses store their genetic information as ribonucleic acid (RNA). This RNA is converted into DNA by special enzyme called as Reverse Transcriptase, which is special feature of HIV virus.

Epidemiology:

Mode of HIV transmission

Sexual intercourse

Sexual intercourse is major route of transmission, whether heterosexual or homosexual. Risk of becoming infected through an act of unprotected sexual intercourse depends upon whether sex partner is infected, type of sex act (receptive partner has greater risk than insertive partner), amount of virus present in sexual secretions of infected person and

presence of other sexually transmitted diseases in either partner. Overall infectivity of sexual route is 0.1-0.5%.

Blood-borne infections

HIV infected blood, blood products, transplanted organs or tissues can transmit HIV. This is most efficient way of HIV infection. Transmission potential of HIV virus through blood borne route is more than 90%.

Use of un-sterilized needles and equipment

When needles, syringes and equipment come in contact with body fluids of HIV infected persons, they can become potential source of HIV transmission if not sterilized properly. Needle prick during procedure has also risk of transmission of HIV virus. Possibility of infection from needle prick is estimated at the level of 0.03%.

From HIV infected mother to foetus before, during or after birth

HIV infected pregnant mother has approximately 30% to 45% chances of transmitting virus to her foetus in breastfeeding mothers while 20 to 25 % chances transmitting virus to her foetus who do not breastfeed. out of which, 60% are in utero or during delivery .
(Ref:- National Technical Guidelines 2018 on Anti Retroviral Treatment page no 50)

Efficiency of transmission

Table: Efficiency of various routs of HIV/AIDS Transmission

Sr.	Mode of transmission	Efficiency	Contribution to total infections in India
1	Sexual intercourse	0.1-1%	84.6%
2	Blood transfusion	90-95%	3.2%
3	Perinatal	20-40%	2.4%
4	Intra venous drug use	1-10%	3.2%
5	Needle stick injury, tattooing, etc.	0.03-0.5%	Data not available

Clinical manifestations:

HIV infection and AIDS are two different stages in life of infected person. When someone is infected with HIV virus, he/she goes through four stages of illness.

Stage - I: Acute retroviral illness

This stage usually starts from 8-12 weeks after entry of virus. Body's immune system produces antibodies against invading virus and results in hypersensitive reaction known as acute retroviral illness. This stage is manifested by fever, Lymphadenopathy, malaise, rash, etc. These symptoms last for10-12 days, are usually self-limiting, and are seen only in 60%of cases. CD4 count is normal.

Stage - II: Early stage of immune deficiency
Patient looks healthy and unless blood is tested, he/she is not even suspected to be suffering from HIV infection. Virus is fast multiplying in body but killed by immune system. HIV replication is mostly taking place in lymph nodes and CD4 count is between 500-800 cells/cu dl. Many of patients suffer from autoimmune diseases during this stage.

Stage - III: Intermediate stage of immune deficiency
CD4 count has now dropped between 200-500 cells/cu dl. Patient experiences less severe infections, particularly of skin and mucus membrane. In India this stage is very important as most of patients get reactivation of tuberculosis at this stage and they respond well to treatment. Reactivation of herpes simplex or herpes zoster occurs during this phase with prompter solution and response to treatment

Stage - IV: Advance immune deficiency
CD4 count is now less than 200 cells/cu dl. Advanced immune deficiency leads to high risk of developing AIDS defining opportunistic infections or malignancy. Increased concentration of virus in blood or semen is associated with high risk of sexual transmission in men and women.

Diagnosis of AIDS
Clinical case definition of AIDS for persons above 12years of age
Three positive tests for HIV infection (ELISA – Rapid and simple) ***and*** Any one of following –

- Significant weight loss (10% or more in one month) and/ or cachexia and chronic diarrhoea (intermittent or continuous) or prolonged fever
- Tuberculosis (all types)
- Neurological impairment preventing independent daily activities, not known to be due to conditions unrelated to HIV infections (e.g. trauma)
- Oesophageal candidiasis
- Clinically diagnosed life threatening or recurrent episodes of pneumonia.
- Other conditions like Cryptococcal meningitis, Recurrent Herpes Zoster, etc.
- Kaposi's sarcoma

Case definition of AIDS for children up to 12 years of age
Three positive tests of HIV infection among children 18 months or older, or confirmed maternal HIV infection for children <18months, ***and***
Presence of at least two major signs and two minor signs in absence of known cause of immuno-suppression

Major signs

- Loss of body weight or failure to thrive
- Chronic diarrhoea
- Prolonged fever

Minor signs

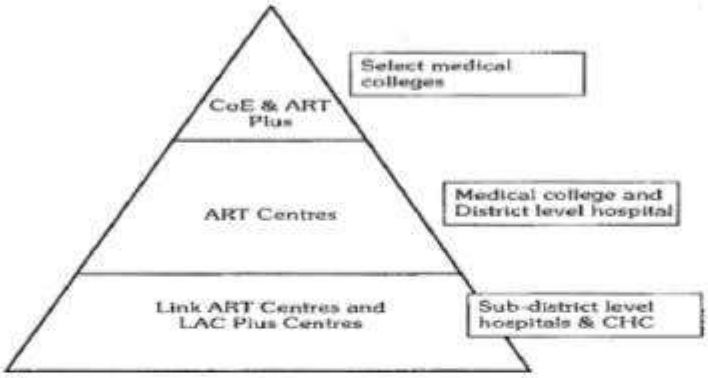
- Repeated common infections
- Generalized lymphadenopathy
- Oropharyngeal candidiasis
- Persistent cough for more than one month
- Disseminated maculo-papular dermatitis

Management of AIDS patients

HIV infection results into progressive depletion of immune system making host susceptible to various infections, including opportunistic infection and other AIDS related illnesses. Though the process cannot be completely stopped, it can be slowed down, which would improve quality of life. Therefore, essential features of management plan for AIDS patient include preventive, therapeutic, and supportive measures.

Care, support and treatment

The care, support and treatment (CST) component of NACP aims to provide comprehensive services to people living with HIV (PLHIV) with respect to free Anti- Retroviral Therapy (ART), psychosocial support, prevention and treatment of opportunistic infections including tuberculosis, and facilitating home-based care and impact mitigation. CST services are provided through ART centres established by DAC in health facilities across the country. These are linked to Centres of Excellence (CoE) and ART Plus centres at selected institutions, while some of the services have been decentralized through Link ART Centres (LAC). ART centres are also linked to ICTCs, STI clinics, PPTCT services and other clinical departments in the institutions of their location, as well as with the Revised National Tuberculosis Programme



(RNTCP), in order to ensure proper management of TB-HIV co-infected patients.



No. T-11020/86/2006-NACO (ART)
Government of India
Ministry of Health and family Welfare
National AIDS Control Organization

9th Floor, Chandralok Building,
36 Janpath, New delhi-11001
Dated: 05th May, 2017

Office Memorandum

Subject: Revised guidelines on initiation of Antiretroviral Therapy (ART).

In accordance with recommendations of Technical Resource group on ART and review of evidence in WHO 2016 ART Guidelines, the guidelines for initiation of ART in PLHIV under National programme have been revised. As per revised guidelines, it has been decided to **TREAT ALL** PLHIV with Antiretro viral Therapy **regardless of CD4 count, clinical stage, age or population**.

Patients who are in Pre ART care should undergo a fresh CD4 count if it is more than three months old and baseline investigations before ART initiation as per revised criteria.Adequate counselling and preparedness needs to be ensured before ART initiation in all PLHIV, particularly for those with higher CD4 count as they are likely to be asymptomatic and more likely to default.

The guidelines on what regimen to start remains same as of now.

This OM is in suppression of all earlier OMs in this regard.

Dr R S Gupta
Deputy Director General (CST)

Table : Commonly used NRTIs

Generic Name	Dose	Adverse effects
Tenofovir (TDF)	300 mg once daily	Renal toxicity, bone demineralization
Zidovudine (ZDV, AZT)	300 mg twice daily	Anaemia, neutropenia, bone marrow suppression, gastrointestinal intolerance, headache, insomnia, myopathy, lactic acidosis, skin and nail hyperpigmentation
Lamivudine (3TC)	150 mg twice daily or 300 mg once daily	Minimal toxicity, rash (though very rare)
Abacavir (ABC)	300 mg twice daily or 600 mg once daily	Hypersensitivity reaction in 3 to 5% (can be fatal), fever, rash, fatigue, nausea, vomiting, anorexia, respiratory symptoms (sore throat, cough, shortness of breath); Re-challenging after reaction can be fatal.

Aims of management

Following supportive measures should be advised to AIDS patients Prevention of repeated STIs

- HIV reactive person should use condom in sexual practice even if both partners are HIV reactive. This will prevent STDs, which acts as co-factor in transmission of HIV.
- Change in lifestyle. Patient should be counselled for positive way of life and should avoid drinking, smoking, and late nights as all these activities depress immunity.
- Some amount of physical exercise enhances immune function of body. CD4 cell count goes up in people who do simple, consistent exercise. Exercise also gives energy, increases appetite and sense of wellbeing.
- Anxiety and tension are very common in AIDS patients. They have detrimental effect on patient's ability to fight diseases and maintain good health. Reassurance and psychological support by PHC staff is necessary to help HIV-AIDS patients to overcome periodic bouts of severe depression.

Therapeutic management

AIDS is a disease for which no effective cure is available yet. Anti-Retroviral drugs only improve quality of life but offer no cure. PHC has limited role in therapeutic management of AIDS patient. Presently Anti-Retroviral Therapy is available in ART Centre of Medical College Hospitals, Rural Hospital and Sub-District Hospital etc.

At ART centre the following things will be done:

Initial work up of patients at the ART centre

The patients should is screened for Opportunistic Infections (OI) and eligibility for ART. WHO clinical staging and CD4 count is done and documented. Besides this all the patients are assessed on the following aspects:

- Step 1: Clinical History
- Step 2: Physical Examination
- Step 3: Baseline laboratory Evaluation
- Step 4: Preparedness Counselling

Step 1: Clinical History

The clinical history should include information on HIV specific symptoms, both present & past, any past history of TB, HIV related co morbid conditions, history of jaundice, dyslipidaemia etc. Besides this detailed sexual history (Genital ulcers, other STIs, multiple sex partners, etc)

along with personal history (smoking, alcohol & substance abuse), prior use of ARVs, treatment for coexisting conditions like (diabetes, cardiovascular disease, contraceptives pills, herbal drugs) and family medical history should be taken.

Detailed, behavioural / psychosocial assessment which should include information about educational level, employment status and financial resources, social support and family / household structure and Identification of primary caregiver. Besides this a nutritional and mental health assessment (mini mental score) also needs to be done.

Step 2: Physical Examination

A detailed physical examination should be done at the first visit which should include measurement and recording of weight and height, vital signs & BMI. Detailed examination of the oral cavity, lymph nodes, skin, genital, ophthalmic and systemic examination.

Step 3: Baseline laboratory work up at ART centre

Essential / mandatory tests for all patients registering in HIV care at ART centre/LAC plus

- Haemogram /CBC, Urine for routine and microscopic examination, fasting blood sugar, blood urea, ALT (SGPT), VDRL, X-ray Chest PA view. Pregnancy test in females if required.
- CD4 Test
- Symptoms and signs directed investigations for ruling out OIs. (Opportunistic Infections).
- Other investigations like USG abdomen, sputum for AFB, CSF analysis etc. as per the physician's decision depending on clinical presentation. Efforts to be made to fast track these investigations so that ART initiation is not delayed.
- Serum creatinine is essential when considering TDF drug. (Tenofovir)
- PAP smear, fundus examination also to be done but ART initiation not to be delayed for these tests.
- Tests for Special Situation
- E.g. HBsAg, Anti HCV etc.

Step 4: ART Preparedness Counselling

ART preparedness counselling needs to be done in 2-3 sessions (on an average) while they undergo clinical and laboratory screening. The counsellor should make sure that the patient understands that the treatment is life long, has gained knowledge about the nature of treatment, is willing to take ART and follow the adherence guidelines. The patient must also understand that first line treatment is his best chance for long term survival. Hence adherence is most critical issue. He/She should also not share drugs with spouse/ friends or family members. He/She should also be counselled on probable side effects of drugs and need to use condoms even if both the partners are HIV positive. Counsellor should also encourage family involvement/guardianship. Besides this the counsellor should also discuss with the patient about risk reduction behaviour especially about condom use, substance use and about dietary habits. The importance of accessing an appropriate health facility, as and when required should also be emphasized upon

Once the counsellor certifies "treatment preparedness", only then patient should be initiated on ART by the Medical Officer.

MO prescribes ARV and other necessary drugs for 14 days

In case of pregnant women, she should be counselled on issues relating to infant feeding, need for regular follow-up, what to do in early post-natal period, linking infant to EID (Early Infant Diagnosis) after delivery and ART adherence.

Opportunistic infections

Opportunistic infections are most important clinical manifestations of advanced immunodeficiency of HIV reactive persons. In immuno-compromised host, opportunistic infections are usually reactivation of previous infections that may not have produced symptomatology till immune system is deteriorated.

Important opportunistic infections are as follows

Tuberculosis

Tuberculosis is most common opportunistic infection amongst AIDS patients in India. DOTS therapy can cure TB of AIDS patient and improve quality of life. Refer TB patient with high-risk behaviour to nearest Voluntary Counselling and Testing Centre (VCTC).

Respiratory infections

Up to two third of HIV reactive persons have respiratory infections as opportunistic infections. Presence or worsening of cough and or chest pain, dyspnoea are indications of respiratory disease. For management of respiratory infections, first rule out TB. Start broad spectrum antibiotics. If possible, send sputum sample of patient for **Gram Staining** and **Culture Sensitivity**. You can change antibiotics as per laboratory results. If patient does not get relief within five days from starting of antibiotics, refer to District Hospital/ Medical College.

Chronic diarrhoea

Diarrhoea is most common gastrointestinal symptom among HIV reactive persons. Diarrhoea affects up to 90% of patients and becomes more frequent as immune deficiency progresses. Assess type of diarrhoea and dehydration status of patient.

Preferred Therapy: Tab Ciprofloxacin 500–750 mg Oral (or 400 mg IV) BD

Alternative Therapy: Ceftriaxone IV 1 g OD or Inj. Cefotaxime IV 1 g TDS

Home based care

HIV/AIDS has long incubation period. People suffering from this condition require a long continuous treatment. Such patients cannot be kept admitted to hospital throughout their illness. So home based care is important. MO PHC and staff can help such patient and relatives in home based care by helping to complete antiretroviral therapy, early diagnosis of opportunistic infections, treatment of minor ailments, psychological support to patient and family, etc.

National Aids Control Program

NACP I:

The NACP I started in 1992 was implemented with an objective of slowing down the spread of HIV infections so as to reduce morbidity, mortality and impact of AIDS in the country.

NACP II: was launched to reduce the spread of HIV infection in India, and (ii) to increase India's capacity to respond to HIV/AIDS on a long-term basis.

NACP III: was launched in July 2007 with the goal of Halting and Reversing the Epidemic over its five-year period.

NACP IV: was launched in 2012, aims to accelerate the process of reversal and further strengthen the epidemic response in India through a cautious and well-defined integration process over the next five years.

NACP V: was implemented as a Central Sector Scheme fully funded by the Government of India from 1st April 2021 to 31st March 2026

The NACP Phase-V will take the national AIDS and STD response towards the attainment of United Nations' Sustainable Development Goals 3.3 of ending the HIV/AIDS epidemic as a public health threat by 2030 through a comprehensive package of prevention, detection and treatment services.

The Phase-V builds upon the gamechanger initiatives of the HIV/AIDS Prevention and Control Act (2017), Test and Treat Policy, Universal Viral Load Testing, Mission Sampark, Community-Based Screening, transition to Dolutegravir-based Treatment Regimen etc and introduces newer strategies consolidating and augmenting the gains. This includes setting-up of Sampoorna Suraksha Kendras (SSK) for providing services through a single window model for those "at risk" for HIV and STI covering prevention-test-treat-care continuum. It includes a holistic set of services customized as per clients' needs, with strong linkages and referrals within and outside of health systems.

Objectives of NACP Program

The NACP is in now phase-V (2021-26) it builds on the game changer initiatives of the HIV and AIDS (Prevention and Control) Act, 2017 and rules thereof,

- test and Treat policy,
- universal Viral load testing,
- Mission Sampark,
- Community based Screening,
- transition to Dolutegravir-based treatment Regimen stc. with an integral vibrant community engagement.

Ref:- National AIDS and STD Control Programme phase-V (2021-26

Activities

To achieve objectives laid down under National AIDS Control Program, following HIV AIDS control activities should be implemented in PHC.

- Referring persons with high-risk behaviour to VCTC
- Information education and communication
- Condom promotion
- Hospital infection control measures
- Family health awareness campaign

Actions to be taken for each of activities are given below-

Referring persons with high-risk behaviour to ICTC.

- Voluntary Counselling and Testing Centers are now available at all District Hospitals and Sub-District/Rural Hospitals. Pre and Post test counselling of referred patients is conducted by qualified counsellors and HIV testing is carried out. Anybody can avail these services free of cost. Persons with high-risk behaviour and having sexually transmitted infections should be advised to avail ICTC. services.
- Use ICTC instead of word VCTC
- Now it is free.

Information, Education and Communication

HIV/AIDS does not have permanent cure. Possibility of vaccine availability is distend. Therefore, Health Education is most effective tool available to prevent spread of HIV infection. Following points should be considered during IEC activities:

- HIV infection spreads when there are multiple sex partners, use of infected blood/needles and from HIV infected mother to child, unsafe surgeries etc.
- HIV infection does not spread by sharing water, food, utensils, clothes, etc. and by hugging, shaking hand, sneezing, etc.
- Immediately contact doctor if there is genital ulcer, urethra discharge, swelling in genital area, etc. and get complete treatment as per advice.
- Condom helps to prevent HIV infection. It is available free of cost at all government health institutions.
- Never discriminate HIV reactive person or AIDS patient.
- In case of doubt, avail services of nearest ICTC.

Condom use

Condom use physically prevents contact of sexual secretions and thus prevents spread of HIV infection. Condoms are extremely important for persons having high-risk behaviour.
Following points should be considered for promotion of condom use:

- Ensure free of cost and easy availability of condoms at all Government Health Facilities all the time.
- Maintain sufficient stock of good quality condoms at all Government Health Facilities
- Increase awareness, knowledge and skills regarding use of condom among men and women in rural areas, especially those at high risk.

Prevention of Parent to Child Transmission (PPTCT)

All pregnant women attending ANC clinic are counselled for HIV testing. HIV positive mother is identified and given ART to prevent mother to child transmission. MO should inform about PPTCT services to all MPW (F) and HA (F). All the pregnant women in PHC should be informed to avail PPTCT services at nearby PPTCT centre.

Hospital infection control measures

HIV infection can be introduced through infected blood, improperly sterilized needles and syringes or through contact with body fluids of infected patient. Importance of hospital infections and how to prevent them is discussed with details in chapter of infection control measures.

Family health awareness campaign

Awareness which can lead to attitudinal and behavioural changes in an individual and society towards safe sexual and other healthy practices is one of the most effective weapons we have presently against HIV/AIDS.
Relationship between RTI/STD and HIV infection is due to unprotected sexual intercourse with multiple partners. Presence of RTI/STD facilitates acquisition and transmission of HIV infection by 2-10 times. Thus, early diagnosis and effective treatment of RTI/STD can significantly reduce HIV transmission. Family Health Awareness Campaign is a strategy through which target population (15-49 years) is sensitized towards RTI/ STD, risk they posed and their modes of transmission. All efforts would be made to encourage early detection and prompt treatment of RTI/STD by fully involving community.

Objectives

- To raise level of awareness among general population as well as vulnerable segments of population about RTI/STD and HIV/AIDS in rural areas and urban slums.
- To encourage health seeking behaviour in general population for RTI/STD.
- To make people aware about services available in public health system for management of RTI/STD.
- To facilitate early detection and prompt treatment of RTI/STD by mainstreaming program with infrastructure available under primary health care.
- To implement a focused IEC strategy for general population and especially for youth.

Strategy

- **Inter-sectoral coordination**

Help of other departments like WCD, Education, Social welfare ,, Transport and NGOs can be obtained at village level for proper success of program.

- **Interpersonal communication**

MPW / ANM/ASHA/ CHO can give information to the community about disease and its prevention methods during their Home Visits.

- **Training**

MO PHC will be trained in syndromic management of RTI/STD.
Training of paramedical staff is organized in communication strategy, recognition of RTI and referral to Higher centre.

- **Treatment**
  - Treatment on the basis of syndromic approach to RTI/STD treatment.
  - Follow up of RTI/STD cases and their referral if required.

6.8.2. Viral Hepatitis

Presently five viruses are responsible for viral hepatitis as they have common characteristics as primary replication in liver. Each virus belongs to different taxonomic family. Amongst these, Hepatitis B virus (HBV), Hepatitis C virus (HCV) and Delta Hepatitis virus (HDV) are transmitted by blood and body fluids and have ability to produce a persistent infection and chronic liver diseases. They rarely present in epidemic form.

Clinical symptomatology does not distinguish between different types of viral hepatitis. Therefore clinical symptoms alone should not be used to establish etiologic diagnosis in jaundice patients. and have ability to produce a persistent infection and chronic liver diseases. They rarely present in epidemic form.

Characteristics of Viral Hepatitis

Hepatitis-B

Acute HBV infection can be asymptomatic or cause clinically evident hepatitis or result into fulminate hepatitis and death. Acute hepatitis B cannot be differentiated from other types of viral hepatitis on the basis of signs and symptoms, correct diagnosis being only made by serological testing.

Mode of transmission

Hepatitis-B is transmitted by blood transfusion, use of contaminated needles or medical instruments, conjunctival/ mucosal contamination with infected blood or body fluids, sharing razors/toothbrush with infected persons, sexual contact, etc.

Clinical characteristics

Clinical onset of Hepatitis-B is usually insidious with malaise, weakness and anorexia being most common findings. Liver enzyme elevation occurs usually prior to appearance of jaundice. Incubation period is 6 weeks to 6 months.

Control of Hepatitis B

Immunization

Routine vaccination against Hepatitis-B is the only control measure available at present.
Give at Birth 'O' dose within 24 hours.
Full Immunization schedule of Hepatitis-B vaccine- Schedule for primary immunization in children is given in chapter on immunization, which has been initiated in Maharashtra in phased manner.

- For general population, immunization schedule is as below:

1st dose	1ml intra muscularly	any time
2nd dose	1ml intra muscularly	1 month after 1st dose
3rd dose	1ml intra muscularly	6 months after 1st dose

Post exposure administration

Hepatitis-B vaccine should be given immediately after exposure in following conditions -

- To newborns of Hepatitis-B carrier mothers (half the adult dose)
- Accidental exposure to HBV infection due to transfusion, cuts, injuries or needle sticks. This is important in case of occupational risk in case of health care personnel.

Hepatitis-B Immunoglobulin (HBIG)

HBIG should be given in following conditions

- Health personnel exposed to HBV infectious blood
- Newborn infants of carrier mothers
- Sexual contact of acute Hepatitis-B patients Recommended dose is 0.05 to 0.07ml/kg body weight. Two doses should be given 30 days apart. HBIG provides short-term passive protection, which lasts for approximately 3 months.

Hepatitis-C

Hepatitis-C virus has been shown to be primary etiologic agent of parenterally transmitted non-A, non-B hepatitis worldwide.

Important aspects

Spectrum of infection ranges from an asymptomatic infection (most common) to acute fulminate hepatitis (very rare). Average incubation period is 6-7 weeks. Most patients with acute HCV infection are asymptomatic and only 15-30% develop jaundice. Clinical illness in persons with acute hepatitis-C similar to that observed in hepatitis of other viral etiologies and diagnosis of Hepatitis-C can be made only with appropriate serological testing.
Striking feature of acute HCV infection is that a persistent infection develops in more than 85% of adults and children and may occur with or without evidence of chronic hepatitis. Of persons with chronic HCV infection, an average of 67% develop chronic hepatitis with elevated enzymes within 6 months after onset of acute infection and no clinical and epidemiological features of patients appear to be predictive of progression to chronic infection or hepatitis.

Prevention

Presently no vaccine is available against Hepatitis-C infection. Only preventive measure that can be adopted is screening of blood and donor organs for HCV infection.

Delta Hepatitis (HDV)

Delta hepatitis virus is small, circular, single stranded RNA, delta antigen and an outer coat of HBsAg. There are three forms of HDV infection

- An acute co-infection that occurs with HBV
- Super infection of a person with chronic HBV infection
- Latent infection in persons who receive liver transplant for HBV-HDV disease. Spectrum of clinical disease in acute HDV co-infection or super infection varies from no illness to fulminate hepatitis. In general, HDV infection augments severity of both acute and chronic HBV infection, with 50-70% of acute infections (co infection or super infection) resulting in an episode of clinical hepatitis with jaundice, compared with 30% of HBV infections.

Investigation and control of Hepatitis outbreak

Hepatitis-B, Hepatitis -C and Delta Hepatitis are transmitted through parenteral route. They spread primarily through blood transfusion, sexual contact and improper sterilization of needles, syringes, instruments and equipment. Parenterally transmitted hepatitis rarely develops into epidemic form.

National Viral Hepatitis Control Program (NVHCP)

The National Viral Hepatitis Control Program has been launched by Ministry of Health and Family Welfare, Government of India on the occasion of the World Hepatitis Day, 28th July 2018. It is an integrated initiative for the prevention and control of viral hepatitis in India to achieve Sustainable Development Goal (SDG) 3.3 which aims to ending viral hepatitis by 2030. This is a comprehensive plan covering the entire gamut from Hepatitis A, B, C, D & E, and the whole range from prevention, detection and treatment to mapping treatment outcomes. Operational Guidelines for National Viral Hepatitis Control Program, National Laboratory Guidelines for Viral Hepatitis Testing and National Guidelines for Diagnosis and Management of Viral Hepatitis were also released.

Aim:

- Combat hepatitis and achieve country wide elimination of Hepatitis C by 2030;
- Achieve significant reduction in the infected population, morbidity and mortality associated with Hepatitis B and C viz. Cirrhosis and Hepato-cellular carcinoma (liver cancer);
- Reduce the risk, morbidity and mortality due to Hepatitis A and E.

Key Objectives:

- Enhance community awareness on hepatitis and lay stress on preventive measures among general population especially high-risk groups and in hotspots.
- Provide early diagnosis and management of viral hepatitis at all levels of healthcare
- Develop standard diagnostic and treatment protocols for management of viral hepatitis and its complications.
- Strengthen the existing infrastructure facilities, build capacities of existing human resources and raise additional human resources, where required, for providing

comprehensive services for management of viral hepatitis and its complications in all districts of the country.

- Develop linkages with the existing National programs towards awareness, prevention, diagnosis and treatment for viral hepatitis.
- Develop a web-based "Viral Hepatitis Information and Management System" to maintain a registry of persons affected with viral hepatitis and its sequelae.

Components:

Preventive component: This is the cornerstone of the NVHCP. It includes

- Awareness generation & behaviour change communication
- Immunization of Hepatitis B (birth dose, high risk groups, health care workers)
- Safety of blood and blood products
- Injection safety, safe socio-cultural practices
- Safe drinking water, hygiene and sanitary toilets

Diagnosis and Treatment:

- Screening of pregnant women for HBsAg to be done in areas where institutional deliveries are < 80% to ensure their referral for institutional delivery for birth dose Hepatitis B vaccination.
- Free screening, diagnosis and treatment for both hepatitis B and C would be made available at all levels of health care in a phased manner.
- Provision of linkages, including with private sector and not for profit institutions, for diagnosis and treatment.
- Engagement with community/peer support to enhance and ensure adherence to treatment and demand generation.

Monitoring and Evaluation, Surveillance and Research

Effective linkages to the surveillance system would be established and operational research would be undertaken through Department of Health Research (DHR). Standardized monitoring & evaluation framework would be developed and an online web based system is established.

Training and Capacity Building:

This will be a continuous process and will be supported by NCDC (National Centre for Disease Control), ILBS (Institute of Liver and Biliary Sciences) and state tertiary care institutes and coordinated by NVHCP. The hepatitis induction and update programs for all level of health care workers would be made available using both, the traditional cascade model of training through master trainers and various platforms available for enabling electronic, e-learning and e-courses.

National Viral Hepatitis Control Management Unit

The NVHCP will be coordinated by the units at the centre and the states.

- National Viral Hepatitis Management Unit (NVHMU): The NVHMU is established at the centre with in the NHM (National Health Mission) and will be responsible for implementation of program in the country. The NVHMU will be headed by a Joint Secretary who will report to the Mission Director (NHM).
- State Viral Hepatitis Management Unit (SVHMU)- The State Health Society with nodal officer and required essential manpower will coordinate the program at state level.

- District Viral Hepatitis Management Unit (DVHMU)- A program officer at the district level from available manpower would act as the nodal person to supervise the program and facilitate the logistics, supply chain, outreach, training at district level.

6.10 Other Diseases of Public Health Importance

6.9.1. Food Poisoning

Although expression of food poisoning is generally applied to any disease caused by food, this term is used for acute diseases caused by consumption of food contaminated by microorganisms or their metabolic products.

It is common practice in India to offer meals to all those who attend ceremonies like marriages, cultural gatherings, religious functions, etc. Preparation, storage and serving food to large gathering with inadequate resources and untrained food handlers are root causes of majority of food poisoning episodes.

Common causes of food poisoning:

- Food is prepared by local people who are not trained in hygienic food preparation and handling.
- Utensils, water and raw food items used for food preparation may be contaminated.
- After preparation, food is kept at room temperature and in unhygienic condition for long time (overnight).
- Food handlers are not checked for infection or diseases.
- Instead of discarding, unused food is distributed among poor people, sometimes after more than 24 hours of preparation which is consumed after variable period from distribution.

Frequently encountered food- borne diseases in Maharashtra state.

Most frequently encountered food-borne diseases in Maharashtra state, their incubation period and duration of illness are given in following table.

Staphylococcal food poisoning

Characteristics

- Staphylococcal food poisoning is generally suspected when a large number of people develop acute, predominantly upper gastrointestinal tract symptoms a few hours after consumption of some common food.
- Symptoms usually appear 2 to 6 hours after ingestion. Onset is generally abrupt and violent. Salivation, nausea, vomiting, abdominal cramps, diarrhoea (less often than vomiting) and occasionally hypertension occur.
- Acute gastrointestinal symptoms generally last for less than one day, weakness may persist for another one to two days. Death in otherwise healthy individual is rare.

Source of contamination

Staphylococci are widely distributed in nature, and man is natural reservoir. Organisms are abundant in purulent discharge of infected finger, cut, burn or chronic infections of nasal sinuses. Persons with boils, carbuncles and common colds are heavy shedders as well. Foods implicated in Staphylococcal food poisoning generally require much handling and are always rich in protein.

Prevention

Three principal requirements for production of sufficient enterotoxin to cause diseases are –

Table: Incubation period and duration for common food poisoning

No.	Type	Incubation period in hours	Duration
1	Staphylococcus aureus (Toxin)	2 to 6	6 to 24 hours
2	Salmonella (Infection)	6 to 48	1 to 7 days
3	Clostridium botulism (Toxin)	12 to 96, usually 18 to 36	Slow convalescence over 6 to 8 months or death in 24 hrs to 8 days
4	Clostridium perfringens (Toxin)	8 to 22	24 to 48 hours
5	Bacillus cereus (Toxin)	1 to 16	12 to 24 hours

- Food must be contaminated with enterotoxin producing staphylococci.
- Food must be a good growth medium.
- Food must be kept at room temperature for several hours.

Prevention depends upon following important actions:

- Eliminating sources of contamination and practicing safe food handling; workers with purulent discharge, running nose should be excluded from food preparation.
- Food handling should be minimum possible.
- Food should be stored at proper temperature .

Salmonella infection:

Characteristics

- Salmonella are most prevalent zoonotic infectious agents.
- Incubation period is between 6-48 hours.
- Frequent symptoms of salmonellosis are diarrhoea, abdominal cramps, pain, fever, headache, nausea and vomiting.
- Case fatality rate is usually low, but infants, aged and immune suppressed often become seriously ill.

Source of contamination

- Milk and Poultry products frequently harbour salmonella.
- Temperature used in routine pasteurization of milk destroys Salmonella. However Salmonella within meat or poultry products may survive if cooking temperature and time of cooking are not adequate.
- Refrigeration does not destroy salmonella which necessitates reheating of refrigerated food.

Prevention

- Food borne salmonella infection can be prevented by adequate heating to destroy these pathogens and avoidance of cross contamination after heating.
- For severe salmonellosis most effective antibiotic is fluoroquinolone, such as ciprofloxacin.

Botulism

Characteristics

- Food borne botulism results from ingestion of preformed botulinal toxin in improperly preserved food.
- Signs and symptoms appear after 12-48 hours after ingestion of contaminated food.
- Initial symptoms are ptosis, blurred or double vision and dry or sore throat. Progressive descending paralysis may then develop.
- Case fatality ratio is more than 30% and respiratory paralysis is generally immediate cause of death.
- Most notable effect of botulism is flaccid paralysis because of interruption of nerve impulses at myoneural junction.
- Treatment of botulism requires high quality supportive care with immediate access to intensive care unit so that respiratory failure can be anticipated and promptly treated. Therefore, if MO suspects botulism poisoning, patient should be referred to hospital where MICU facility is available. Antitoxins are available but are not supplied to PHC.

Source of contamination

- Most cases of food-borne botulism are caused by homemade and preserved foods that have received some preliminary heat treatment as by canning or smoking.

Prevention

- Botulism toxin once formed is readily destroyed by boiling; however most of botulism spores require very high temperature 1160 C to destroy.

Clostridium perfringens

Characteristics

- Organism has been found in faeces of humans, animals and in soil, water and air.
- Majority of outbreaks have been associated with ingestion of meat, meat dishes, and poultry.
- If food is not cooled adequately, spores germinate and multiply and produce variety of toxins.
- Usual history is that, food has been prepared and cooked 24 hours or more before consumption, and allowed to cool slowly at room temperature and then heated immediately prior to serving.
- Common symptoms are diarrhoea, abdominal cramps, low or no fever occurring 8 to 22 hours after consumption of food. Recovery is rapid and no deaths occur.

Prevention

- Cooking food just prior to its consumption.
- If it has to be stored, follow rapid and adequate cooling.
- Stored meat for long duration needs to cook/boiled for long duration before consumption.

Bacillus cereus poisoning

- Organisms are ubiquitous in soil and in raw dried and processed food. Spores survive cooking. Spores germinate and multiply at a favourable temperature.
- Symptoms are due to enterotoxin produced.
- Vomiting followed by diarrhoea, abdominal pain, nausea are seen.

Prevention

- Cooking food just prior to its consumption.
- If it has to be stored, follow rapid and adequate cooling.

Investigation of food poisoning

Investigation of food poisoning should start as early as possible. This is important because, memories fade, people scatter and suspected food may be discarded and unavailable for investigation or in worst case sometimes it may be consumed by others in course of time.
In relatively small outbreak, an effort should be made to question all who were exposed, whether ill or not, for symptoms and food consumption history.

Collection of samples:

Collection of food samples

Collection of adequate and appropriate samples is essential for investigation. Important aspects about collection of food samples are -

- Samples should be collected in sterile container. Container can be sterilized by complete immersion of container in boiling water for at least 30 minutes. Container should be allowed to dry before collection of samples. Do not use cloth for drying container.
- Food sample or all left over prepared food or drink along with kothimbir, chatni, curd, water etc. served should be collected in sterile containers.
- Raw material such as food grains, pulses, atta, chilli powder, turmeric powder, whole spices need not be collected routinely unless there is reason to believe that they are contaminated with pesticides, organic chemicals or any other material. Sample required to be collected is 500 gms.
- Food sample must reach laboratory within 24 hours, preferably in cold chain by special messenger.
- Label of sample should indicate place, date and time of collection and approximate weight of sample.
- Send following information along with samples to laboratory. This will help in isolation of causative organism.
    - Date and time of food preparation, food storage time and when food was actually served
    - Number of persons consumed food and Number of persons affected
    - Symptoms reported, date and time of onset of symptoms
    - If death; number of deaths. Condition of recovering patients
    - Reasons for suspecting food causing poisoning

This information will guide in examining food samples in laboratory.

Collection of specimens from human sources

- Specimens may be obtained from patients suffering from food poisoning like rectal swabs or stool and vomit for examination.
- Rectal swabs, swabs from nose or throat or from skin lesions of food handlers to detect carriers and to identify cases of illness.

Steps to be carried out to investigate food poisoning

Confirmation of food poisoning incidence

- Immediately rush to affected village along with PHC team.
- Team should have Gastro Epidemic Kit, 10 plastic bags of at least 250-500 grams capacity, clips, marker pen and plain paper for labelling.

- Once food poisoning is confirmed, inform police in writing about incidence. In case of death, information to police should be conveyed through special messenger.
- Inform organizers of ceremony about not to serve food to anybody and also not to destroy remaining food.

Treatment of affected persons

- Examine all patients for symptoms and dehydration status, start ORS or Ringer's Lactate as per severity of dehydration.
- If any patient shows signs of neurological involvement e.g. ptosis, weakness of limbs, etc, then refer all cases with neurological involvement to nearest specialty hospital with facility of medical ICU.

Investigate for causative food

- Collect history of food consumption as given in table below.
- First list all food items prepared for ceremony. Write down food items on each column of form. Separate forms should be used for affected and not affected persons.
- Start with affected persons. Ask person which food items he/she has consumed on that occasion.
- Tick-mark the items consumed. Read remaining items from list and ask affected person whether he/she has consumed these items also. If yes tick-mark these items also.
- Complete survey of all affected persons available at the time of investigation.
- Ask similarly to all the non-affected persons and collect information of food consumption in non-affected person sin separate form.

Calculation of attack rate

Calculate attack rate for each food item separately forepersons who eat specified item and who did not. Attack rate is calculated by following formula.

No. of affected persons / Total number of persons× 100

To calculate difference in attack rate, subtract attack rate of persons who eat specified food from persons who did not.

Food Poisoning Investigation Survey Form

Village ..... Affected/Non-affected*

Sr.	Name of the person	H/o consumption of food item					
		Item 1	**Item 2**	**Item 3**	**Item 4**	**Item 5**	**Item 6**
1							
2							

*Use separate forms for affected and non-affected persons

Analyse the information

Once survey is complete, compile information in the form of table given below -

Food Item	Persons who ate specified food				Persons who did not eat specified food				Diff.in attack rate
	Affected	**Well**	**Total**	**Attack rate**	**Affected**	**Well**	**Total**	**Attack rate**	
Item-1									
Item-2									
Item-3									

Interpretation of results

- Implicated food generally has highest attack rate.
- Difference between attack rates is called attributable risk,i.e. illness that can be attributed to food item under consideration.
- It is common belief of MO that, association of illness with a particular implicated food should be perfect i.e. all those who ate must become sick and those who did not eat should not get sick. However there are several reasons because of which such things rarely happen in practice , some of them are mentioned below.
  - Implicated food may not be contaminated throughout. This possibility is more for solid or semisolid food.
  - Host susceptibility to particular pathogen or toxin varies
  - Doses (quantity consumed) may vary from person to person
  - Food histories may contain reporting errors through faulty records, lying by patient or there may be errors in recording.
  - Some persons who did not eat specific food also develop symptoms due to cross contamination because of use of same serving utensils.

If food poisoning outbreak is large i.e. more than 100 persons are involved, patients can be selected randomly and questioned for symptoms and food exposure history.

6.9.2 Pandemic

A **pandemic** is an epidemic of an infectious disease that has spread across a large region, for instance multiple continents or worldwide, affecting a substantial number of individuals. A widespread endemic disease with a stable number of infected individuals is not a pandemic. Widespread endemic diseases with a stable number of infected individuals such as recurrences of seasonal influenza are generally excluded as they occur simultaneously in large regions of the globe rather than being spread worldwide.

Throughout human history, there have been a number of pandemics of diseases such as smallpox. The most fatal pandemic in recorded history was the Black Death—also known as The Plague—which killed an estimated 75–200 million people in the 14th century. The term had not been used then but was used for later epidemics, including the 1918 influenza pandemic—more commonly known as the Spanish flu. Current pandemics include HIV/AIDS and COVID-19

Definition

A pandemic is an epidemic occurring on a scale that crosses international boundaries, usually affecting people on a worldwide scale. A disease or condition is not a pandemic merely

because it is widespread or kills many people; it must also be infectious. For instance, cancer is responsible for many deaths but is not considered a pandemic because the disease is not contagious—i.e. easily transmittable—and not even simply infectious.

In 2009, the World Health Organization (WHO) dropped the words "with enormous numbers of deaths and illness" from their definition In 2008, it also dropped the requirement of an "influenza pandemic" to be a new sub-type with a simple Resurgence virus, meaning that many seasonal flu viruses now could be classified as pandemic influenza.

Assessment

Stages

The World Health Organization previously applied a six-stage classification to describe the process by which a novel influenza virus moves from the first few infections in humans through to a pandemic. It starts when mostly animals are infected with a virus and a few cases where animals infect people, then moves to the stage where the virus begins to be transmitted directly between people and ends with the stage when infections in humans from the virus have spread worldwide. In February 2020, a WHO spokesperson clarified that "there is no official category [for a pandemic]

Phase	Probability	Transmission route	Remark
1	Uncertain	Animal-to-animal infection only	–
2	Uncertain	Animal-to-human infection	(Considered a human pandemic threat)
3	Uncertain	Sporadic or clustered cases in humans	No sustained community-level outbreaks
4	Medium to high	Human-to-human transmission	Sustained community-level outbreaks
5	High to certain		Sustained in two countries in one WHO region
6	Pandemic in progress		Sustained in-country in another WHO region
Post-peak			Levels drop below the peak in most countries
Possible new wave			Activity rising again in most countries
Post-pandemic			Levels return to ordinary seasonal levels

During the 2009 influenza pandemic, Dr. Keiji Fukuda, Assistant Director-General *ad interim* for Health Security and Environment, WHO said "An easy way to think about pandemic ... is to say: a pandemic is a global outbreak. Then you might ask yourself: 'What is

a global outbreak?' Global outbreak means that we see both the spread of the agent ... and then we see disease activities in addition to the spread of the virus.

In planning for a possible influenza pandemic, the WHO published a document on pandemic preparedness guidance in 1999, which was revised in 2005 and 2009. It defined phases and appropriate actions for each phase in an *aide-mémoire* titled *WHO pandemic phase descriptions and main actions by phase*. The 2009 revision, including descriptions of a pandemic and the phases leading to its declaration, was finalized in February 2009. The 2009 H1N1 virus pandemic was neither on the horizon at that time nor mentioned in the document. All versions of this document refer to influenza. The phases are defined by the spread of the disease; virulence and mortality are not mentioned in the current WHO definition, although these factors have previously been included.

In 2014, the United States Centers for Disease Control and Prevention introduced an analogous framework to the WHO's pandemic stages titled the Pandemic Intervals Framework.[23] It includes two pre-pandemic intervals,

- Investigation
- Recognition and four pandemic intervals,
- Initiation
- Acceleration
- Deceleration
- Preparation

It also includes a table defining the intervals and mapping them to the WHO pandemic stages.

Severity

In 2014, the United States Centers for Disease Control and Prevention adopted the Pandemic Severity Assessment Framework (PSAF) to assess the severity of pandemics.[23] The PSAF superseded the 2007 linear Pandemic Severity Index, which assumed 30% spread and measured case fatality rate (CFR) to assess the severity and evolution of the pandemic.[25]

Historically, measures of pandemic severity were based on the case fatality rate.[26] However, the case fatality rate might not be an adequate measure of pandemic severity during a pandemic response because:[24]

- Deaths may lag several weeks behind cases, making the case fatality rate an underestimate
- The total number of cases may not be known, making the case fatality rate an overestimate[27]
- A single case fatality rate for the entire population may obscure the effect on vulnerable sub-populations, such as children, the elderly, those with chronic conditions, and members of certain racial and ethnic minorities
- Fatalities alone may not account for the full effects of the pandemic, such as absenteeism or demand for healthcare services

To account for the limitations of measuring the case fatality rate alone, the PSAF rates the severity of a disease outbreak on two dimensions: clinical severity of illness in infected persons; and the transmissibility of the infection in the population.[24] Each dimension can be measured using more than one metric, which are scaled to allow comparison of the different metrics. Clinical severity can instead be measured, for example, as the ratio of deaths to hospitalizations or using genetic markers of virulence. Transmissibility can be measured, for example, as the basic reproduction number R_0 and serial interval or via underlying population

immunity. The framework gives guidelines for scaling the various measures and examples of assessing past pandemics using the framework.

Management

The basic strategies in the control of an outbreak are **containment** and **mitigation**. Containment may be undertaken in the early stages of the outbreak, including contact tracing and isolating infected individuals to stop the disease from spreading to the rest of the population, other public health interventions on infection control, and therapeutic countermeasures such as vaccinations which may be effective if available. When it becomes apparent that it is no longer possible to contain the spread of the disease, management will then move on to the mitigation stage, in which measures are taken to slow the spread of the disease and mitigate its effects on society and the healthcare system. In reality, containment and mitigation measures may be undertaken simultaneously.

A key part of managing an infectious disease outbreak is trying to decrease the epidemic peak, known as "flattening the curve". This helps decrease the risk of health services being overwhelmed and provides more time for a vaccine and treatment to be developed. A broad group of the so-called non-pharmaceutical interventions may be taken to manage the outbreak. In a flu pandemic, these actions may include personal preventive measures such as hand hygiene, wearing face-masks, and self-quarantine; community measures aimed at social distancing such as closing schools and canceling mass gatherings; community engagement to encourage acceptance and participation in such interventions; and environmental measures such as cleaning of surfaces.

Another strategy, **suppression**, requires more extreme long-term non-pharmaceutical interventions to reverse the pandemic by reducing the basic reproduction number to less than 1. The suppression strategy, which includes stringent population-wide social distancing, home isolation of cases, and household quarantine, during the COVID-19 pandemic where entire cities were placed under lockdown; such a strategy may carry with it considerable social and economic costs.

Various Pandemics

HIV/AIDS

Although the WHO uses the term "global epidemic" to describe HIV, as HIV is no longer an uncontrollable outbreak outside of Africa, some authors use the term "pandemic". HIV originated in Africa, and spread to the United States via Haiti between 1966 and 1972. AIDS is currently a pandemic in Africa, with infection rates as high as 25% in some regions of southern and eastern Africa. In 2006, the HIV prevalence among pregnant women in South Africa was 29%. Effective education about safer sexual practices and bloodborne infection precautions training have helped to slow down infection rates in several African countries sponsoring national education programs. There were an estimated 1.5 million new infections of HIV/AIDS in 2020. As of 2020 there have been about a total of 32.7 million deaths related to HIV/AIDS since the epidemic started.

COVID-19

SARS-CoV-2, a new strain of coronavirus, was first detected in the city of Wuhan, Hubei Province, China, in December 2019. It caused a pandemic of cases of an acute respiratory disease, which is referred to as coronavirus disease 2019 (COVID-19). More than 200 countries and territories have been affected by COVID-19, with major outbreaks occurring in Brazil, Russia, India, Mexico, Peru, South Africa,[44][45] Western Europe, and the United States. On 11 March 2020, the World Health Organization characterized the spread of COVID-

19 as a pandemic, marking the first global pandemic since the 2009 swine flu pandemic. As of 31 January 2023, the number of people infected with COVID-19 has reached more than 670 million worldwide. The current death toll is 6,831,146. It is believed that these figures underestimate true totals as testing did not commence in the initial stages of the outbreak and many people infected by the virus have no or only mild symptoms so may not have been tested. Similarly, the number of deaths may also be understated as fatalities may have not been tested or are attributed to other conditions.[31] This was especially the case in large urban areas where a non-trivial number of patients died while in their private residences.

Major COVID-19 outbreaks

Country name	Total cases	Total deaths	Total recovered	Active cases	Deaths % (of total cases)	Recovered % (of total cases)
USA	105,649,010	1,148,993	103,223,189	1,276,828	1.09	97.70
India	44,691,338	530,784	44,156,651	3,903	1.19	98.80
France	39,657,165	165,213	39,430,801	61,151	0.42	99.43
Germany	38,266,753	169,222	37,868,100	229,431	0.44	98.96
Brazil	37,085,520	699,310	36,249,161	137,049	1.89	97.74
Japan	33,326,890	73,226	21,703,521	11,550,143	0.22	65.12
South Korea	30,638,929	34,115	30,435,599	169,215	0.11	99.34
Italy	25,627,473	188,538	25,294,864	144,071	0.74	98.70
UK	24,396,534	207,695	24,129,971	58,868	0.85	98.91
Russia	22,433,361	396,620	21,779,606	257,135	1.15	97.09

Notable outbreaks

In human history, it is generally zoonoses such as influenza and tuberculosis which constitute most of the widespread outbreaks, resulting from the domestication of animals. There have been many particularly significant epidemics that deserve mention above the "mere" destruction of cities:

- **Plague of Athens (430 to 426 BC):** During the Peloponnesian War, typhoid fever killed a quarter of the Athenian troops and a quarter of the population. This disease fatally weakened the dominance of Athens, but the sheer virulence of the disease prevented its wider spread; i.e., it killed off its hosts at a rate faster than they could spread it. The exact cause of the plague was unknown for many years. In January 2006, researchers from the University of Athens analyzed teeth recovered from a mass grave underneath the city and confirmed the presence of bacteria responsible for typhoid.

- **Antonine Plague (165 to 180 AD):** Possibly measles or smallpox brought to the Italian peninsula by soldiers returning from the Near East, it killed a quarter of those infected, up to five million in total.

- **Plague of Cyprian (251–266 AD):** A second outbreak of what may have been the same disease as the Antonine Plague killed (it was said) 5,000 people a day in Rome.

- **Plague of Justinian (541 to 549 AD):** The first recorded outbreak of bubonic plague started in Egypt and reached Constantinople the following spring, killing (according to the Byzantine chronicler Procopius) 10,000 a day at its height, and perhaps 40% of the city's inhabitants. The plague went on to eliminate a quarter to half the human population of the known world.

- **Black Death (1331 to 1353):** The total number of deaths worldwide is estimated at 75 to 200 million. Eight hundred years after the last outbreak, the plague returned to Europe. Starting in Asia, the disease reached the Mediterranean and western Europe in 1348 (possibly from Italian merchants fleeing fighting in Crimea) and killed an estimated 20 to 30 million Europeans in six years; a third of the total population, and up to a half in the worst-affected urban areas. It was the first of a cycle of European plague epidemics that continued until the 18th century. There were more than 100 plague epidemics in Europe during this period . The disease recurred in England every two to five years from 1361 to 1480. By the 1370s, England's population was reduced by 50%. The Great Plague of London of 1665–66 was the last major outbreak of the plague in England and killed approximately 100,000 people, 20% of London's population.

- **Third plague pandemic (1855):** Starting in China, it spread into India, where 10 million people died. During this pandemic, the United States saw its first outbreak: the San Francisco plague of 1900–1904. Today, sporadic cases of plague still occur in the western United States.

- **The 1918–1920 Spanish flu** infected half a billion people around the world, including on remote Pacific islands and in the Arctic—killing 20 to 100 million. Most influenza outbreaks disproportionately kill the very young and the very old, but the 1918 pandemic had an unusually high mortality rate for young adults. It killed more people in 25 weeks than AIDS did in its first 25 years. Mass troop movements and close quarters during World War I caused it to spread and mutate faster, and the susceptibility of soldiers to the flu may have been increased by stress, malnourishment and chemical attacks. Improved transportation systems made it easier for soldiers, sailors and civilian travellers to spread the disease.

Encounters between European explorers and populations in the rest of the world often introduced epidemics of extraordinary virulence. Disease killed part of the native population of the Canary Islands in the 16th century (Guanches). Half the native population of Hispaniola in 1518 was killed by smallpox. Smallpox also ravaged Mexico in the 1520s, killing 150,000 in Tenochtitlán alone, including the emperor, and in Peru in the 1530s, aiding the European conquerors. Measles killed a further two million native Mexicans in the 17th century. In 1618–1619, smallpox wiped out 90% of the Massachusetts Bay Native Americans During the 1770s, smallpox killed at least 30% of the Pacific Northwest Native Americans. Smallpox epidemics in 1780–1782 and 1837–1838 brought devastation and drastic depopulation among the Plains Indians. Some believe the death of up to 95% of the Native American population of the New World was caused by Europeans introducing Old World diseases such as smallpox, measles and influenza. Over the centuries, Europeans had developed high degrees of herd immunity to these diseases, while the indigenous peoples had no such immunity.

Smallpox, introduced by European settlers in 1789 to the Australian continent, devastated the Australian Aboriginal population, killing up to 50% of those infected with the disease during the first decades of colonization. It also killed many New Zealand Māori. In 1848–49, as many as 40,000 out of 150,000 Hawaiians are estimated to have died of measles, whooping cough and influenza. Introduced diseases, notably smallpox, nearly wiped out the native population of Easter Island. Measles killed more than 40,000 Fijians, approximately one-third of the population, in 1875, and in the early 19th century devastated the Great Andamanese population. The Ainu population decreased drastically in the 19th century, due in large part to infectious diseases brought by Japanese settlers pouring into Hokkaido.

Researchers concluded that syphilis was carried from the New World to Europe after Columbus's voyages. The findings suggested Europeans could have carried the non venereal tropical bacteria home, where the organisms may have mutated into a more deadly form in the different conditions of Europe. The disease was more frequently fatal than it is today. Syphilis was a major killer in Europe during the Renaissance. Between 1602 and 1796, the Dutch East India Company sent almost a million Europeans to work in Asia. Ultimately, fewer than a third made their way back to Europe. The majority died of diseases. Disease killed more British soldiers in India and South Africa than war.

As early as 1803, the Spanish Crown organized a mission (the Balmis expedition) to transport the smallpox vaccine to the Spanish colonies and establish mass vaccination programs there. By 1832, the federal government of the United States established a smallpox vaccination program for Native Americans. From the beginning of the 20th century onwards, the elimination or control of disease in tropical countries became a driving force for all colonial powers The sleeping sickness epidemic in Africa was arrested due to mobile teams systematically screening millions of people at risk. In the 20th century, the world saw the biggest increase in its population in human history due to a drop in the mortality rate in many countries as a result of medical advances. The world population has grown from 1.6 billion in 1900 to an estimated 6.8 billion in 2011.

Other Major Pandemic

- Cholera
- Dengue fever
- Influenza
- Typhus
- Smallpox

- Measles
- Leprosy
- Malaria
- Yellow fever

Concerns about future pandemics

In a press conference on 28 December 2020, Dr. Mike Ryan, head of the WHO Emergencies Program, and other officials said the current COVID-19 pandemic is "not necessarily the big one" and "the next pandemic may be more severe." They called for preparation. The WHO and the UN, have warned the world must tackle the cause of pandemics and not just the health and economic symptoms.

The October 2020 'era of pandemics' report by the United Nations' Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, written by 22 experts in a variety of fields, said the anthropogenic destruction of biodiversity is paving the way to the pandemic era and could result in as many as 850,000 viruses being transmitted from animals—in particular birds and mammals—to humans. The "exponential rise" in consumption and trade of commodities such as meat, palm oil, and metals, largely facilitated by developed nations, and a growing human population, are the primary drivers of this destruction. According to Peter Daszak, the chair of the group who produced the report, "there is no great mystery about the cause of the Covid-19 pandemic or any modern pandemic. The same human activities that drive climate change and biodiversity loss also drive pandemic risk through their impacts on our environment." Proposed policy options from the report include taxing meat production and consumption, cracking down on the illegal wildlife trade, removing high-risk species from the legal wildlife trade, eliminating subsidies to businesses that are harmful to the natural world, and establishing a global surveillance network.

In June 2021, a team of scientists assembled by the Harvard Medical School Centre for Health and the Global Environment warned that the primary cause of pandemics so far, the anthropogenic destruction of the natural world through such activities including deforestation and hunting, is being ignored by world leaders

Antibiotic resistance

Antibiotic-resistant microorganisms, which sometimes are referred to as "superbugs", may contribute to the re-emergence of diseases that are currently well controlled. For example, cases of tuberculosis that are resistant to traditionally effective treatments remain a cause of great concern to health professionals. Every year, nearly half a million new cases of multidrug-resistant tuberculosis (MDR-TB) are estimated to occur worldwide. China and India have the highest rate of multidrug-resistant TB.. The World Health Organization (WHO) reports that approximately 50 million people worldwide are infected with MDR TB, with 79 percent of those cases resistant to three or more antibiotics. In 2005, 124 cases of MDR TB were reported in the United States. Extensively drug-resistant tuberculosis (XDR TB) was identified in Africa in 2006 and subsequently discovered to exist in 49 countries, including the United States. There are about 40,000 new cases of XDR-TB per year, the WHO estimates.

In the past 20 years, common bacteria including *Staphylococcus aureus*, *Serratia marcescens* and Enterococcus, have developed resistance to various antibiotics such as vancomycin, as well as whole classes of antibiotics, such as the aminoglycosides and cephalosporins. Antibiotic-resistant organisms have become an important cause of healthcare-associated (nosocomial) infections (HAI). In addition,

infections caused by community-acquired strains of methicillin resistant *Staphylococcus aureus* (MRSA) in otherwise healthy individuals have become more frequent in recent years.

Pandemic Preparedness

Early development of vaccines may be one way to prepare for future pandemics that couldn't get prevented. In 2021, scientists called for accelerated efforts in the development of broadly protective vaccines, especially a universal coronavirus vaccine that durably protects not just against all SARS-CoV-2 variants but also other coronaviruses, including already identified animal coronaviruses with pandemic potential.[189] Other components may include measures related to disease surveillance for detecting pathogens (including early warning systems), data collection and modelling to enable tracing and explaining the spread of pathogens, improvements to public-health guidance and communication, and the development of relevant therapies, including therapies beyond vaccines

- Climate change
- Overpopulation
- Encroaching into wild lands
- Concerning diseases
- Viral haemorrhagic fevers
- Corona viruses

Severe acute respiratory syndrome

After the SARS outbreak, in 2003 the Italian physician Carlo Urbani (1956–2003) was the first to identify severe acute respiratory syndrome (SARS) as a new and dangerously contagious disease, although he became infected and died. It is caused by a corona virus dubbed SARS-CoV-1. Rapid action by national and international health authorities such as the World Health Organization helped to slow transmission and eventually broke the chain of transmission, which ended the localized epidemics before they could become a pandemic. However, the disease has not been eradicated and could re-emerge. These warrants monitoring and reporting of suspicious cases of atypical pneumonia.

- **Influenza**
- **H5N1 (Avian flu)**
- **Zika virus**

Economic consequences

In 2016, the commission on a Global Health Risk Framework for the Future estimated that pandemic disease events would cost the global economy over $6 trillion in the 21st century—over $60 billion per year. The same report recommended spending $4.5 billion annually on global prevention and response capabilities to reduce the threat posed by pandemic events, a figure that the World Bank Group raised to $13 billion in a 2019 report.] It has been suggested that such costs be paid from a tax on aviation rather than from, e.g., income taxes, given the crucial role of air traffic in transforming local epidemics into pandemics (being the only factor considered in state-of-the-art models of long-range disease transmission

The COVID-19 pandemic is expected to have a profound negative effect on the global economy, potentially for years to come, with substantial drops in GDP accompanied by increases in unemployment noted around the world. The slowdown of economic activity early in the COVID-19 pandemic had a profound effect on emissions of pollutants and greenhouse gases. The reduction of air pollution, and economic activity associated with it during a pandemic was first documented by Alexander F. More for the Black Death plague pandemic,

showing the lowest pollution levels in the last 2000 years occurring during that pandemic, due to its 40 to 60% death rate throughout Eurasia.

6.9.3 Yellow Fever

Yellow fever is a zoonotic disease caused by an arbovirus. It affects principally monkeys and other vertebrates in tropical America and Africa and is transmitted to man by certain culicine mosquitoes. It shares clinical features with other viral haemorrhagic fevers (e.g., dengue HF, Lassa fever) but is characterized by more severe hepatic and renal involvement.
The spectrum of disease varies from clinically indeterminate to severe cases. Severe cases develop jaundice with haemorrhagic manifestations (black vomit).
The vaccine is administered subcutaneously at the insertion of deltoid in a single dose of 0.5 ml irrespective of age. Immunity begins to appear on the 7th day and lasts possibly for life.
The risk of death from yellow fever is much higher than the risks related to the vaccine. People who should not be vaccinated include

- children aged under 9 months for routine immunization (or under 6 months during an epidemic);
- pregnant women - except during a yellow fever outbreak when the risk of infection is high;
- people with severe allergies to egg protein; and
- people with severe immunodeficiency caused by symptomatic HIV/AIDS or other causes, or in the presence of thymus disorder. Mild post-vaccinial reactions (e.g., myalgia, headache, low- grade fever) may occur in 2- 5 per cent of vaccines,5 to 10 days after vaccination. Anaphylaxis is very rare, occurring mainly in those allergic to eggs. Cholera and yellow fever vaccines together or within 3 weeks interfere with each other, so whenever possible, they should be given 3 weeks or more apart.

Vector control: The other principal method of preventing yellow fever is through intensive vector control. The objective of vector control is to reduce rapidly the vector population to the lowest possible level and thereby stop or reduce transmission quickly. This approach has proved successful in the Americas to prevent urban epidemics.

The vector, *Aedes* mosquito is peri-domestic in habits. It can be controlled by vigorous anti-adult and anti-larval measures. The long-term policy should be based on organized "source reduction" methods (e.g. elimination of breeding places) supported by health education aimed at securing community participation. Personal protection against contact with insects is of major importance in integrated vector control. Such protection may include the use of repellents, mosquito nets, mosquito coils and fumigation mats.

Surveillance: A programme of surveillance (clinical, serological, histopathological and entomological) should be instituted in countries where the disease is endemic, for the early detection of the presence of the virus in human populations or in animals that may contribute to its dissemination.

For the surveillance of Aedes mosquitoes, the WHO uses an index known as ***Aedes aegypti index.*** This is a house index and is defined as ·'the percentage of houses and their premises, in a limited well-defined area, showing actual breeding of *Aedes aegypti larvae*". This index should not be more than 1 % in towns and seaports in endemic areas to ensure freedom from yellow fever

International measures

India is a yellow fever "receptive" area, that is, "an area in which yellow fever does not exist, but where conditions would permit its development if introduced". The population of India is unvaccinated and susceptible to yellow fever. The vector, *Aedes aegypti* is found in abundance. The climatic conditions are favourable in most parts of India for its transmission. The common monkey of India *(Macacus spp)* is susceptible to yellow fever.

Missing link in the chain of transmission is the virus of yellow fever which does not seem to occur in India. The virus of yellow fever could get imported into India in two ways: (i) through infected travellers (clinical and sub clinical cases}, and (ii} through infected mosquitoes. Measures designed to restrict the spread of yellow fever are specified in the "International Health Regulations" of WHO. These are implemented by the Government of India through stringent aerial and maritime traffic regulations. Broadly these comprise:

Travellers:

All travellers (including infants) exposed to the risk of yellow fever or passing through endemic zones of yellow fever must possess a valid international certificate of vaccination against yellow fever before they are allowed to enter yellow fever "receptive" areas. If no such certificate is available, the traveller is placed on quarantine, in a mosquito- proof ward, for 6 days from the date of leaving an infected area. If the traveller arrives before the certificate becomes "valid" , he is isolated till the certificate becomes valid.

Mosquitoes:

The aircraft and ships arriving from endemic areas are subjected to aerosol spraying with prescribed insecticides on arrival for destruction of insect vectors. Further, airports and seaports are kept free from the breeding of insect vectors over an area extending at least 400 metres around their perimeters. The *"aedes aegypti* index" is kept below 1.

International certificate of vaccination

India and most other countries require a valid certificate of vaccination against yellow fever from travellers coming from infected areas. A few countries (including India) require this even if the traveller has been in transit. It rests with each country to decide whether a certificate of vaccination against yellow fever shall be required for infants under one year of age, after weighing the risk of importation of yellow fever by unvaccinated infants against the risk to the infant arising from vaccination. In this regard, India requires vaccination of infants (?: 9 months of age) too. The validity of the certificate begins 10 days after the date of vaccination. For the purpose of international travel, the vaccination must be given at an officially designated centre, and the certificate must be validated with the official stamp of the Ministry of Health, Government of India. The certificate is valid only if it conforms with the model prescribed under the International Health Regulations. On the other hand, for their own protection, travellers who enter endemic areas should receive vaccination against yellow fever .

New yellow fever vaccination requirement for traveller

In May 2014, the World Health Assembly adopted an amendment of International Health Regulations (2005) , which stipulates that the period of protection afforded by yellow fever vaccination , and the term of validity of the

certificate will change from 10 years to the duration of the life of the person vaccinated . On 11th July 2016, the amendment entered into force and is legally binding upon all !HR states.

This lifetime validity applies automatically to all existing and new certificates, beginning 10 days after the date of vaccination. Accordingly, as of 11th July 2016, re vaccination or a booster dose of yellow fever vaccine will not be required for international travellers as a condition of entry into a State Party, regardless of the date that their international certificate of vaccination was initially issued
In India, the lifetime validity of yellow fever vaccination applies automatically.

Epidemic preparedness and response
WHO recommends that every at-risk country have at least one national laboratory where basic yellow fever blood tests can be performed. A confirmed case of yellow fever in an un vaccinated population is considered as an outbreak. A confirmed case in any context must be fully investigated. Investigation teams must assess and respond to the outbreak with both emergency vaccination campaigns and longer term immunization plans

The Elimination Yellow Fever Epidemic (EYE) Strategy
The EYE Strategy was developed by WHO, UNICEF and GAVY. in response to increased threat of yellow fever urban outbreaks with international spread.
It is guided by three strategic objectives:

- Protect at-risk populations:
- Prevent international spread of yellow fever; and
- Contain outbreaks rapidly.

These objectives are underpinned by five competencies of success:

- Affordable vaccines and sustained vaccine market;
- Strong political commitment at global, regional and country levels
- High-level governance with long-term partnerships;
- Synergies with other health programmes and sectors; and
- Research and development for better tools and practices.

6.11 Emerging-reemerging diseases

6.10.1 Covid 19

Coronavirus disease 2019 (COVID-19) is a contagious disease caused by the coronavirus SARS-CoV-2. The first known case was identified in Wuhan, China, in December 2019. The disease quickly spread worldwide, resulting in the COVID-19 pandemic.
Over 760 million cases and 6.9 million deaths have been recorded worldwide since December 2019, but the actual number is thought to be higher.

Nomenclature -
During the early days of the COVID-19 pandemic, the disease and virus were sometimes called "coronavirus", "novel coronavirus", "Wuhan coronavirus", or "Wuhan pneumonia"
On 11 February 2020, the WHO named the disease COVID-19 (short for coronavirus disease 2019). That same day, the International Committee on Taxonomy of Viruses (ICTV) formally announced it had named the causative virus as SARS-CoV-2 (severe acute respiratory syndrome coronavirus 2) based upon its genetic similarity to the 2003 SARS-CoV. The separation between the disease and the causative virus is based on the same nomenclature policies that separate AIDS and the virus which causes it, HIV.
CO stands for coronavirus, VI for virus, and D stands for disease, while 19 stands for the year, 2019, that the outbreak was first detected.

Overview

COVID-19 is the disease caused by the SARS-CoV-2 coronavirus. It usually spreads between people in close contact.

COVID-19 vaccines provide strong protection against severe illness and death. Although a person can still get COVID-19 after vaccination, they are more likely to have mild or no symptoms.

Anyone can get sick with COVID-19 and become seriously ill or die, but most people will recover without treatment.

People over age 60 and those with existing medical conditions have a higher risk of getting seriously ill. These conditions include high blood pressure, diabetes, obesity, immunosuppression including HIV, cancer and pregnancy. Unvaccinated people also have a higher risk of severe symptoms.

Transmission:

COVID-19 spreads when an infected person breathes out droplets and very small particles that contain the virus. Other people can breathe in these droplets and particles, or these droplets and particles can land on their eyes, nose, or mouth. In some circumstances, these droplets may contaminate surfaces they touch.

Anyone infected with COVID-19 can spread it, even if they do NOT have symptoms.

Symptoms

People may experience different symptoms from COVID-19. Symptoms usually begin 5–6 days after exposure and last 1–14 days.

The most common symptoms are:

- fever
- chills
- sore throat.

Less common symptoms are:

- muscle aches and heavy arms or legs
- severe fatigue or tiredness
- runny or blocked nose, or sneezing
- headache
- sore eyes
- dizziness
- new and persistent cough
- tight chest or chest pain
- shortness of breath
- hoarse voice
- numbness or tingling
- appetite loss, nausea, vomiting, abdominal pain or diarrhoea
- loss or change of sense of taste or smell
- difficulty sleeping.

People with the following symptoms should seek immediate medical attention:

- difficulty breathing, especially at rest, or unable to speak in sentences
- confusion
- drowsiness or loss of consciousness
- persistent pain or pressure in the chest

- skin being cold or clammy, or turning pale or a bluish colour
- loss of speech or movement.

People who have pre-existing health problems are at higher risk when they have COVID-19; they should seek medical help early if worried about their condition. These include people taking immunosuppressive medication; those with chronic heart, lung, liver or rheumatological problems; those with HIV, diabetes, cancer. obesity or dementia.
People with severe disease and those needing hospital treatment should receive treatment as soon as possible. The consequences of severe COVID-19 include death, respiratory failure, sepsis, thromboembolism (blood clots), and multiorgan failure, including injury of the heart, liver or kidneys.
In rare situations, children can develop a severe inflammatory syndrome a few weeks after infection.

Some people who have had COVID-19, whether they have needed hospitalization or not, continue to experience symptoms. These long-term effects are called **long COVID** (or post COVID-19 condition). The most common symptoms associated with long COVID include fatigue, breathlessness and cognitive dysfunction (for example, confusion, forgetfulness, or a lack of mental focus or clarity). Long COVID can affect a person's ability to perform daily activities such as work or household chores.

Complications
Complications may include pneumonia, acute respiratory distress syndrome (ARDS), multi-organ failure, septic shock, and death.
Cardiovascular complications may include heart failure, arrhythmias (including atrial fibrillation), heart inflammation, and thrombosis, particularly venous thromboembolism. Approximately 20–30% of people who present with COVID-19 have elevated liver enzymes, reflecting liver injury.
Neurologic manifestations include seizure, stroke, encephalitis, and Guillain–Barré syndrome (which includes loss of motor functions). Following the infection, children may develop paediatric multisystem inflammatory syndrome, which has symptoms similar to Kawasaki disease, which can be fatal. In very rare cases, acute encephalopathy can occur, and it can be considered in those who have been diagnosed with COVID-19 and have an altered mental status.
Pregnant women are at increased risk of becoming seriously ill from COVID-19. This is because pregnant women with COVID-19 appear to be more likely to develop respiratory and obstetric complications that can lead to miscarriage, premature delivery and intrauterine growth restriction.
Fungal infections such as aspergillosis, candidiasis, cryptococcosis and mucormycosis have been recorded in patients recovering from COVID-19.

Treatment
Most people will recover without needing treatment in a hospital.



For those who need it, doctors will suggest treatments for COVID-19 based on the severity of the disease and the risk of it getting worse. They will consider the person's age and if they have other health problems

As per the severity of the disease, following drugs are used –

- Antivirals (Nirmatrelvir, Ritonavir, Molnupiravir, Remdesivir)
- Corticosteroids
- Anti-coagulants
- IL – 6 receptor blockers
- Baricitinib

Covid 19 treatment document is a living document & is modified as per emerging new evidences. For most recent living treatment guidelines in details, one should refer to WHO website. (www.who.int)

Prevention

Vaccination as per current guidelines - Vaccination against COVID-19 is based on priority groups such as people aged 60 years and over, and those with underlying medical problems such as high blood pressure, diabetes, chronic health problems, immunosuppression (including HIV), obesity, cancer, pregnant persons, and unvaccinated people.

Type of vaccine used & guidelines pertaining to that do change as per new emerging evidences. One need to be well acquainted with recent state & national guidelines.

To prevent the spread of COVID-19:

avoid crowds and keep a safe distance from others, even if they don't appear to be sick;

- wear a properly fitted mask if you feel sick, have been close to people who are sick, if you are at high-risk, or in crowded or poorly ventilated areas.
- clean your hands frequently with alcohol-based hand rub or soap and water;
- cover your mouth and nose with a bent elbow or tissue when you cough or sneeze;
- dispose of used tissues right away and clean your hands; and
- if you develop symptoms or test positive for COVID-19, self-isolate until you recover.

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28. Important QR Codes for NTEP

QR Codes:

1. Nikshay mobile app : Registration of TB patients and to check TB data



2. Nikshay Setu app – NTEP guidelines for Medical officer and paramedical staff



3.

3. TB Arogya Sathi App: For TB patients and general community



Section 7

Non-Communicable Diseases (NCD) & Other Important Health Problems

7.1 National Programme For Control of Non-Communicable Diseases

NCDs are one of the major challenges for public health in 21st century, not only in terms of human sufferings they cause but also the harm/burden they inflict on the socioeconomic development of the country. NCDs kill approximately 41 million people (71% of global deaths) worldwide each year, including 14 million people who die too young between the ages of 30 and 70. The majority of premature NCD deaths are preventable. According to World Health Organization (WHO) projections, the total annual number of deaths from NCDs will increase to 55 million by 2030, if timely interventions are not done for prevention and control of NCDs. NCDs are rapidly increasing globally and reached epidemic proportions in many countries, largely due to globalization, industrialization, and rapid urbanization with demographic and lifestyle changes.

India is the first country to adopt the National Action Plan with specific national targets and indicators aimed at reducing the number of global premature deaths from NCDs by 25% by 2025. The global action plan has suggested 9 targets for countries to set. However, India has taken the unprecedented step of setting a tenth target to address household air pollution. India's National Monitoring Framework for Prevention and Control of NCDs has committed for a 50% relative reduction in household use of solid fuel and a 30% relative reduction in prevalence of current tobacco use by 2025.

National Programs Implemented in the state for various NCDs includes

- National Programme for prevention & Control of Cancer, Diabetes, Cardiovascular Diseases & stroke (NPCDCS)
- National Programme for Control of Blindness & Visual Impairment (NPCB-VI)
- National Mental Health Programme (NMHP)
- National Programme for healthcare of Elderly (NPHCE)
- National Programme for the Prevention & Control of Deafness (NPPCD)
- National Tobacco Control Programme (NTCP)
- National Oral Health Programme (NOHP)
- National Programme for Palliative care (NPPC)
- National Programme for Prevention & Management of Burn Injuries (NPPMBI)
- National Programme on Climate Change & Human Health (NPCCHH)
- National Programme for Non-Alcoholic Fatty Liver Disease (NAFLD) under NPCDCS.
- National programme for Prevention and Control of Fluorosis (NPPCF)

7.1.1 National programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases and Stroke (NPCDCS)

Non-communicable diseases (NCD), also known as chronic diseases include cardiovascular diseases, diabetes, stroke, most forms of cancers and injuries. Such diseases mainly result

from lifestyle related factors such as unhealthy diet, lack of physical activity and tobacco use.

NCDs are one of the major challenges for public health in the 21st century, not only in terms of human suffering they cause but also the harm they inflict on the socioeconomic development of the country. NCDs kill approximately 41 million people (71% of global deaths) worldwide each year, including 14 million people who die too young between the ages of 30 and 70. The majority of premature NCD deaths are preventable. According to World Health Organization (WHO) projections, the total annual number of deaths from NCDs will increase to 55 million by 2030, if timely interventions are not done for prevention and control of NCDs. In India, nearly 5.8 million people (WHO report, 2015) die from NCDs (heart and lung diseases, stroke, cancer and diabetes) every year or in other words 1 in 4 Indians has a risk of dying from an NCD before they reach the age of 70. It is estimated that the overall prevalence of diabetes, hypertension, Ischemic Heart Diseases (IHD) and Stroke is 6.2%, 15.9%, 3.7% and 0.15% respectively in India. There are an estimated 25 Lakh cancer cases in India. To contain the increasing burden of Non-Communicable Diseases, Ministry of Health and Family welfare, Government of India, has started National Programme for Prevention and Control of Cancers, Diabetes, Cardiovascular Diseases and Stroke (NPCDCS) .

Introduction to NPCDCS:

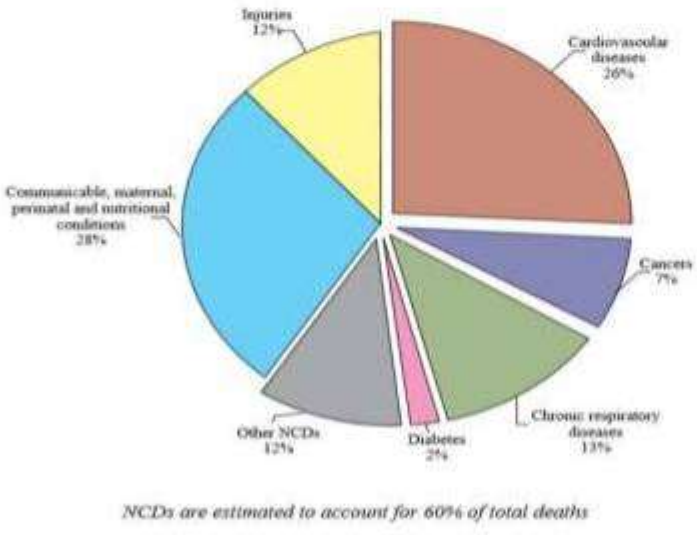


Figure: Proportional Mortality

(Ref.- *Training Module for Medical Officers for Prevention, Control and Population Level Screening of Hypertension, Diabetes and Common Cancer (Oral, Breast & Cervical) 2017, GOI)*

Non-communicable Diseases (NCDs) are currently the leading cause of preventable deaths and disability in India. The four identified major NCDs are Cardiovascular Diseases

(CVD) such as heart attacks and stroke, Diabetes, Chronic Respiratory Diseases (Chronic Obstructive Pulmonary Diseases and Asthma) and Cancer.
They are the leading cause of death, accounting for over 60% of premature mortality

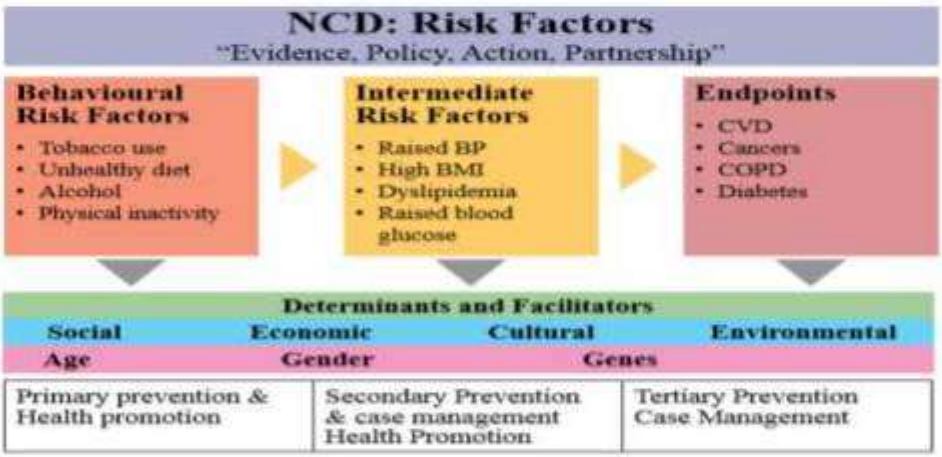
Objectives of NPCDCS:

- Prevent and control common NCDs through behavior and life style changes
- Provide early diagnosis and management of common NCDs
- Build capacity at various levels of health care for prevention, diagnosis and treatment of common NCDs.
- Train human resource within the public health set up viz doctors, paramedics and nursing staff to cope with the increasing burden of NCDs and establish and develop capacity for palliative & rehabilitative care Strategies

Strategies:

The Strategies to achieve above objectives are as follows:

- Health Promotion, awareness generation and promotion of healthy lifestyle.
- Screening and Early Diagnosis.
- Treatment.
- Capacity building of human resource.
- Surveillance, Monitoring & Evaluation.



Risk factors for NCD's:

Figure: Risk Factors for Non-Communicable Diseases

It is important to note that all these risk factors are amenable to modification through lifestyle changes. primary and secondary prevention of chronic diseases and their common risk factors provide the most sustainable and cost-effective approach to chronic disease prevention and control.

Population Based Screening (PBS) for NCDs:

Process of population based screening for common NCDs:

Population based screening for diabetes mellitus; hypertension and the three common cancers will be done amongst all women and men aged 30 years and above. It would be

included in the set of services being offered as part of comprehensive primary health care.

The steps includes :

- Population enumeration of all families under the designated population, filling of CBAC form of all individuals above 30 yrs of age by ASHA.
- This will be followed up by population based screening of 5 common NCDs at HW/ PHC/ RH/DH as part of comprehensive primary health care.

Types of NCD	Frequency of Screening *	Role of MO/ CHO in case of suspects identification
HT	Once in a year	Confirmation of HT, CVD risk assessment#, treatment and management, in case of complications referral to CHC/DH, follow up & support.
DM	Once in a year	Confirmation of DM, CVD risk assessment#, treatment and management, in case of complications referral to CHC/DH, follow up & support.
Oral Cancer	Once in every 5 years	Referred through PHC MO to the higher facility equipped for confirmation and management of Oral Cancer.
Cervical Cancer	Once in every 5 years	Referred through PHC MO to the higher facility equipped for confirmation and management of Ca cervix
Breast Cancer	Once in every 5 years	Referred through PHC MO to the higher facility equipped for confirmation and management of Ca breast.

**** Frequency of screening given below is applicable only if findings of 1st screening are WNL.***

The Framework for population based screening common NCDs

- The first step in the process is the active enumeration of the population and registration of families through individual health cards placed within a family health folder.
- ASHAs will undertake completion of the Health Cards.
- At the start of the programme, ASHAs will complete a Community Based Assessment Checklist (CBAC) for all women and men over 30 years in their population (we assume a normative population of 1000 in the service area of one ASHA). This form is intended to capture data related to age, family history for any of the NCDs, waist circumference, and risky behaviours such as physical inactivity, use of/or exposure to tobacco and alcohol use. This section of the form has questions that are allocated a score. A score of 4 and above implies High Risk.

- While Hypertension, Diabetes, Oral and Breast Cancer Screening can be offered in the outreach services at the village level, since the processes are relatively simple, cervical cancer screening requires a space where speculum examinations and Visual Inspection under Acetic Acid (VIA) can be done in privacy.
- Cervical cancer screening should be supported and supervised by a trained Lady Health Visitor/ Staff Nurse or even a Medical Officer.
- In a population of 1000, the proportion of people in the age group over 30 years, is about 37%, (Census 2011) implying about 370 people (182 women and 188 men). In a normative sub centre population of 5000, this would roughly mean about 1850.

Diabetes

Diabetes is a disease in which the body does not produce or properly use the hormone Insulin. The body needs insulin to convert sugar, starches and other foods into energy. Impairment of insulin secretion and action in the body leads to abnormally elevated levels of glucose in blood, a condition classically termed as Diabetes.

Types of Diabetes:

Diabetes is classified into three types namely:

- Type 1 Diabetes,
- Type 2 Diabetes and
- Gestational Diabetes.

Type 1 Diabetes (T1DM):

Usually occurs in younger people, children and adolescents. The diagnosis of T1DM can be made throughout childhood but it is more likely below 15 yrs of age. The onset is usually acute and severe and insulin is required for survival. Type 1 diabetes results from autoimmune destruction of the beta cells in the pancreatic islets. Family history of diabetes is rare in T1DM. Presence of features of associated autoimmunity (autoimmune disorders, vitiligo) and absence of obesity and acanthosis nigricans are characteristics of T1DM. In addition, urine of T1DM patients with uncontrolled hyperglycemia is positive for ketone bodies.

Type 2 Diabetes (T2DM):

Is the commonest type of Diabetes. It usually occurs after the age of forty years but occurs frequently even at lower age among Indians. T2DM was previously known as non-insulin dependent diabetes mellitus. The onset is usually insidious and may be mild to severe. The family history is usually positive and strong. Obesity, metabolic syndrome and acanthosis nigricans are usually seen in these patients while there is no evidence of autoimmunity. Further, there is no insulin dependence till late in the course of illness.

When is a person at high risk for Diabetes?

- If he/she is overweight (BMI is more than 25)
- If he/she is physically inactive, that is, he or she exercises less than 3 times a week.
- If he/she has high blood pressure.
- If he/she has impaired Fasting Glucose or impaired Glucose Tolerance.

- If his/her triglyceride and/or cholesterol levels are higher than normal.
- If his/her parents/siblings or grandparents have or had diabetes.
- If she delivered a baby whose birth weight was 4 kgs or more
- If she has had diabetes or even mild elevation of Blood sugar during pregnancy.
- If he/she has h/o consumption of alcohol and/or tobacco consumption in any form. (*ref.* www.cdc.gov)

When to suspect diabetes?

- Symptoms of uncontrolled hyperglycaemia: excess thirst, excess urination, excess hunger with loss of weight.
- Frequent infections
- Non-healing wounds
- Unexplained lassitude
- Fatigue
- Impotency in men

Management of Diabetes

Management of T2DM should be initiated as soon as diagnosis is established even if the patient is asymptomatic. Initial assessment and management of the patients has to be carried out at PHC level. Management of T2DM comprises initial assessment, initial management and follow-up visits. Each of these components is elaborated here.

- Initial assessment of individuals suspected of having T2DM need to be subjected to risk assessment which include:
- History and physical examination;
- Assessment of blood glucose level;
- Presence of CVD risk factors (lipid profile, hypertension); and
- End-organ damage (urine for protein/ ECG/ fundus examination)

Initial management include:

- Pharmacotherapy for the management of hyperglycaemia and any other co-morbid conditions e.g. high blood pressure, dyslipidaemia etc.
- Therapeutic lifestyle management and
- Diabetes patient Education and counselling

Principles of Management

Therapeutic Lifestyle management (healthy diet and physical activity) accompanied by drug therapy or insulin are the corner stone of diabetes management. Apart from these other concurrent complications should be addressed. The basic principles in the management of type-2 diabetes are:

- Modify Lifestyle: diet and physical activity
- Reduce Insulin resistance through reduction in weight, specifically reduction of fat mass.
- Pharmacological treatment (if inadequate control): Metformin/ Sulfonylureas.
- Treatment for high blood pressure: ACE Inhibitors, Calcium channel blockers such as amlodipine and diuretics such as hydrochlorothiazide.
- Lipid control with statins

Glycosylated Hemoglobin (HbA1C)

A fraction of hemoglobin in the RBCs is found to be in a glycosylated form i.e. has glucose attached to it. The HbA1c level is proportional to average blood glucose concentration over the previous two to three months and therefore is an excellent indicator of how well the patient has managed his/her diabetes over the last four weeks to three months. Glycated hemoglobin is recommended for monitoring blood sugar control in diabetic patients.

American Diabetes Association (ADA) recommends an HbA1c goal of less than 7% for people with diabetes in general.

Foot care advice to the patients

- Inspect your feet daily for cracks, blisters, infections, and injuries. You may be able to see a problem before you feel it. If you can't see the bottoms of your feet easily, use a mirror. A magnifying glass may help you see better. If you can't check your own feet, have someone else do it for you.
- Cleanse your feet daily as you bath or shower, using warm water and mild soap. Dry your feet with a soft towel making sure to dry between the toes. Don't use hot water. You may burn your skin as you may not be able to feel the hotness of the water. Moisturize dry skin by using oil. If it causes redness or irritation, discontinue its use and inform your doctor. If you are currently using a cream or lotion that keeps your skin soft and free of cracks, continue using it.
- Clip toenails straight across. Use a nail cutter; don't use a scissor and also smooth down the edges. If you can't easily reach your feet or have thick nails, have someone experienced trim your nails.
- Always wear something on your feet (socks, slippers, shoes) to protect from injury - even in your house.
- Treat minor breaks in the skin promptly. Cleanse the area with soap and water, dry, and cover with clean gauze. Observe for signs of infection such as redness, swelling, warmth, pain or drainage. Don't put weight on the foot that has an injury.



Hypertension:

Types of Hypertension:

Abnormally elevated blood pressure is a pathological condition which increases the work load on the heart. This condition is termed as high blood pressure or hypertension. Based on the etiology, high blood pressure is of two types:

Primary/essential: Primary or "essential" hypertension has no known cause, however many of the above said lifestyle factors are associated with this condition.

Secondary: Secondary hypertension is caused by some other medical conditions/problem or the use of certain medications. Secondary hypertension is seen only in very few individuals in the community. The causes of secondary hypertension include: kidney diseases: reno-vascular disease and chronic renal disease, endocrine disorders: hyperthyroidism, Cushing's syndrome and pheochromocytoma, sleep disorders, coarctation of the aorta and nonspecific aorto-arteritis. Some of these causes are often curable, and many others treatable.

Criteria for diagnosing high blood pressure

The table below provides a classification of blood pressure for adults ages 18 and older. The classification is based on consistent elevation during two or more properly measured BP readings in sitting position.

Risk assessment should cover:

- Assessment of medical history
- Physical Examination
- Laboratory Investigation



Table : Initial Assessment of Hypertensive Patients for history and Physical and laboratory examination

Assessment of medical history	Physical examination	Laboratory Tests
A. Risk factors ▪ Lack of physical activity (or sedentary lifestyle) ▪ Obesity or being overweight ▪ Abdominal obesity ▪ High sodium intake/high salt intake ▪ Excess alcohol consumption B. Family history C. Symptoms of consequences of hypertension	A. BP measurement at least in one upper and one lower limb B. Measurement of Body weight and height to obtain BMI C. Measurement of Waist circumference	**Essential:** ▪ Blood Sugar ▪ Urine analysis for proteinuria **Desirable:** (at CHC/sub-district/district level hospitals depending upon the available facilities for laboratory investigations) ▪ Haemogram

Assessment of medical history	Physical examination	Laboratory Tests
D. Frequent intake of pain relieving drugs (NSAIDS) E. Steroid intake for asthma F. Breathing difficulty particularly on exertion G. Swelling of feet H. Urinary difficulties, history of passing stones in the past	D. Palpating all peripheral pulses E. Auscultation for bruit (renal, carotid, abdominal and others) F. Eye evaluation if ophthalmology facility is available	▪ Serum creatinine ▪ Serum sodium and potassium levels ▪ Lipid profile ▪ Complete Urine analysis ▪ Electrocardiogram (ECG) ▪ X-Ray chest



Counselling for Treatment Adherence:

To keep BP at a safe and healthy level, patients must take daily medication for the rest of their lives. Patients can be reluctant to commit to taking medication every day and struggle to take medication regularly for a disease with no symptoms. But BP will increase again if the patient stops treatment. Health Staff have an important role in helping patients understand the risks of high BP, and supporting them to take medications consistently.

Counselling to patients should stress the following points:

- High BP is very dangerous. Even though a patient does not feel sick, high BP can harm the organs and cause heart attack, stroke, kidney disease, and death.
- Patients can control high BP and protect themselves from heart attack and stroke by regularly taking medication and returning to the clinic for follow-ups.
  - Taking medication regularly is the most important thing you can do to control high BP. Even if you feel fine, NEVER stop a medication without consulting a doctor. There is a difference between medicines for long-term control (as in hypertension) and medicines for quick relief (such as for headaches), and taking the proper dose at the same time each day can save the patient's life.
- To ensure regularity, the patient should:
  - Take medication after certain regular activity. For example, every morning after brushing teeth;
  - Keep a sufficient supply of medications at home till next visit to health facility;
  - Use memory aids, such asnotes, weekly pillboxes, alarms and smartphone applications.

Other important measures taken to ensure patient adherence is 1) referral of patient to nearest health facilities including HWCS for follow up 2) Up to 3months of treatment to patient who have BP under control 3) Home delivery of medicine to geriatric patient and patient who are unable to visit health facilities due to valid reasons , etc.

Retrieval of patients who missed visits:

Staff should develop a system for follow-up with patients through phone, home visits and other methods. Every month, ANM should check if all the patients came for follow-up visits at either the Sub Centre or HWC. If any patient did not come for follow up, a phone call or home visit should be made. The reason for not following up should be noted and the patient should be counselled to come back for follow-up visits regularly. ASHA can be involved in patient retrieval during their routine visit.

The patient adherence and follow can be discussed with health staff at PHC and HWCs during monthly meeting so that retrieval of patient can be achieved in coordinated way.

Blood Pressure and Diabetes Control:

- All HT patient visiting health facilities for follow must have both systolic blood pressure below 140 mm Hg and diastolic below 90 mm Hg. Patient who are not controlled with current treatment can be escalated to higher regime as per treatment protocol or referred to specialist for consultation if necessary
- For Diabetes patient the Blood Sugar target level for fasting blood sugar is 90-120 mg/dl and for post prandial blood sugar is 110-140mg /dl

For successful implementation of program all patient registered with program must have regular follow and their BP and /or blood sugar must be under control to avoid complications.

The reporting for Blood pressure and blood sugar control rate among patient registered to be reported for patient registered till one month earlier and followed up in current month (e.g., for 1st April to 30th April month reporting, patient registered till 31st March will be considered as denominator and patient followed up in 1st April to 30th April with Blood Pressure/ blood sugar controlled will be considered as numerator)

Role of Medical Officer in Cancer Prevention and Control

Prevention of Cancers

- Create awareness about the ills of tobacco and advocate avoidance
- Encourage and assist habitual tobacco users to quit the habit
- Promote healthy dietary practices and physical activity

Early detection of Cancers

- Create awareness about the early warning signs of cancer
- Encourage Self Breast Examination (SBE)
- Awareness for Clinical Breast Examination (CBE) (Refer to Figure : Steps of Clinical Breast Examination given Breast Cancer section)
- Encourage oral self-examination.
- Create awareness about symptoms of cervical cancer
- Examine, as a routine, the oral cavity of patients with history of tobacco use
- Offer clinical breast examination to any woman over 30 years presenting to the health centre
- Offer screening for cervical cancer to any women over 30 years presenting to the health facility
- Promptly refer any person with a suspicious lesion for accurate diagnosis and appropriate treatment

Treatment of Cancers

- Ensure that every patient complies with therapy advised
- If follow up care is required at the health center level, make sure that detailed instructions are provided by the treating institution.

Palliative care

- Ensure that the patient is free from pain as far as possible. Learn and practice the WHO step-ladder approach of pain management; refer to the appropriate centre for oral morphine.
- Achieve control of unwanted symptoms to the extent possible
- Provide psychological support to the patient to accept the diagnosis and treatment.
- Involve the family in diagnosis, treatment and care as far as possible
- Cancer is a group of diseases characterized by uncontrolled cell multiplication which can occur in any living tissue at any site in the human body. Cancer develops in several phases depending on the type of tissue affected. Figure below, shows the phases in cancer development.



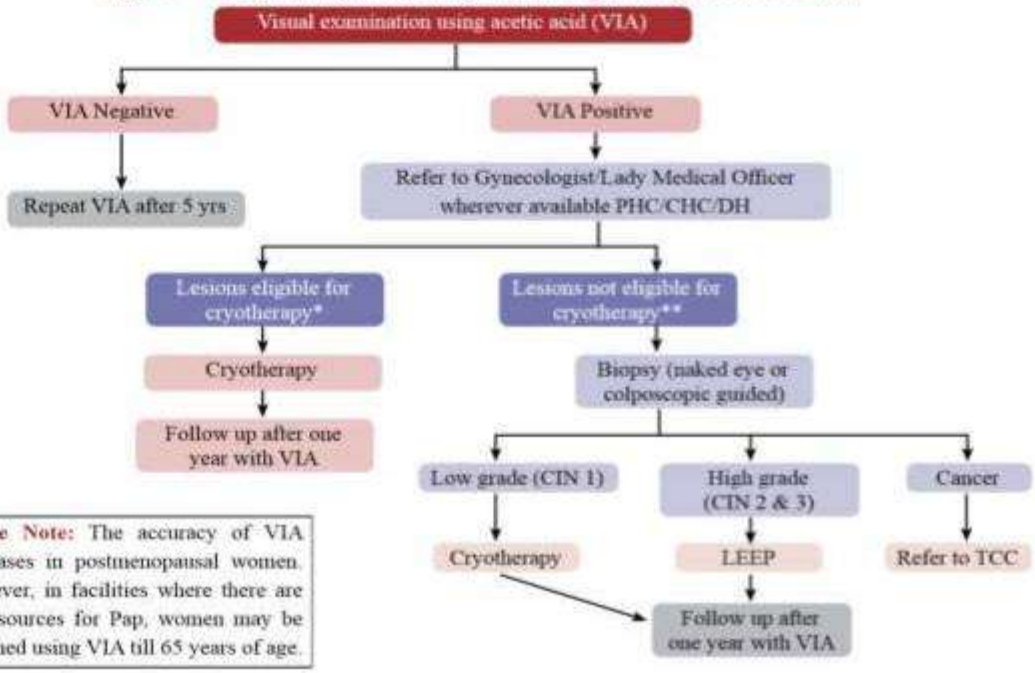
Figure: Phases of Cancer Development

- Survival rates for all three cancers are good, provided they are detected and treated in the early stages2. Thus for example, the five year survival rates for early stage cancers are 60.2%, 76.3% and 73.2% for oral, breast and cervical cancers respectively. The prognosis for advanced stage on the other hand is poor, with five year survival rates being 3.3%, 14.9%, and 7.9% for these cancers. According to GLOBOCAN 2012, India accounts for 7.2% of global cancer incidence, but in terms of mortality, India accounts for 8.3% of global mortality. This highlights the fact that cancers in India tend to be detected late, leaving little opportunity for effective management and patient survival.

Table : Criteria for categorizing VIA test results as negative or positive or invasive cancer

VIA CATEGORY	DESCRIPTION
NEGATIVE	▪ No aceto-white lesions ▪ Transparent lesions or faint patchy lesions without definite margins ▪ Nabothian cysts becoming aceto-white ▪ Faint line like aceto-whitening at the junction of columnar and squamous epithelium
POSITIVE	▪ Aceto-white lesions far away from the transformation zone ▪ Distinct, opaque aceto-white area ▪ Margin should be well defined, may or may not be raised ▪ Abnormality close to the squamo-columnar junction in the transformation zone and not far away from the os.
INVASIVE CANCER	Obvious growth or ulcer in the cervix. Aceto-white area may not be visible because of bleeding.

Figure : Algorithm for Screening and management of Cervical Cancer



Please Note: The accuracy of VIA decreases in postmenopausal women. However, in facilities where there are no resources for Pap, women may be screened using VIA till 65 years of age.



Negative **Positive**

Figure: premalignant lesions of cervix,

Ref: To compare the effectiveness of Pap smear, VIA and colposcopy for screening of premalignant lesions of cervix, by Mahin Fatima Faridi Khan, Bhavana Gupta, Meenakshi Srivastava, Kusum Lata, Vibha Singh, Twinkle, Indian Journal of Obstetrics and Gynaecology Research Online ISSN: 2394-2754, CODEN: IJOGCS*

Warning signals for Cancers

- C - Change in bowel or bladder habits
- A - A wound that does not heal
- U - Unusual bleeding or discharge
- T - Thickening or lump in the breast or elsewhere
- I - Indigestion or difficulty in swallowing
- O- Obvious change in a wart or mole
- N - Nagging cough or hoarseness of voice

Cervical cancer screening:

- Visual Inspection with Acetic acid (VIA) (ref. Table 5.1) Visual inspection of the uterine cervix, after application of 3 - 5% acetic acid (VIA) is a simple test for the early detection of cervical pre-cancerous lesions and early invasive cancer. The results of VIA are immediately available and do not require any laboratory or specialist support. The categorization of the results of VIA depends upon the color changes observed on the cervix. This test can be performed by any trained paramedical health worker and not necessarily only by a doctor. Only minimal duration training is all that is required for performing this test.

Screening for breast cancer

- Breast cancer is the commonest cancer among women all over the world. Some of the risk
- Factors for breast cancer are:
- Reproductive and hormonal factors – The older a woman is when she has her first child, the greater her chance of having breast cancer. Early menarche (before age 12), late menopause (after age 55) or never had children are also at greater risk. Women who take menopausal hormone therapy (estrogen and progesterone) for five years or more after menopause also appear to have an increased risk.
- Family History: Risk of Breast cancer increases in women with a first-degree relative with breast cancer
- Other factors: Being obese after menopause
  - Physical inactivity.

- Alcohol intake: some studies suggest that the risk of breast cancer increases with increased intake of alcoholic beverages.

High Risk Group for occurrence of breast cancer

- Family History of Breast/ Ovarian/Colon Cancer
- Chronic Benign Breast Diseases

Prompt diagnosis of breast cancer in the early stage is very important. This is possible by increasing the level of awareness among women and health care professionals. The following methods may be used for early detection.

Self Breast Examination: The first person to detect any lump in the breast is the woman herself which is by teaching the woman to be aware of any of the following signs at the earliest possible –

- A change in size
- A nipple that is pulled in or changed in position or shape
- A rash on or around the nipple
- Discharge from one or both nipples
- Puckering or dimpling of skin
- Lump or thickening in the breast
- Constant pain in the breast or armpit
- In case a woman notices any such change, she should promptly visit the health centre or health professional.

All women > 30 years will be received by the Staff Nurse /ANM at the screening centre, will be provided a pre-procedure counseling, and then screened using Clinical Breast Examination (CBE). Clinical Breast Examination is to be performed by a trained physician or a nurse or a health worker.

Clinical Breast Examination (CBE)

Both breasts are visually inspected and palpated in different positions from all sides for the following signs and referred for further investigations on finding for anything suspicious or abnormal.

Inspection: Any changes in symmetry in breast shape and size, skin changes – skin dimpling, skin retraction, skin ulceration, the level of both nipples, retraction of nipple(s), Inverted nipple. Please note that horizontal slit is a normal variation.

Palpation: Any discharge from the nipple(s), color of the discharge, swelling, lumps, consistency of lumps, swelling in the arm pit (maxillary area), above the collar bone (supra clavicular area) and root of the neck (infra clavicle area).

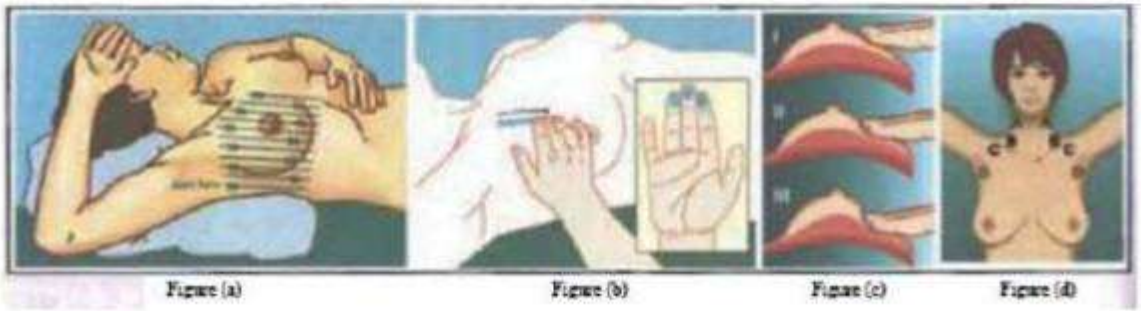


Figure: Steps of Clinical Breast Examination

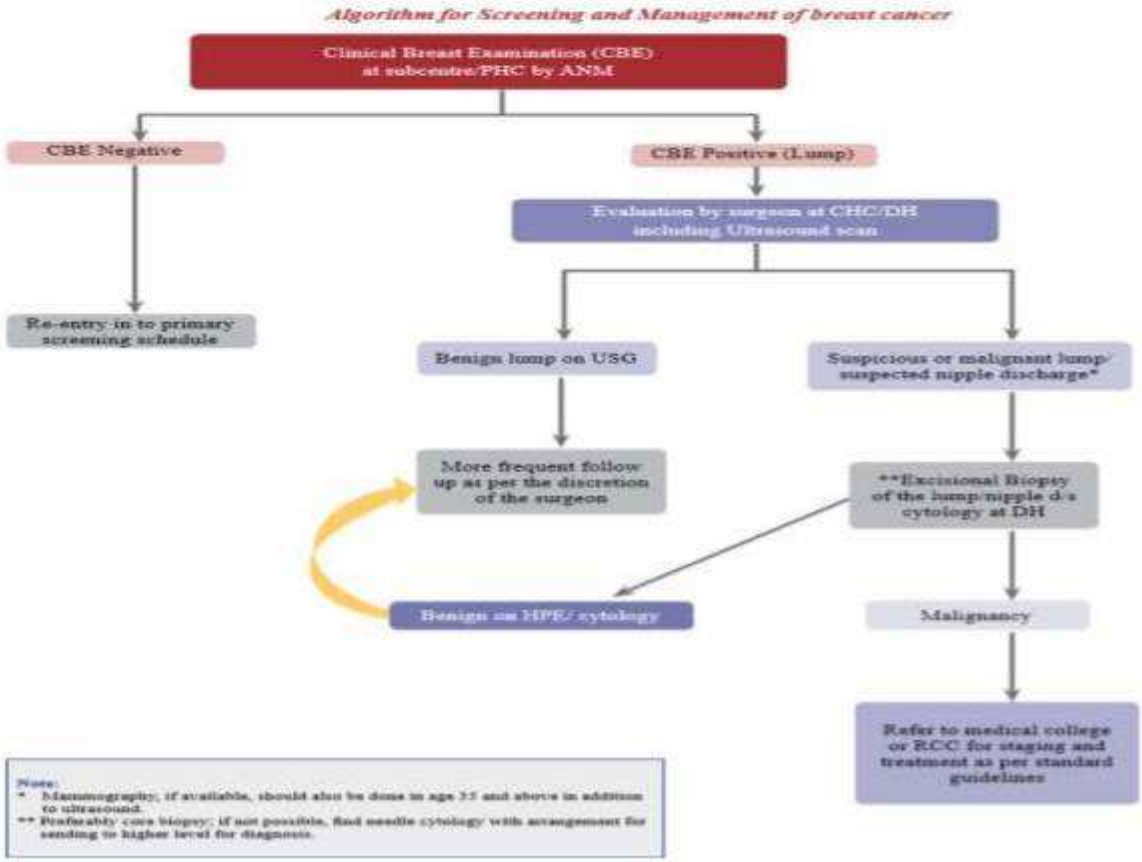
- Patients should be examined in sitting and lying down positions, with their ipsilateral hand overhead to enhance any changes in the breasts. Use of a small pillow under the shoulder/lower back will centralize the breast.
- The finger pads of middle three fingers should be used to palpate (not squeeze) the breast in circular motion using a ·vertical strip· pattern (Figure a) with uniform pressure.
- Palpation Pressure:
  - Light Pressure for superficial breast tissue;
  - Medium Pressure tor intermediate layer;
  - Deep Pressure for tissue close to chest wall.
- Nodes: A&B - Supra clavicular area; C. Infra clavicular area; D. Axillary area

Interpretation:

The results of CBE will be interpreted in the following ways:

- Normal/Negative: No abnormalities on visual inspection or palpation.
- High Risk: Target women with family H/o Breast /Ovarian /Colon Cancer, with H/o Chronic Benign Breast Diseases and with past history of Breast Cancer in the same Breast or the opposite Breast will be categorized under 'High Risk Group' and managed according the screening and management algorithm for breast cancer.
- Abnormal: Definite asymmetrical finding on either visual inspection or palpation. It could be either Probably Malignant or Probably Non Malignant. Presence of discrete hard lump(s) in the breast with or without swelling(s) in the armpit, recent nipple retraction or distortion, skin dimpling or retraction, ulceration, blood stained nipple discharge presence of other lumps will be considered as positive findings on Clinical breast examination and patient will be managed according to the screening and management algorithm for breast cancer.
- **Please Note:** MO to have a list of nearest facility there equipped for confirmation and management of Ca breast. He should refer directly the suspected cancer cases to these centres only

Figure: Algorithm for Screening and Management of Breast Cancer



Screening for Oral Cancer

Risk factors:

Tobacco & tobacco product chewing is the single most important risk factor for oral cancer. Other risk factors include alcohol use, betel nut chewing, and chronic trauma to oral mucosa by sharp tooth or ill-fitting dentures. Chronic exposure to these risk factors causes changes in the oral mucosa and these changes are visible as pre-cancerous lesions. Over a period of time, malignancy may develop in these lesions.

Pre-cancerous lesions

Pre-cancerous lesions or conditions are local/generalized disturbances that predispose to malignancy in a particular site. Leukoplakia, erythroplakia, palatal changes associated with reverse smoking or bidi smoking and submucous fibrosis are local pre-cancerous lesions. Plummer Vinson syndrome, syphilis, and erosive lichen planus are generalized pre-cancerous conditions. All these conditions are amenable to early diagnosis, and treatment is possible in many cases.

Leucoplakia

This is defined as a white patch that cannot be characterized as any other disease clinically or pathologically. They can be of 4 types:

- Homogeneous leucoplakia: Low risk of cancer.
- Ulcerated or erosive leucoplakia: High risk of cancer
- Speckled or nodular leucoplakia: High risk of cancer
- Verrucous leucoplakia: Very high risk of cancer.

Two or more types of leucoplakia may be present in the oral cavity at the same time.

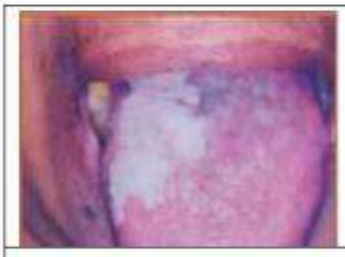


Figure: Homogeneous leucoplakia involving dorsum and right lateral border of tongue



Figure: Erythroplakia

Confirmatory diagnosis is by biopsy.

Erythroplakia

This is a bright, velvety area sometimes surrounded by faint plaques which cannot be characterized as any other lesion clinically or pathologically (Figure 5.9). About 90% of these lesions show cellular dysplasia or malignancy. The risk of malignancy in erythroplakia is higher than in leukoplakia.

The most common cancer seen in the oral cavity is squamous cell carcinoma. It presents as a painless ulcer, mass or fissure. As the disease advances, patient may have excessive salivation, trismus, and difficulty in chewing, swallowing or cervical lymphadenopathy. Distant metastases are uncommon in oral cancers.

Inclusion criteria: Any individual aged 30 years and above should be screened at all screening centers.

Any abnormal finding on oral visual examination should be considered as positive and patient should be managed according to screening and management algorithm for oral cancer.

Algorithm for Screening and Management of oral cancer

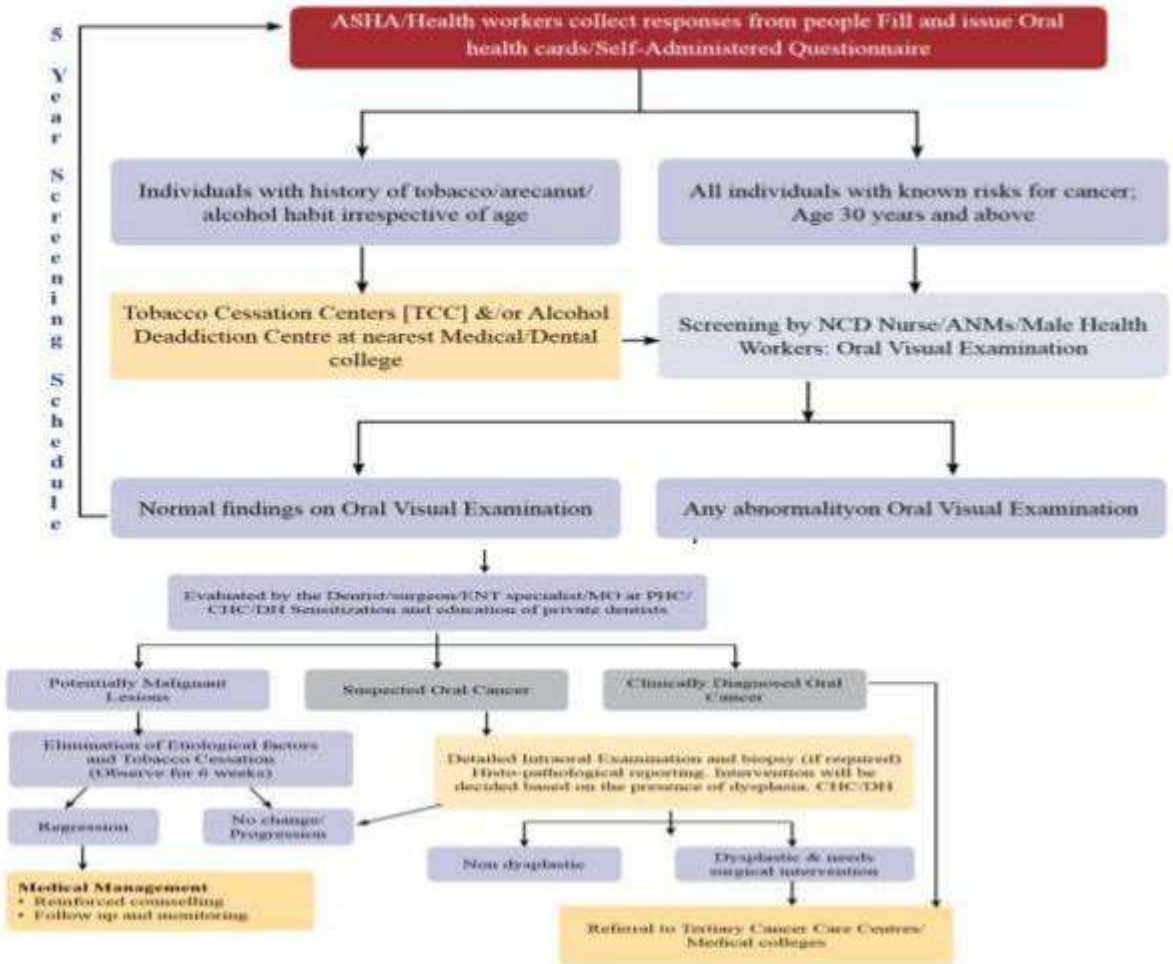


Figure: Algorithm for Screening and Management of oral cancer

Please Note:
MO to have a list of nearest facility there equipped for confirmation and management of Ca breast. He should refer directly the suspected cancer cases to these centres only.

Non-Alcoholic Fatty Liver Diseases
NAFLD is a build-up of extra fat in liver cells that is caused by factors other than alcohol. In Some individuals, NAFLD leads to live inflammation, liver fibrosis and liver cirrhosis and in some cases liver cancer. If the fat content increases beyond 5-10 % of the live weight, it is called as Fatty Liver (Steatosis) NAFLD, the abnormal accumulation of fat in the liver in the absence of secondary causes of fatty liver, such as harmful alcohol use, viral hepatitis, or medications is a serious health concern as it encompasses a spectrum of liver abnormalities, from a simple non-alcoholic fatty liver (NAFL, simple fatty liver disease) to more advanced ones like non-alcoholic steatohepatitis (NASH), cirrhosis and even liver cancer. Over the last two decades global burden of NASH has more than doubled. Globally, NASH caused 40 lakh prevalent cases of compensated cirrhosis in 1990, which increased to 94 lakh cases in 2017. NAFLD is emerging as an important cause of liver disease in India."

NAFLD Can be further classified in to two categories

- Non Alcoholic Fatty Liver (NAFL) :
  Fat in the liver but no inflammation or signs of liver damage. The Simple fatty liver typically does not usually progress to liver damage or any complications
- Non Alcoholic Steatohepatitis (NASH):
  NASH is a form of NAFLD which has inflammation in the liver and liver damage in addition to fatty changes. Some of the patient develops hepatic oxidative stress and cytokines leading to hepatic inflammation and fibrosis.

Epidemiology Global and Indian Scenario
Globally NAFLD affects 20-30 % of the population , About 2-5% develops NASH. In India the prevalence is 9-32% with higher prevalence in in overweight an obese individual. According to NFHS 418-20% of the individual are overweight.

The HFE gene mutation appear to play role of pathogenesis in development of NAFLD
Screening and Diagnosis of NAFLD

The NAFLD is usually suspected in overweight and obese individual who is found to have mid elevations in their liver function test or may have abnormal ultrasound and CT Scan.
The objectives to prevent and control NAFLD with:

- Behaviour and lifestyle changes ,
- Early diagnosis and management of NAFLD,
- Building of capacity at various levels of healthcare for prevention, diagnosis and treatment of NAFLD.

NAFLD as a Component of NPCDCS

The CBAC form used by ASHA for population enumeration and screening contains following details of NAFLD will be considered as suspects

- Abdominal obesity (Waist Circumference >90cm in Men and > 80cm in women)
- Family history of diabetes , hypertension , CHD, Liver diseases and Cancer
- Obesity (BMI > 25)
- Presence of pedal edema

All patient will be referred for screening at PHC for NAFLD. The confirmation will be done by conducting LFT and USG / CT Scan.

Chronic Obstructive Pulmonary Disease and Asthma:

Burden- Global and India Scenario

Chronic obstructive pulmonary disease (COPD) is the third leading cause of death worldwide, causing 3.23 million deaths in 2019.Nearly 90% of COPD deaths in those under 70 years of age occur in low- and middle-income countries (LMIC). COPD causes persistent and progressive respiratory symptoms, including difficulty in breathing, cough and phlegm production. COPD results from long-term exposure to harmful gases and particles combined with individual factors, including events which influence lung growth in childhood and genetics. Environmental exposure to tobacco smoke, indoor and outdoor air pollution and occupational dusts, fumes and chemicals are important risk factors for COPD.

Early diagnosis and treatment, including smoking cessation support, is needed to slow the progression of symptoms and reduce flare-ups.

COPD is the second most common cause of NCD-related deaths in India, with the age-specific prevalence of COPD increasing rapidly after the age of 30 years. It was noted that the prevalence of COPD among individuals between 5 and 29 years ranged from 0.1%–0.9%, which increased to 1.6%–28.3% among the population aged 30 years or more. From 2007 to 2017, the percentage change in death and premature death due to COPD is over 39% and 37%, respectively [14]. In India, COPD is the second most leading cause of DALYs with the 36% mean percentage change in the number of DALYs from 1990 to 2016. The rate of DALYs per case due to COPD was 1.7 times higher than the global average in 2016

Definition:

COPD is a common preventable and treatable disease that is characterized by persistent respiratory symptoms and airflow inflammation that is due to airway and/or alveolar abnormalities usually caused by significant exposure to noxious particles and gases.

Causes:

COPD develops gradually over time, often resulting from a combination of risk factors:

- Tobacco exposure from active smoking or passive exposure to second-hand smoke;
- Occupational exposure to dusts, fumes or chemicals;

- Indoor air pollution: biomass fuel (wood, animal dung, crop residue) or coal is frequently used for cooking and heating in low- and middle-income countries with high levels of smoke exposure;
- Early life events such as poor growth in utero, prematurity, and frequent or severe respiratory infections in childhood that prevent maximum lung growth;
- Asthma in childhood; and
- A rare genetic condition called alpha-1 antitrypsin deficiency, which can cause COPD at a young age.

Definition:
Asthma is chronic inflammatory disorder of airways characterized by recurrent episode of wheezing, breathlessness, chest tightness and cough that is often reversible either spontaneously or by treatment

Causes / risk factors:
Modifiable risk factors:
- Indoor air allergens - house dust mites , animal proteins
- Tobacco Smoke.
- Outdoor and indoor air pollution
- Respiratory viral Infections
- Occupational dust
- Formula feed and cows milk during infancy
- Obesity

Non Modifiable risk factor:
- History of atopy , eczema , recurrent sneezing , itchy, watery eyes
- Genetic – Family history

Integration of Chronic Respiratory Disease Component in NPCDCS Program
For Creating awareness, early detection, management appropriate referral and continuum of care for COPD and Asthma , services are integrated with CPHC, NTCP, NTEP, NPHCE and NPCDCS Program .
CBAC Form: (Refer Annexure 7.1 (Vol. II))

7.1.2 The Pradhan Mantri National Dialysis Programme (PMNDP)
The Pradhan Mantri National Dialysis Programme was rolled out in 2016 as part of the National Health Mission (NHM) for provision of free dialysis services to the poor. The Guidelines for Pradhan Mantri National Dialysis Programme envisage provision of dialysis services under NHM in PPP (Public Private Partnership) mode.

Rationale:
Every year about 2.2 Lakh new patients of End Stage Renal Disease (ESRD) get added in India resulting in additional demand for 3.4 Crore dialysis every year. With approximately 4950 dialysis centres, largely in the private sector in India, the demand is less than half met with existing infrastructure. Since every Dialysis has an additional expenditure tag of about Rs.2000, it results in a monthly expenditure for patients to the tune of Rs.3-4 Lakhs annually. Besides, most families have to undertake frequent trips, and often over long distances to access dialysis services incurring heavy travel costs and loss of wages for the patient and family members accompanying the patient. This therefore leads to financial

catastrophe for practically all families with such patients. With substantial gain in quality of life and extension of progression free survival for patients, families continue to stretch financially to make large out of pocket spends. It has been felt that both in terms of provision of this important life saving procedure and also for reducing impoverishment on account of out of pocket expenditure for patients, a Dialysis program is required.

Solution Strategy

There are two main types of dialysis, which are haemodialysis and peritoneal dialysis.

- **Hemodialysis (HD, commonly known as blood dialysis)**: In HD, the blood is filtered through a machine that acts like an artificial kidney and is returned back into the body. HD needs to be performed in a designated dialysis centre. It is usually needed about 3 times per week, with each episode taking about 3-4 hours.
- **Peritoneal dialysis (PD, commonly known as water dialysis):** In PD, the blood is cleaned without being removed from the body. The abdomen sac (lining) acts as a natural filter. A solution (mainly made up of salts and sugars) is injected into the abdomen that encourages filtration such that the waste is transferred from the blood to the solution. There are 2 types of PD - continuous ambulatory peritoneal dialysis (CAPD) and automated peritoneal dialysis (APD). CAPD needs to be done 3 to 5 times every day, but does not require a machine. APD uses an automated cycler machine to perform 3 to 5 exchanges during the night while the patient is asleep.

Close medical supervision is not required for most PD cases, thus making it a feasible option for patients who may want to undergo dialysis in the home setting. Each treatment option has its advantages and disadvantages, which vary with the condition of the patient and presence of underlying diseases. It is therefore important for every patient with ESRD to discuss various treatment options in detail with his doctor before starting treatment.

The majority of patients in India receive renal replacement therapy in haemodialysis centre. The number of patients on Haemodialysis and the number of hospital based and free standing units is steadily growing. A dialysis unit delivers patient care, and has specific requirements of treated water, electricity, medical gases and waste disposal. It additionally requires accommodating all the workers involved in patient care, allow emergency procedures, permit adequate hygiene and maintenance of specialized equipment. The design and layout of a unit must take into account all the above features in order to function smoothly and prevent development of complications. Proper planning of a dialysis unit is therefore essential.

Public Private Partnership for Hemodialysis services

As per the guidelines, the private partner is to provide medical human resource, dialysis machine along with Reverse Osmosis (RO) water plant infrastructure, dialyzer and consumables, while the space, power, and water supply within District Hospitals is to be provided by the State Government.

Financial support

Currently, under NHM 100 % of the service procedure fees for patients from below poverty line (BPL) economic group is covered. However, non BPL patients would have the benefit of accessing the services close to the community at the district hospitals at same rates as paid by the Government for the BPL patient.

While there exist health schemes such as Rashtriya Swasthya Bima Yojana (RSBY) funded by Govt. of India which cover haemodialysis procedure, it is evident that due to high cost and recurring sessions required over the life time, the total cost for providing dialysis cannot be adequately covered. However, for BPL families registered under RSBY, the cost of dialysis care shall be catered through RSBY funding upto its maximum coverage. The additional resources required would be provided to the state under the National Health Mission

7.1.3 National Programme for Health Care of The Elderly (NPHCE)

The population over the age of 60 years has tripled in last 50 years in India and will relentlessly

increase in near future. In 2001, the proportion of older people was 7.7% which will increase to 8.14% in2011 and 8.94% in 2016. Hence, Govt. of India has initiated National Programme for Health Care of the Elderly (NPHCE) . In Maharashtra, this programme is being implemented in phased manner.

Objectives:

- To provide accessible, affordable, and high-quality long-term, comprehensive and dedicated care services to an Ageing population. Creating a new "architecture" for Ageing to build a framework to create an enabling environment for "a Society for all Ages"
- To promote the concept of Active and Healthy Ageing.
- Convergence with National Health Mission, AYUSH and other line departments like Ministry of Social Justice and Empowerment.

Components of the Program:

- National Health Mission (NHM) Component: Primary & Secondary care service delivery through District Hospitals (DH), Community Health Centres (CHC), Primary Health Centres (PHC), Sub-Centre/Health & Wellness Centres.
- Tertiary Component: Renamed as 'Rashtriya Varisth Jan Swasthya Yojana' in 2016-17. These services are being provided though Regional Geriatric Centres (RGCs)

Program Strategies

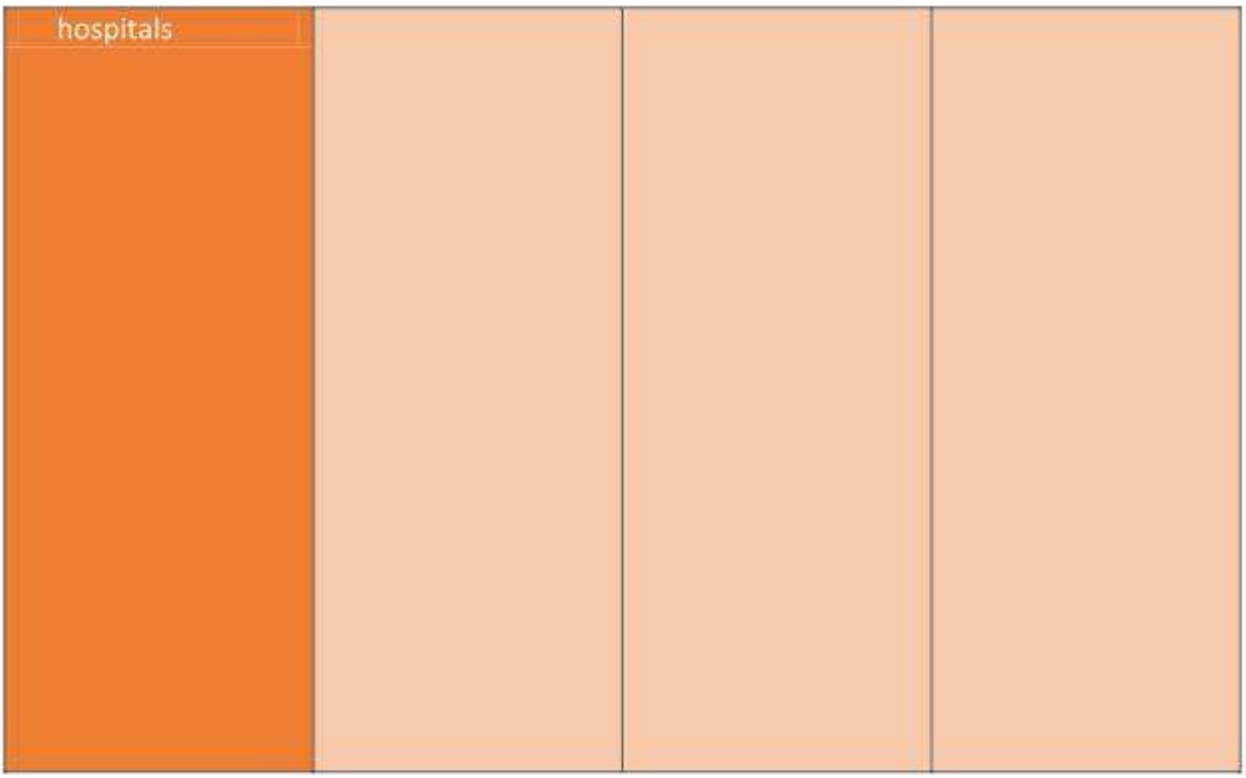
- Community based primary health care approach including domiciliary visits by trained health care workers.
- Dedicated services at PHC/CHC level including provision of machinery, equipment, training, additional human resources (CHC), IEC, etc.
- Dedicated facilities at District Hospital with 10 bedded wards, additional human resources, machinery & equipment, consumables & drugs, training and IEC.
- Strengthening of Regional Geriatric Centers to provide dedicated tertiary level medical facilities for the Elderly, introducing PG courses in Geriatric Medicine, and in-service training of health personnel at all levels.
- Information, Education & Communication (IEC) using mass media, folk media and other communication channels to reach out to the target community.
- Continuous monitoring and independent evaluation of the Programme and research in Geriatrics and implementation of NPHCE.

Regional Geriatric Centre:

Grant Medical College is selected as regional Geriatric Centre for Maharashtra, Goa and North Karnataka.

Services offered at different Health Institutes:

District Hospital	Community Health Centre (RH/ SDH)	HWC-PHC	AB_HWC
• Dedicated OPD services to the Elderly. • Facilities for laboratory investigations for diagnosis and provision of medicines for geriatric medical and health problems • Ten-bedded Geriatric Ward for in-patient care of the Elderly • Existing specialties like General Medicine; Orthopedics, Ophthalmology; ENT services etc. will provide services needed by elderly patients. • Provide services for the elderly patients referred by the CHCs/PHCs etc. • Conducting camps for Geriatric Services in PHCs/CHCs and other sites • Referral services for severe cases to tertiary level	• First Referral Unit (FRU) for the Elderly from PHCs and below. • Geriatric Clinic for the elderly persons twice a week. • Rehabilitation Unit for physiotherapy and counseling. • Domiciliary visits by the rehabilitation worker for bed ridden elderly and counseling of the family members on their home-based care. • Health promotion and Prevention • Referral of difficult cases to District Hospital/higher health care facility	• Weekly geriatric clinic run by a trained Medical Officer • Maintain record of the Elderly using standard format during their first visit • Conducting a routine health assessment of the elderly persons based on simple clinical examination relating to eye, BP, blood sugar, etc. • Provision of medicines and proper advice on chronic ailments • Public awareness on promotional, preventive and rehabilitative aspects of geriatrics. • Referral for diseases needing further investigation and treatment, to RH/ District Hospital as per need.	• Weekly geriatric clinic run by a trained Medical Officer • Maintain record of the Elderly using standard format during their first visit • Conducting a routine health assessment of the elderly persons based on simple clinical examination relating to eye, BP, blood sugar, etc. • Provision of medicines and proper advice on chronic ailments • Public awareness on promotional, preventive and rehabilitative aspects of geriatrics. • Referral for diseases needing further investigation and treatment, to RH/ District Hospital as per need.



Role & Responsibilities of Medical Officers in Elderly Care

- Conduct weekly/ biweekly fixed day geriatric clinics
- In-depth person-centered assessment of elderly; Undertake Advanced comprehensive geriatric assessment of the elderly.
- Primary management of all common diseases of the elderly and basics of counselling and physiotherapy
- Referral and linkages
- Assure public awareness on promotional, preventive and rehabilitative aspects of geriatrics and village
- Conduct home visit for bed bound elderly at-least on quarterly basis.
- Facilitate provision of assistive devices for the needy elderly and also train them to use it
- Enable skills and competencies of the caregivers

7.1.4 National Program for Palliative Care (NPPC)

Introduction

Palliative care is also known as supportive care, which is required in the terminal cases of Cancer, HIV-AIDS, etc., and can be provided relatively simply and inexpensively. Effective palliative care requires a broad multidisciplinary approach that includes the family and makes use of available community resources. It can be provided in tertiary care facilities, in community health centres and even in patients homes. It improves the quality of life of patients and families who face life-threatening illness, by providing pain and symptom relief, spiritual and psychosocial support from diagnosis to the end of life and bereavement.

Less than 1% of India's 1.3 billion population have access to palliative care.

Definition:

Palliative care is an approach that improves the quality of life of patients and families who face life-threatening illness by providing pain and symptom relief, spiritual and psychosocial support from diagnosis to the end of life and bereavement.

Palliative care:

- Provides relief from pain and other distressing symptoms
- Affirms life and regards dying as a normal process
- Intends neither to hasten or postpone death
- Integrates the psychological and spiritual aspects of patient care
- Offers a support system to help patient's live as actively as possible until death;
- Offers a support system to help the family cope during the patients illness and in their own bereavement(g)
- Uses a team approach to address the needs of patients and their families, including bereavement counselling, if indicated
- Will enhance quality of life, and may also positively influence the course of illness, and
- Is applicable early in the course of illness, in conjunction with other therapies that are intended
- to prolong life, such as chemotherapy or radiation therapy, and includes those investigations needed to better understand and manage distressing clinical complications.

Palliative care for children:

Palliative care for children is the active total care of the child's body, mind and spirit, and involves giving support to the family.

- It begins when illness is diagnosed, and continues regardless of whether or not a child receives Treatment directed at the disease.
- Health providers must evaluate and alleviate a child's physical, psychological, and social distress.
- Effective palliative care requires a broad multidisciplinary approach that includes the family and makes use of available community resources; it can be successfully implemented even if resources are limited.
- It can be provided in tertiary care facilities, in community health centres and even in children's homes.

Hospice Care:

Hospice Care is the end-of-life care provided by health professionals and volunteers. The goal of the care is to help people, who are dying, have peace, comfort and dignity. However, sometimes the hospice care is equated synonymous with palliative care.

Palliative Care Provider	Component of essential service package
JAS/VHSNC/ MAS/RWA	• Awareness for Palliative care and the importance of volunteers for Psycho-social economic-spiritual support

	• Help families with routine home care • Help in accessing various service as needed including mobilization of local resources • Bereavement support
ASHA	• Identifying patients/families for palliative care needs • Help families with routine home care • Help in accessing various service as needed • Networking to assure community support • Referral services • Encourage VHSNC/JAS/MAS/RWA to provide bereavement support
MPW/ANM	•Assessment of patient/families by home visits • Perform basic nursing procedures • Supporting – caregivers/ ASHA/Volunteers • Compassionate communication and Counseling • Provide basic medications as per instructions from Staff Nurse/MO • Referral services • Bereavement support
Staff Nurse/CHO (H&WC(SHC) /PHC/ CHC)	•Detailed assessment of patient/families by home visits • Perform basic nursing procedures • Training of the caregivers/ ASHA/Volunteers/ ANM. • Dispense medication as per the prescription of MO to palliative care patients excluding Narcotic Drugs. • Conduct weekly outpatient clinics in H&WC or PHC/UPHC • Referral & Linkage services for complex cases • Data management for entire H&WC /PHC / CHC – rural and urban • IEC activities • Compassionate communication and Counselling
Staff Nurse	• Primary management of complex cases • Inpatient management of cases • Training of all sub-district level healthcare functionaries in palliative care. • Compassionate communication and Counselling
Medical Officer (PHC)	•Detailed assessment of patient/families by home visits or Outpatient basis • Perform basic procedures [Ryle's Tube Insertion, Urinary Catheter Insertion, Ascites Tapping, Complex wound dressing, Colostomy Care, Tracheostomy Care etc.] • Training of the caregivers/ ASHA/Volunteers/ ANM/ Staff Nurse. • Prescribe medication to palliative care patients including

	Essential Narcotic Drugs. • Conduct weekly outpatient clinics in HWC &/ or PHC/UPHC • Manage palliative care patients referred to PHC/UPHC • Referral & Linkage services for complex cases • Supervision of all palliative care activities under his/her unit. • Compassionate communication and Counselling
Medical Officer (Hospitals)	Management of complex cases • Inpatient management of cases • Training of all sub-district level healthcare functionaries in palliative care. • Compassionate communication and Counselling
Specialized Palliative Care Centres (Including Medical Colleges)	Specialized Palliative Care Services • Inpatient care • Research & Training • Policy & Advocacy

Program Component:

- Service provision: Provision of basic palliative care services at district level.
- Capacity Building: Infrastructure development and manpower training in pain and palliative care.
- Awareness generation through IEC activities: for involvement of community including the caregivers in the delivery of palliative care.

NPPC Strategies:

- Recruitment of Palliative Care team at district level
- Service Provision:
  - Provision of basic palliative care services through OPD and IPD services at district hospital by Qualified/trained palliative care professionals
  - Provision of out-reach services at CHC/PHC by Palliative Care team at fixed interval for providing palliative care to the patients admitted at CHC/PHC.
- Training of palliative care team
- Community awareness
- Supervision and monitoring

7.1.5 National Program for Prevention and Control of Deafness (NPPCD)

Hearing loss is the most common sensory deficit in humans today. As per WHO estimates in India, there are approximately 63 million people, who are suffering from significant auditory impairment; this places the estimated prevalence at 6.3% in Indian population. As per NSSO survey, currently there are 291 persons per one lakh population who are suffering from severe to profound hearing loss (NSSO, 2001). Of these, a large percentage is children between the ages of 0 to 14 years. With such a large number of hearing impaired young Indians, it amounts to a severe loss of productivity, both physical and economic. An even larger percentage of our population suffers from milder degrees of hearing loss and unilateral (one sided) hearing loss.

Long term objective: To prevent and control major causes of hearing impairment and deafness, so as to reduce the total disease burden by 25% of the existing burden by the end of eleventh five year plan.

Components of the programme:

- **Manpower training and development**: For prevention, early identification and management of hearing impaired and deafness cases, training is provided with the help of Medical College specialists (ENT and Audiology) .
- **Capacity building**: To provide District Hospital, RH/SDH and Primary Health Center ENT/ Audiology infrastructure.
- **Service provision:** Early detection of hearing impairment and deafness, management of hearing and speech impaired cases and rehabilitation (including provision of hearing aids) at different levels of health care delivery system.
- **Awareness generation through IEC / BCC activities**: for early identification of hearing impaired, especially children so that timely management of such cases is possible and to remove the stigma attached to deafness.

Strategies:

- To strengthen the service delivery for ear care.
- To develop human resource for ear care services.
- To promote public awareness through appropriate and effective IEC strategies with special emphasis on prevention of deafness.
- To develop institutional capacity of the District hospitals, RH/SDH and Primary Health Centers, selected under the programme.

Expected benefits of the programme:

- Availability of various services like prevention, early identification, treatment, referral, rehabilitation etc. for hearing impairment and deafness as the Primary Health Center / Community Health Centers / District Hospitals largely cater to their need.
- Decrease in the magnitude of hearing impaired persons.
- Decrease in the severity/ extent of ear morbidity or hearing impairment.
- Improved service network/ referral system for the persons with ear morbidity/hearing impairment.
- Awareness creation among the health workers/grass root level workers through the Primary Health Centre Medical Officers and District Officers which will percolate to the lowest level as the lower level health workers function within the community.
- Capacity building at the district hospitals to ensure better care.

Service Delivery and Referral System:

Primary level- CHCs/PHCs/SCs/Primary School teachers/Health Workers /Panchayat

Functions:

- Early identification of cases of hearing impairment and their management in collaboration with NHM (RBSK- Rashtriya Bal Swasthya Karyakram)
- Primary ear care.
- Promoting public awareness in respect of prevention of deafness.
- Sensitization training of health workers.
- Support to School Ear care programme.

Secondary level - District Hospital

Functions:

- Management of cases referred from PHCs/CHCs.
- Organization of Ear care screening camps in collaboration with NHM and Ministry of Social Justice & Empowerment
- Organization of School Ear Care Programme.
- Training of manpower- PHC doctors, nurses, Audiometric assistants, health workers, school teachers.
- Audiometry
- Provision of Hearing Aid

Tertiary level - State Medical College

In each state, one medical college has been identified to act as the Center of Excellence and referral center for the districts covered under the programme in that state. Two ENT surgeons and one Audiologist from the medical college will be trained under the programme.

Functions

- Training of Manpower i.e. sensitization programmes and surgical training workshops.
- Management of referral cases, especially the difficult cases for diagnosis and management.
- Rehabilitation of the hearing impaired.
- All hearing impaired patients need some short of and rehabilitation for communication.

Indication For Hearing Aids:

Any individual who has hearing problem that cannot be helped by medicine or surgical means is a candidate for hearing aid.

- Sensorineural hearing loss
- Deaf children should be fitted with hearing aid and as early as possible for development of speech and learning. In severely deaf children,binaural aid (one for each ear and individually fitted) are more useful.Training in lip reading is given simultaneously.
- Conductive deafness-most of such persons can be helped by surgery but hearing aid is prescribed when surgery is refused or not feasible or has failed.

The various means available to them are:

Instrumental Devices

Implants:

- Conventional hearing aids
- Bone anchored hearing aids
- Implantable Hearing Aids (vibrant sound bridge)
- cochlear implants
- Auditory brainstem implants.

Training:

- speech (lip) reading
- auditory training
- speech conversation.

Cochlear Implants:

- It is an electronic device that can provide useful hearing and improved communication abilities for person who have severe to performed sensorineural hearing loss and who cannot benefit from hearing aids.
- Cochlear implants works by producing meaningful electrical stimulation of auditory nerve where degeneration of the hair cells in the cochlear has progressed to a patient such that amplification provided by hearing aid is no longer effective.
- It has external component called as external speech processor and transmitter ,the speech processor may be body worned or behind the ear.
- The internal component of cochlear implant is surgically implanted.It comprises the receiver/ stimulator package with an electrode array.

7.1.6 National Oral Health Care Program (NOHCP)

Background:

- In 1999, National Oral Health Care Programme (NOHCP) was launched on a pilot basis in collaboration with Department of Oral & Maxillo-facial Surgery, AIIMS, New Delhi was piloted in 1 District each in 5 States – Delhi, Punjab, Maharashtra, Kerala and North Eastern India.
- In 2012, under the 12th Five Year Plan, allocation was made to set up a National Oral Health Cell
- In 2014, an expert group was formed for guiding the National Oral Health Programme under Chairmanship of DGHS.
- Followed a three pronged strategy as below.

Oral Health Education	Preventive Programs	Curative Service Programs
• Training of the trainers	• Promotion of fluoride tooth paste	• Oral healthcare setup
• Oral health education chapters in school curriculum	• Legislation against tobacco products	• School dental health programs
• Oral health education through mass media	• Manufacture of sugar free chewing gums	• Manpower requirement
	• Sugar substitutes in medicinal syrups	• Equipment requirement

Oral health

- According to the World Health Organization (WHO), Oral health is a state of being free from chronic mouth and facial pain, oral and throat cancer, oral sores, birth defects such as cleft lip and palate, periodontal (gum) disease, tooth decay and tooth loss, and other diseases and disorders that affect the oral cavity.
- To reduce morbidity from oral diseases by strengthening existing healthcare delivery system and ensure access to affordable, quality, patient centred care.
- Oral diseases have also been linked to bacterial endocarditis, atherosclerosis, chronic obstructive lung diseases and preterm low birth weight. Periodontal health has direct links with diabetes.
- As per recent data from Dental Council of India, there are about 1.5 lakh registered dentists for a population of about 1.3 billion, out of which 72% live in villages which remain deprived from dental care.
- Oral Health care is very important aspect of Human health to implement the oral health care policy that government planned the National Oral Health Program. As Oral Health is related with almost maximum health problems or have an association with other diseases like Diabetes (periodontitis is a 6th complication of Diabetes), oral mmanifestation of HIV-AIDS, etc.
- Being a general physician, Doctors come across with the multiple varieties of patients, in that patient having dental base for a disease should refer to Dental Surgeon. Some dental origin diseases go unnoticed until it affects the individual at its worst for example periodontitis. It is a common condition and if the periodontitis get treated at its localized state or its initial stage then saving of a tooth/teeth prognosis will be good or else it will lead towards poor & even hopeless prognosis.

Objectives

- Improvement in the determinants of oral health e.g. healthy diet, oral hygiene improvement etc and to reduce disparity in oral health accessibility in rural & urban population.
- Reduce morbidity from oral diseases by strengthening oral health services at Sub district/district hospital to start with.
- Integrate oral health promotion and preventive services with general health care system and other sectors that influence oral health; namely various National Health Programs.
- Promotion of Public Private Partnerships (PPP) for achieving public health goals

Activities under NOHP

NHM component – Support to States to set up Dental Care Units at DH or below. Support provided for:

- Manpower support [Dentist, Dental Hygienist, Dental Assistant]
- Equipment including Dental Chair, autoclave etc. – up to Rs. 7 Lakhs per center
- Consumables for dental procedures – up to Rs. 5 Lakhs per year

Tertiary component – Central level activities such as:

- Designing IEC materials like Posters, TV, Radio Spots, Training Modules
- Organizing national, regional nodal officers training program to enhance the program management skills, review the status of the program

- Preparing State/District level Trainers by conducting national, regional workshops to train the paramedical health functionaries associated in health care delivery.

Strategies

- Strategy 1: Infrastructure
- Strategy II : Generating awareness on oral health – IEC & BCC materials
- Strategy III : Training and capacity building
- Strategy IV : Integration
- Strategy V : Leveraging technology
- Strategy VI : Research & Policy

When to Refer?

- When the patient is having halitosis (Bad Breath)
- When the patient is having Calculus/Tartar deposits around tooth structure
- When the patient is having initial demineralization of a tooth due to progressive caries
- Patient is having swelling related with tooth/teeth caries or with salivary gland infection
- Any viral infection having adverse effect on Oral cavity e.g. Herpes simplex - 1 virus infection, HHV-4 infection (Epstein-Barr virus-infectious glandular fever mononucleosis)
- Patient is having suspicious lesion on oral mucosa.
- Any abnormal growth in oral cavity.
- Tobacco associated discolorations (pigmentation) of oral mucosa.
- Any patient is having cervical lymphadenopathy with oral cavity lesion.

How to diagnose?

- Bad breath will be diagnosed by organoleptic methods.
- Demineralization of tooth/ teeth by caries can be diagnosed by getting a catch on tooth surface with the help of a probe.
- Periodontitis can be checked by finding tooth mobility mostly in association with calculus deposits on tooth surface.
- Two forms of periodontitis acute and chronic acute is associated with the higher virulence of a bacteria Aggregatibacter actinomycetemcomitans that causes destructive effect on teeth attachment in acute phase.
- In chronic periodontitis the calculus bands loosen the teeth attachment this will take longer period of time.

7.1.7 National Tobacco Control Programme (NTCP)

Historical Background

Tobacco is the foremost preventable cause of death and disease in the world today, killing half of the people who use it. If current trends continue, by 2030 tobacco use will kill more than 8 million people worldwide each year. It is estimated that 80% of these premature deaths will occur among people living in low and middle income countries. Furthermore, up to one in five deaths from tuberculosis (TB) could be avoided if TB patients did not smoke.

The National Tobacco Control Programme was launched by Ministry of Health and Family Welfare, Government of India in 2007- 08, during the 11th five year plan.
A comprehensive tobacco control legislation tilted, "the Cigarettes and Other Tobacco Products (Prohibition of Advertisement and Regulation of Trade and Commerce, Production, Supply & Distribution) Act, 2003" was passed.

Goals

- To bring about greater awareness about the harmful effects of tobacco use and Tobacco Control Laws.
- To facilitate effective implementation of the Tobacco Control Laws.

The objectives of NTCP are as under:

- To build up capacity of the State/Districts to effectively implement the tobacco control initiatives;
- To train the stakeholders such as health professionals, enforcement officials, civil society partners etc.
- To undertake appropriate IEC activities and mass awareness campaigns, including in schools,colleges and workplaces.
- To set up a regulatory mechanism to monitor/ implement the Tobacco Control Laws
- Provide facilities for treatment of tobacco dependence.
- To take necessary action, in co-ordination with other government departments and stakeholders for effective tobacco control in the state.

The Main Components of NTCP:

- Public awareness/Mass media campaigns for awareness building and behavioral change.
- Establishment of tobacco product testing lab to build regulatory capacity under COTPA,2003.
- Main streaming program components as a part of the health delivery mechanism under NHM.
- Monitoring evaluation adult tobacco survey.
- Dedicated tobacco control cells for effective implementation and monitoring anti-tobacco initiation
- Awareness activities in schools and colleges.

Role of MO:

- Organizing awareness activities in the schools for the students and the teachers.
- Establishing tobacco cessation clinics in health care facilities and up-scaling tobacco cessation facilities through training of health care providers.
- Organizing training/sensitization programmes on tobacco control..
- Enforcement of Cigarette and Other Tobacco Product Act 2003 (COTPA 2003).
- IEC activity implementation

- Advocacy and networking with NGOs, Nehru Yuva Kendra , National Service Scheme, National Cadet Corps (NCC), Indian Medical Association, Indian Dental Association, Rotary International, Self Help Groups (SHG) etc. for creating awareness against tobacco.
- Coordination with Department of Education for reaching out to the youth and young children.
- Celebration of World Anti-Tobacco Day.

Service Centres:

- State Tobacco Control Cell (STCC) has been formed in the State Health Directorate, Mumbai and Joint Director (NCD) is a State Nodal Officer (SNO) for this programme.
- At district level, Civil Surgeon of that respective district acts as a District Nodal Officer (DNO). The program is being implemented in a phased manner in the state

Cigarettes and Other Tobacco Products Act (COTPA) 2003:

Government of India has enacted the Cigarettes and Other Tobacco Products (Prohibition of Advertisement and Regulation of Trade and Commerce, Production, Supply and Distribution) Act (COTPA) 2003 to control the tobacco use in the country. This act is applicable to all over country. Some of the few important sections have given below.

Important sections of COTPA 2003:

- **Section 4:** Prohibition of Smoking in Public Places.
- **Section 5:** Prohibition of direct and indirect advertisement, promotions and sponsorship of cigarette and other tobacco products.
- **Section 6(a):** Prohibition of sale of cigarette and other tobacco products to a person below the age of eighteen years.
- **Section 6(b):** Prohibition of sale of tobacco products within the radius of 100 meters of educational institutions.
- **Section 7:** Mandatory depiction of statutory warnings (including pictorial warnings on tobacco pack

7.1.8 National Program for Control of Blindness and Visual Impairement (NPCB-VI)

India was the first country in the world to launch the National Programme for Control of Blindness (NPCB) in 1976 with the goal of reducing the prevalence of blindness to 0.3% by 2020. The programme has been renamed in the year 2017 as National Programme for Control of Blindness and Visual Impairment (NPCB&VI). Rapid Survey on Avoidable Blindness conducted under NPCB during 2015-19 showed reduction in the prevalence of blindness from 1% (2006-07) to 0.36%. Apart from cataract surgeries, now the focus of the programme is on treatment and management of other eye diseases like glaucoma, diabetic retinopathy, vitreoretinal diseases, corneal blindness, low vision and childhood blindness. The programme is now geared to take care of all categories of visual impairment.

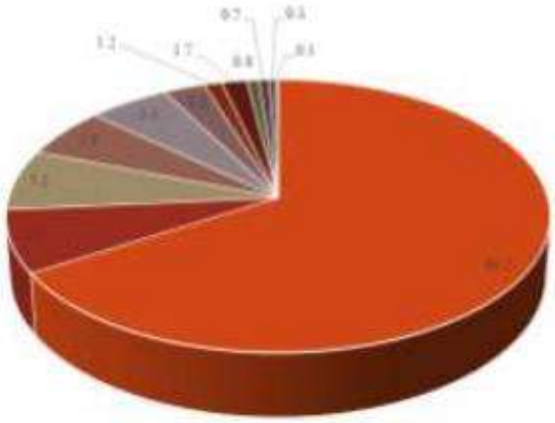
In 1999, the World Health Organization (WHO) launched Vision 2020: The Right to Sight to eliminate avoidable blindness by 2020. In 2013, World Health Assembly adopted Universal Eye Health: Global Action Plan 2014-19 with an aim to reduce prevalence of avoidable visual impairment by 25% by 2019 compared to the baseline prevalence at 2010.

India has around 4.6 million blind people and 33.6 million people with visual impairment. The main causes of blindness in India are - Cataract (66.2%), Corneal Blindness (7.4%), Cataract surgical complication (7.2%), Glaucoma (5.5%), Posterior Segment Disorder (5.09%) and others. Refractive error and cataract are the most common causes of visual impairment in the country.Estimated National Prevalence of Childhood Blindness is about 0.80 per thousand. India has implemented a series of measures in its ongoing NPCB&VI to combat blindness and visual impairment in the country.

With the introduction of Ayushman Bharat, an expanded package of services has been introduced at the Ayushman Bharat-Health and Wellness Centres (AB-HWC), which includes eye care provision at the level of AB-HWCs as part of the Comprehensive Primary Health Care (CPHC).

Blindness is one of the important causes of disability and also the most significant social problem in India. According to the World Health Organization criteria, blindness is defined as, visual acuity of less than 3/60 (Snellen) or its equivalent. Vision 3/60 means, the letter that can be seen from 60 meters by person with normal eye sight is seen by the person from 3 meters only.

Causes of Blindness (RAAB Survey 2015-19)



Cataract untreated 66.2%

Non Trachomatous corneal opacity 7.4%

Cataract Surgical Complications 7.2%

Other posterior segment diseases 5.9%

Glaucoma 5.5%

Phthisis 2.8%

Diabetic retinopathy 1.2

Aphakia Uncorrected 1.7

Trachomatous corneal opacity 0.8%

ARMD 0.7%

Globe/CNS abnormalities 0.5%

Refractive error 0.1%

As per the Government of India definition of blindness, visual acuity of less than 6/60 is considered as the cut off point for blindness.

In order to facilitate the screening of visual acuity by health worker in the absence of appropriate vision charts, blindness is defined as inability to count fingers in daylight at a distance of 6 meters to indicate less than 6/60 or its equivalent.

Approaches to control blindness:

- Primary prevention- Preventing the diseases causing blindness by vitamin A supplementation, measles (Measles Rubella Vaccine) immunization and primary preventive measures for trachoma.
- Secondary prevention (Preventing vision loss from established disease): Examples are treatment of glaucoma, trachoma, and corrective glasses for refractive error.
- Tertiary prevention (Restoring lost sight): Examples are cataract surgery, keratoplasty for corneal blindness.

Objectives of programme: -

- To reduce the backlog of the blindness through identification & treatment of blind
- To develop comprehensive eye care facilities in every district
- To develop human resources for providing eye care services
- To improve quality of service delivery
- To secure participation of voluntary organization / private practitioner in eye care
- To enhance community awareness of eye care

School Eye Screening

Refractive error is the major cause of blindness especially in students, which leads to lower performance of such students in schools. Early detection and immediate correction of refractive error improves the scholastic performance of these students. School Eye Screening (1^{st} to 10^{th} Std.) is conducted by MO RBSK and ophthalmic assistant.

Elderly Eye Screening

Elderly people of the age of 40 years above have degenerative changes (loss of function) in the eyes and the eyes lose the ability to accommodate (focus on near objects). Corrective refraction error by use of spectacles easily. This can be easily detected and guided by the Ophthalmic Assistant. Eligible elderly can avail free spectacles provision preference will be given to the person below poverty line.

Blind Register

House to house survey is conducted by the ASHA, with the help of CBAC form the person with visual impairment or blindness or any eye diseases will be identified and referred to the AB-HWC. Patient with avoidable blindness should be referred to the PHC for diagnosis

and a blind register should be maintained at both the facility. Medical officer should ensure the process, also updating of the blind register and diagnosis, referral and follow up- of the blind person.

Examination of the Eye

Medical Officers can identify commonly preventable conditions by listening to the patient's complaints and looking for common Eye signs by a simple Torch Examination

Common Eye Complaints	History taking & General Examination
1. Diminution/Cloudiness of Vision --- may be sudden or Gradual, can be painless or Painful, for near or Distant objects 2. Redness of the eyes – can be sign of infection, allergy or a foreign body in the eye. 3. Watering and/or discharge from the Eye 4. Painless or painful on lids or around lids – Indicates infection of lids/Eyes. 5. Foreign body sensation/grittiness/ itching in the eye 6. Headache/Glare/ Photophobia/ seeing coloured Halos around light bulb 7. History of foreign body falling in eye Chemicals, wood, splinters, metal etc. 8. Diplopia (Double Vision) or Polyopia 9. Bulging (Proptosis) of eyes or obliqueness of eyes (Squint) 10. White reflex in the pupillary area.	Proper history taking should done before the examination of eye like duration and progression of symptoms, changes in vision (decreased vision), foreign body sensation in the eye, associated pain and photophobia, History of trauma (where-when-injuring object details), Eye discharge/ watering (degree, amount and nature), History of Systemic diseases (Diabetes, Hypertension etc.), history of recent eye surgery. **General Examination of Eye** The Medical Officer should use a well-focused torch light 1. Explain to the patient what are you going to do. 2. Check distance and near vision and record it. 3. Examine eyelids for drooping, swelling (in and around eyelids), injury, inflammation, Trichiasis (In turning of Eye Lashes), entropion/ ectropion, follicles etc. 4. Check ocular movements in all directions and presence of squint. 5. Check for foreign bodies - if superficial remove. The upper lid should be everted to look for foreign bodies, Follicles, Concretions etc. 6. Check the Conjunctiva for any redness, discharge, haemorrhage etc. 7. Cornea examination - If it is clear, shiny and transparent or not. Any foreign body, Ulceration or dryness etc. Should be noted. 8. Anterior chamber depth (Shallow or deep) should be noted and presence of Hypopyon/ Hyphema and or Keratic Precipitates may be noted. 9. Pupils - whether round, equal in size, and reactive to light. 10. The Crystalline lens can be seen through the pupil. Any white, greyish white reflex denotes a Cataract or some posterior segment pathology 11. Do a regurgitation test for Patency of Lacrimal

	apparatus, especially in elderly patients (press on the medial side of inner canthus) 12. Intraocular pressure measurement 13. Any other relevant examination depending upon patient's presentation.

Record:

Following record has to be maintained by health workers:

- Blind person registers
- Suspected cataract cases, cataract operated cases
- Elderly Eye Screening
- School wise number of students in 1st to 10th std and trained teachers for eye screening.

Role of Medical Officer in Eye Care

- Diagnosis and treatment of common acute eye conditions presenting to the facility and those referred from the AB-HWC-SHC.
- Diagnosis for refractive errors and provision of free spectacles to patients diagnosed with presbyopia and school children with refractive errors.
- Collaboration with RBSK team to provide spectacles to children with refractive errors.
- Identification of patients with operable cataract and referral to higher center for surgery, follow up care for operated patients.
- Screening for glaucoma and referral to higher center for surgery, follow up care for operated patients.
- Screening for diabetic and hypertensive retinopathy and facilitating consultation with specialist at early stage. Annual screening of all diabetic patients must be done.
- Refer cases of corneal blindness to Vision Centre and follow up care for patients.
- Primary treatment for eye injuries and referral to higher center for further management, follow up care for patients.
- Removal of superficial foreign body in eye and referral to Vision Centre for corneal/deep foreign bodies in eye.

- Coordination with district team/RBSK team for eye screening camps and outreach services.
- Carry out surveillance of trachoma cases and refer to Specialist when needed.
- Coordinate health promotion activities related to eye health including counseling regarding eye hygiene, ensuring healthy diet, providing Vitamin A prophylaxis, awareness generation regarding available eye care services.
- Nodal officer for Vision Centre operations, outreach activities (planning, monitor wellness clinics/community workers and co-ordination with district hospitals), quality assurance of ASHA and Ophthalmic Assistant (OA).
- Ensure record maintenance as per NPCBVI guidelines and periodic review of progress
- Medical fitness for cataract surgery, disability certification, initial reading of fundus images, outreach activities, quality assurance of ASHA and OA activities (MO).
- Providing follow up care for post-operative cases as recommended by the eye specialist (MO).
- Supportive supervision of AB-HWC-PHC/UPHC team and AB-HWC-SHC teams in regular eye care activities.
- Monitoring activities of your team in daily activities as well as in monthly meetings.
- Maintenance of drugs and equipment and inventory control.

Formats in NPCB-VI: (Refer Annexure 7.2 (Vol. II))

7.1.9 National Mental Health Programme

Psychiatric disorders amount for a large proportion of chronic health problems. Mental state of individual greatly influences general health status and ability to access needed health care services. Thus it is essential for MO PHC to recognize the mental disorders and refer the needed cases to appropriate specialists.

Issues indicating the importance of Mental Health in PHC set up

- Quality of life is largely determined by person's mental health
- Large proportion of people who need medical care have psychiatric disorders
- Many physical disorders have an important mental component
- As the life expectancy increases, risk of chronic mental impairment raises.

Two features of mental disorders are distinguishable from other nonfatal conditions:

- First the care of mentally ill has long been a government responsibility.
- Second unique feature of psychiatric disorders is personal interview which is most important tool for diagnosis of these diseases.

Previously, mental illnesses were divided into two major categories, as Psychoses and Neuroses. Nowadays there are two diagnostic systems i. e. ICD - International classification of diseases (Latest ICD-10) and Diagnostic and statistical manual of mental disorder (Latest edition DSM-IV). The fourth edition of DSM correlates with the WHO's ICD-10

The ICD-10 classification of psychiatric illnesses broadly is as follows

According to ICD, 10 classification, all psychiatric illnesses are categorized into 10 major groups and they are coded from F00 to F99. (Refer Annexure 7.3 (Vol. II))

Nearly all-psychiatric disorders are classified in these ten groups. When patient suggestive of psychiatric illness attends OPD in your PHC, take careful history of patient, examine to rule out any organic problem and try to fit in the patient into the disorder described in classification.

Primary treatment

Management of excited, violent patient

Your approach should be calm and quiet. Enquire with relatives, examine patient for any obvious organic illness. For excited patient, the recommended treatment is.

Inj. Haloperidol 10 mg. + Inj. Phenergan 50mg. IM stat. Dose can be repeated 8 hourly.

Wait for some time to get effect of medication. After the patient becomes relatively silent, refer to the psychiatrist.

Treatment Modalities.

Drugs used in psychiatry are broadly classified for convenience as below:

- Antipsychotics
- Antidepressants
- Antianxiety drugs
- Mood stabilizers

Anti-psychotics:

- Tab Olanzapine- 5 mg once at night
- Tab Clonazepam- 0.5 mg once at night

Schizophrenia requires long term management and regular maintenance therapy.

Anti-depressants

These are effective in depressed but not agitated psychotics. After 2-3 weeks of continuous treatment, mood is gradually elevated; patient becomes more communicative and starts taking more interest in self and surroundings.

Anti-depressant drugs:

- Tab Imipramine- 25 mg once at night.
- Tab Amitryptiline- 25 mg once at night.
- Tab Clonazepam- 0.5 mg once at night

Anti-anxiety drugs:

- Tab Clonazepam- 0.25 mg twice daily

Tension Headache:

- Tab Imipramine- 25 mg once at night.
- Tab Amitryptiline- 25 mg once at night.
- Tab Clonazepam- 0.5 mg once at night

Referrals:

After giving primary treatment, the patients who are unmanageable, excited and difficult to diagnose should be referred to nearby hospital to be examined by a psychiatrist.

Suicidal risk patients

Attempted suicidal or deliberate self-harm like poisoning, hanging, burns after primary treatment should be referred to hospital where psychiatric services are available.

Follow Up

Follow up of psychiatric patient is very important. Psychiatric patients need close supervision. Once the patient is examined by psychiatrist and is on maintenance dose, such cases can be reviewed on OPD basis fortnightly or even once in a month.

Admission procedure in Mental Hospital (Ref. Mental Health Care Act 2017)

Admissions in the mental hospital are governed by Mental Health Care Act (MHCA) 2017. Admission to mental hospitals is carried out by two methods.

- Independent Admission: Patient who has capacity to take decision, can admit himself/ herself in any Mental Health Establishment (MHE)
- Supported Admission: Those patients who don't have capacity to take the decision, then the nominated representative (NR) has the responsibility to admit patient.

Court Orders needed for wandering, roadside and prisoners with mental illness.

Discharge from mental hospital is by following ways

- Voluntory Boarders (VB) discharge
- Leave of absence.
- Discharge through visitors committee.

Role of ASHA MPW and ANM

Responsibility of MPW/HA for mentally ill patients is as follows -

- They should suspect patients and refer
- They should give health education in the community regarding mental illness.
- They should help to remove misbelifes regarding psychiatric illness.
- Follow up of patients on treatment to see regularity of treatment, side effects etc.

Role of MO

- Medical Officers should sensitize ASHA MPWs and ANMs regarding mental health program.
- Give primary treatment to psychiatric patients before referral.
- Follow up of the patients who were referred to higher center.
- Plan IEC activities to create awareness regarding mental health.
  - ➢ To incorporate mental health services with other general health services and to make mental health service, an integrate part of general health services.

- To associate mental health knowledge and services, in social development schemes in general.
- To ensure people's participation in delivering and developing mental health care services in the society.
- There are 4 mental hospitals; "Regional Mental Hospitals"(RMHs) in the state having total
  5555 bed strength Pune,Thane, Nagpur, Ratnagiri.

Prerna Prakalp Program

Prerna prakalp - Farmer Counseling Health Service Program was initiated in the year 2015, GR dated 25/11/2015 & then it was wide revised, *GR dated 24/09/2018.* The program runs in 14 districts of Maharashtra Aurangabad, Beed, Jalna, Hingoli, Nanded, Latur, Osmanabad, Parbhani, Akola, Amravati, Buldhana, Washim, Yavatmal & Wardha which recorded high incidences of farmer suicides. The ASHA workers are trained to identify farmers who are affected by depression, using screening tools. These farmers are then referred to the Primary health centre doctors who are trained in mental health, psychiatrists and other mental health professionals appointed at the District level under the project. The programme also has established linkages with the 104 mental health helpline for ongoing counseling services.

Activities in Mental Health –DMHP

OPD – Out patients service
IPD – In patients services

Targeted Intervention

- Targeted interventions are a resource-effective way to implement Mental Health Programme.
- Under Targeted Intervention DMHP Team Visiting to Schools, Elderly Home, Jail, Villages regularly and conduct sessions and Camps.
- In sessions Team Provides service to patients Like Screening , Counseling and helping to tackle Mental health problems.

Memory Clinic

- The Memory clinics shall aim to help and support the person suffering from dementia and their care givers, right from the onset of symptoms to the advanced stages.
- In Maharashtra 33 Memory Clinic Established at District Hospitals.

Manashakti Clinic (मनशक्ती क्लिनिक)

- On the occasion of 75 yrs. Of Independence day- Amrut Mohatsav, public health department decided to start dedicated Mental Health outpatients service at Primary Health Centers of 34 district of Maharashtra.
- The main objective of this is to provide mental health services to needy people at their nearest location. Under this basic mental health out patients services, referral

services, follow up services are being provided through MBBS qualified PHC medical officers & health workers.

- Target is of 1814 PHCs to start Mental Health OPD, out of that till Jan 2022 in 580 PHCs mental health outpatients services started.
- Toll free Help line no- 104
- Free advice/Counselling regarding Mental Health Issues provided by Counselor through 104 Toll free helpline No.

Role of Medical Officers in Mental Health

Medical officers currently working in the primary health center are being trained on mental illness. And through them mental health services are being provided to the people through "Manashakti Clinic" in Maharashtra.

As mentioned –Main objective of this mission is to provide basic mental health services to needy people at their nearest location.

Role of PHC/SC staff in mental health program.

- Medical officers should complete the mental health training themselves and all their subordinates, ANMs, staff nurses and other officers and staff with the help of DMHP Team and District Psychiatrist.
- Responsibility of CHO/MPW/ANM for mentally ill patients is as follows-
- Identify patients from history narrated by patient and relatives.
- Give primary treatment to psychiatric patient before referral.
- Guide patient/relatives who need admission to mental hospital.
- After improvement motivate the patient and relative for follow up treatment.
- Counseling, group therapy for improved patient. Help the patient for rehabilitation.
- Give health education in the community regarding mental illness and help to remove misbelief regarding psychiatric illness.
- Plan IEC activities to create awareness regarding mental health.
- Identify patients from history narrated by patient and relatives.
- Give primary treatment to psychiatric patient before referral.
- Guide patient/relatives who need admission to mental hospital.
- After improvement motivate the patient and relative for follow up treatment.
- Counseling, group therapy for improved patient. Help the patient for rehabilitation.
- Give health education in the community regarding mental illness and help to remove misbelief regarding psychiatric illness.

Mental Health Day

World health Day	7th April
Schizophrenia Day	24th May
De-addiction Day	26th June
Suicide Prevention Day	10th September
Mental Health Day	10th Oct

Alzheimer Day	21st September
Epilepsy Day	26th March

7.1.10 National Programme for Prevention and Control of Fluorosis (NPPCF)

Introduction

Fluorosis, a public health problem, is caused by excess intake of fluorides through drinking water/food products/industrial pollutants, over a long period. It results in major health disorders like dental fluorosis, skeletal fluorosis and non-skeletal fluorosis besides inducing ageing. These harmful effects, being permanent and irreversible in nature, are detrimental to the health of an individual and the community, which in turn, has an impact on growth, development, economy and human resource development of the country..

Sources of Fluoride

The main sources of fluoride intake are drinking water, food, drugs & industrial emissions. Permissible limit for fluoride, as per Bureau of Indian Standards (BIS), is 1.5 ppm in drinking water.

- Fluorine is abundant in nature, found in compound form like fluoride
- Fluorine is essential for mineralization of bones & formation of dental enamels
- Fluoride is often called double edged weapon, its deficiency leads to dental caries while prolonged ingestion through drinking water in excess of daily requirement viz.> 0.8 mg/L is associated with dental & skeletal fluorosis.
- 96% of fluoride of body found in bones & teeth
- The major source of fluorine to man is drinking water. Fluorides occur in traces in many foods but some foods (Sea fish, cheese, tea) are reported to be rich in fluorides. Normally small amount of fluoride is required (0.5 to 0.8 mg/L) in drinking water.

Goal

To prevent and control fluorosis cases in the country.

Objectives

The Objectives of the National Programme for Prevention & Control of Fluorosis are as follows:

- To collect, assess and use the baseline survey data of fluorosis content in
- drinking water sources.
- Comprehensive management of fluorosis in the selected areas.
- Capacity building for prevention, diagnosis and management of fluorosis cases.

Case Definition;

Suspected Cases of dental Fluorosis

Any case residing in an endemic area along with one/both of the followings-

- Chalky white teeth

- Transverse yellow brown or dark brown bands

Suspected Cases of Skeletal Fluorosis

Any case residing in an endemic area along with one/more of the followings-

- Severe pain &stiffness in the neck & back bone
- Severe pain & stiffness in joints
- Severe pain & rigidity in pelvic girdle.
- Knock knee / Bow leg
- Inability to squat
- Ugly gait & posture.
- Increased girth, thickening & density of bone seen in X- Ray

Suspected cases of Non – skeletal Fluorosis:

Any case residing in an endemic area along with one/more of the followings-

- Gastro –intestinal problems: Consistent abdominal pain, intermittent
- Diarrhoea/constipation, blood in stool
- Neurological manifestations: Nervousness & depression, tingling sensation in fingers & teeth, polydypsia, polyuria
- Muscular manifestations: Muscle weakness & stiffness, pain in the muscle, loss of muscle power.

Implementation of NPPCF in the state of Maharashtra:

NPPCF programme started in Maharashtra state in phased manner from year 2009-2010

Old 6 Districts:

Chandrapur, Nanded - Phase 2-August 2010

Latur, Yavatmal, Nashik - Phase 3-July 2011

Beed – Phase 4-May 2012

NPPCF is functional in seven districts as approved by the Govt of India under NPPCF for the year 2022-23 as given below: 1) Nagpur ,2) Nanded 3) Chandrapur ,4) Beed ,5) Latur, 6) Washim, 7) Yavatmal.

Guidelines for comprehensive management of fluorosis cases

Analysis of urine samples

Sample collection

- 15ml spot urine sample in 25 ml plastic screw cap bottles.
- Put 1-2 drops of Toulene (AR Grade).
- Properly labeled.

Transportation of samples

- Urine Sample should be sent to district lab within a week time.
- Samples can be kept at room temperature.
- Report should be sent to State Nodal Officer.

Early Detection

Following criteria is used for confirming fluorosis cases

- Any suspect case with high level of fluoride in urine (>1mg/L)
- Any suspect case with interosseous membrane calcification in the forearm confirmed by X-Ray

Prompt Intervention:

- **Health Education**

Do's & Don'ts in relation to nutrition intervention in fluorosis

Do's	Don'ts
✓ Calcium rich food	x Black Tea
✓ Milk	x Black/Rock salt
✓ Milk products	x Tobacco
✓ Green leafy vegetables	x Supari
✓ Vitamin C rich food	x Fluoridated toothpaste
✓ Iron rich food	
✓ Citrus fruits	
✓ Banana, Guava, Brinjal	

Preventive Measures

- Closing contaminated water source.
- Arranging alternative safe water source.
- Flocculation, Sedimentation, coagulation (with lime & alum), filtration of drinking water before use.
- Health education, dietary counseling & nutrition.
- Dietary supplementation of calcium, vitamin C, D3 & iron.
- Enhanced surveillance, early detection, proper treatment & rehabilitation.
- Rain & surface water harvesting for agriculture & household.
- Supply of pipeline river water from water treatment plant.
- Water treatment gadgets in tube wells where surface water is not available.
-

Treatment

- Medical treatment: No specific treatment; treatment supplementation with vitamin C&D, antioxidants, calcium & correction of malnutrition
- Treatment of deformities: Orthoses, surgical shoes, physiotherapy, reconstructive surgery.

As per guidelines following are the focus areas in state for NPPCF.

- Community Diagnosis of Fluorosis village/block/cluster wise.
- Gap analysis in facilities and organization of physical and financial support for bridging the gaps, as per strategies listed above.
- Diagnosis of individual cases and providing MEDICAL management.

- Public health intervention on the basis of community diagnosis.
- Behaviour change by IEC, making people aware about the fluorosis. The video film prepared by GOI in Marathi has been distributed in field. Standees, posters etc are prepared locally by districts and centrally also the same are being published for distribution
- Training of Medical and Paramedical staff to rope them in program

7.1.11 National Programme on Climate Change & Human Health (NPCCHH)

Objectives:

The NPCCHH objectives with some initially identified key actions are:

- To create awareness among general population (vulnerable community), health-care providers and Policy makers regarding impacts of climate change on human health.
- To strengthen capacity of healthcare system to reduce illnesses/ diseases due to variability in climate
- To strengthen health preparedness and response by performing situational analysis at national/ state/ district/ below district levels.
- To develop partnerships and create synchrony/ synergy with other missions and ensure that health is adequately represented in the climate change agenda in the country
- To strengthen research capacity to fill the evidence gap on climate change impact on human health

7.2 Disability

When considering the total disease burden of the community, contribution of various disabilities in the disease burden is significant. Some of the disabilities could be prevented by taking primary preventive measures so that they do not occur, whereas for some of them early diagnosis and prompt treatment is important.

Disability has its impact in various ways. Person may have functional limitation by decreased mobility, he may suffer from psychological setback, and there may be decreased earning capacity. In addition to this family has to support the disabled person physically, socially and economically.

Therefore, providing preventive, promotive, curative and rehabilitative services to the community especially disabled persons is important.

7.2.1 Definition

Disability is defined as an existing difficulty in performing one or more activities which in accordance with the age, sex of the subject and as per normative social role are generally accepted as essential basic components of daily living.

Disability incidence

There are no comprehensive surveys to know the exact incidence of disability. In India some sample surveys have been conducted and it is estimated that at least 2 to 5 percent of Indian population is suffering from some kind of disability.

Disability includes following **conditions**

- Blindness
- Low vision
- Leprosy cured
- Hearing impairment
- Locomotor disability
- Mental retardation
- Mental illness

7.2.2 Disability prevention

Prevention of disability is important which is made at three levels – primary, secondary and tertiary.

Primary prevention

It is the action taken prior to the onset of disease, which eliminates the possibility that a disease will occur. Common examples are – Proper antenatal, intranatal, postnatal care to prevent child born with disability, prevention of accidents, avoiding consanguineous marriages, immunization to prevent polio etc., and Consumption of Folic acid to prevent Neural Tube Defects during pre-conception period.

Secondary prevention

These are the actions, which halt the progress of the disease at its incipient stage and prevent complications. This includes correction of refraction, early diagnosis and treatment of leprosy etc., correction of club foot in infancy, surgical correction of Cleft lip and cleft palate etc.

Tertiary prevention

When the disease process has advanced beyond early stage, tertiary preventive measures are taken e.g. cataract surgery, provision of artificial limb in case of amputation etc.

The persons with disabilities (Equal opportunities, protection of rights and full participation) Act, 1995

Need for the act

Disabled persons face discriminatory attitude, they do not get the opportunities for improving their quality of life and also the community does not respect them. Considering these issues legislation has been formulated which is known as 'the persons with disabilities (Equal opportunities, protection of rights and full participation) Act, 1995'.

Definitions used as per the act

- 'Blindness' refers to a condition where a person suffers from any of the following conditions:
  - ✓ Total absence of sight.
  - ✓ Visual acuity not exceeding 6/60 in the better eye with correcting lenses or
  - ✓ Limitation of the field of vision subtending an angle of 20 degrees or worse.
- 'Cerebral palsy' means group of non-progressive conditions of a person characterized by abnormal motor control posture resulting from brain insult or injuries occurring in the pre-natal, peri natal or infant period of development.
- 'Hearing impairment' means loss of sixty decibels or more in the better ear in the conversational range of frequencies.
- 'Locomotor disability' means disability of bones, joints or muscles leading to substantial restriction of movement of the limbs or any form of cerebral palsy.
- 'Mental illness' means any disorder other than mental retardation.
- 'Mental retardation' means a condition of arrested or incomplete development of mind of a person, which is specially characterized by sub normality of intelligence.
- 'Person with disability' means a person suffering from not less than 40 percent of any disability as certified by the medical authority.
- 'Person with low vision' means a person with impairment of visual functioning even after treatment or standard refractive correction but who uses or is potentially capable of using vision for the planning or execution of a task with appropriate assistive devices.
- 'Rehabilitation' refers to a process aimed at enabling persons with disabilities to reach and maintain their optimal physical, sensory, intellectual, psychiatric or social functional levels.
- 'Leprosy cured person' means any person who has been cured for leprosy but is suffering from –
- Loss of sensation in hands or feet as well as loss of sensation and paresis in the eye and eye lid but with no manifests deformity.
- Manifest deformity and paresis but having sufficient mobility in their hands and feet to enable them to engage in normal economic activity.
- Extreme physical deformity as well as advanced age, which prevents him from undertaking any gainful occupation.

Activities to be undertaken for early detection of disabilities as per the act

- To undertake survey and investigations concerning the cause of occurrence of disabilities.
- Implementation of activities for prevention of disabilities.
- Screen all children at least once in a year for identifying high-risk cases,
- Screening of children under age of 6 yrs are screened by dedicated teams of Doctors (RBSK), twice a year through visits to Anganwadis.
- Measures for prenatal, perinatal and postnatal care of mother and child.

- Creating awareness among the community regarding causes of disabilities and preventive measures to be adopted.

Following activities are important for MO in disability prevention

- Medical Officer should examine the disabled persons coming to OPD in PHC, especially children; identify the causes of disability and refer patient to appropriate specialty.
- Continued education of the workers regarding identification of various disabilities, prevention of disabilities etc.
- MO should plan IEC activities by involving all health workers, AWW in PHC jurisdiction.
- MO should refer the disabled persons to the Civil Surgeon for getting the handicapped certificate. The Social welfare department provides identity card to handicapped persons.
- RBSK team should perform examination of children from schools once in a year and MO PHC should examine non-school going children for assessment of disability and their appropriate referral.
- MO should try for getting facility of ramp at PHC.

7.2.3 Disability Certificate

The Disability Certificates are issued through Online Software by Computerized system
The certificate is issued by a board of Doctors which consists of Civil Surgeon /Dean, Additional Civil Surgeon/Medical Superintendent, Concerned Specialist Doctor.
The disabled person has to approach District /General Hospital /Govt. Medical College of the district where he /she is residing.
The Proof of Residence and Photograph is essential for obtaining Disability Certificate.
As per *GR Public Health Department* *अप्रवि- २०१८/ प्र. क्र. ४६/ आरोग्य-६ dated 14th September 2018*
Now a days unique disability Identity Card (UDID/ Swavalamban Card). It is an initiative by GoI with a view of creating a national data base for person with disabilities (PwDs). This unique disability Identity card is issued to each PwD through online platform *https://www.swavalambancard.gov.in/*

7.3 Disaster Management

A "Disaster" can be defined as "any occurrence that causes damage, ecological disruption, loss of human life or deterioration of health and health services on a scale sufficient to warrant an extraordinary response from outside the affected community or area" As per WHO, a disaster is defined as “Any Event or Series of Events causing a serious disruption of community’s infrastructure- often associated with wide spread human ,material ,economic or environmental loss and impact ,the extent of which exceeds the ability the affected community to mitigate using existing resources”.

Disasters are not confined to a particular part of the world; they can occur any where and at any time. India is one of the ten worst disaster prone countries of the world. The country is prone to disasters due to a number of factors; both natural and human induced. Emergencies and disasters not only affect health and well-being of people;

frequently, large number of people are displaced, killed or injured, or subjected to greater risk of epidemics.

As per the Constitution of India, Health, including health care delivery is a State subject and the Central Government has specific responsibility areas in Public Health. Also the Directive Principles put added responsibility on the State to ensure Right to Health as subsumed in Right to Life. The preparedness and response mechanisms for biological disasters are to be primarily that of the State/ UT Administration. Disaster Management Act, 2005 has defined roles and responsibilities for disasters that include epidemics and empower the district and state authorities to cope up with public health emergencies. In addition, the Criminal Procedure Code provides useful tools for enabling public health situation control.

7.3.1 Types of Disasters

Geological

- Earthquake
- Landslides
- Avalanches

Hydrometeorological

- Flood
- Drought
- Tsunami
- Cyclone and Wind
- Cold Wave / Frost
- Heat Wave

Accidents

- Road Traffic Accidents (RTA)
- Train Accidents
- Air Accidents
- Marine Accidents
- Fire Accidents (Urban / Domestic)
- Chemical Accidents

Biological

- Epidemics
- Bio-terrorism
- Accidental release of virulent microorganism

Nuclear

- Nuclear warfare
- Nuclear mishaps (accidental/ accidental release of nuclear materials)

Radiological Explosive

The relative number of injuries and deaths differ, depending on a number of factors such as the type of disaster, the density and distribution of the population, condition of the environment, degree of the preparedness and opportunity of the warming. Injuries

usually exceed death in explosions, earthquakes, typhoons, hurricanes, fires, tornadoes etc.

7.3.2 Disaster Management Plan:

It can be defined as the organization and management of resources and responsibilities for dealing with all humanitarian aspects of emergencies, in particular prevention, preparedness, mitigation, response and recovery in order to lessen the impact of disasters. It provides operational guidance relating to the all-hazard emergency situations and describes the overall roles and responsibilities in minimizing loss of life and suffering by giving a rapid response to disasters through effective use of resources.

Disaster can increase the transmission of communicable diseases through following mechanisms:

- Overcrowding and poor sanitation in temporary resettlement.
- Population displacement may lead to introduction of communicable diseases to which either the migrant or indigenous populations are susceptible.
- Disruption and the contamination of water supply, damage to sewerage system and power systems are common in natural disasters.
- Ecological changes may favour breeding of vectors and increase the vector population density.
- Displacement of domestic and wild animals, who carry with them zoonoes that can be transmitted to humans as well as to other animals.

The Principles of preventing and controlling communicable diseases after a disaster are to:

- Implement as soon as possible all public health measures, to reduce the risk of disease transmissions;
- Organize a reliable disease reporting system to identify outbreaks and to promtly intiate control measures; and
- Investigare all report of disease outbreaks rapidly.

Key Phases of Disaster Management

There are three key phases of activity within disaster management:

- **Pre-Disaster or Phase of Preparedness:** Before a disaster to reduce the potential for human, material or environmental losses caused by hazards and to ensure that these losses are minimized when the disaster actually strikes.
- **During Disaster:** It is to ensure that the needs and provisions of victims are met to alleviate and minimize suffering.
- **Post Disaster***:* After a disaster to achieve rapid and durable recovery which does not reproduce the original vulnerable conditions.

Pre – Disaster Phase:

Prevention and Mitigation

Reducing the risk of disasters involves activities, which either reduce or modify the scale and intensity of the threat faced or by improving the conditions of elements at risk.

Mitigation - Measures taken prior to the impact of a disaster to minimize its effects (sometimes referred to as structural and non-structural measures. Personal mitigation is

a key to national preparedness. Individuals and families to be trained to avoid unnecessary risks. E.g. In earthquake prone areas, these preventive measures might include structural changes such as the installation of an Earthquake Valve to instantly shut off the natural gas supply inside a building or In flood prone areas, houses built on poles/stilts, areas which are prone to prolonged electricity black-outs, installation of a generator, in cyclone prone areas ,construction of storm callers and fallout shelters

Preparedness

Preparedness can be defined as measures taken in anticipation of a disaster to ensure that appropriate and effective actions are taken in the aftermath. The process enables government, communities and individuals to respond rapidly to disaster situations to cope with them effectively.

Early Warning - This is the process of monitoring the situation in communities or areas known to be vulnerable to slow onset hazards, and passing the knowledge of the pending hazard to people.

During disaster Phase

Response -This refers to the emergency relief activities undertaken during and immediately following a disaster, which includes immediate relief, rescue, and the damage needs assessment. It includes the first stage response to any calamity such as setting up control rooms, putting the contingency plan in action, issue warning, action for evacuation, taking people to safer areas, rendering medical aid to the needy. This includes immediate treatment from nearby health institute, setting up of Mobile Medical Units, ambulances and Referral services etc.

The Post- disaster Phase

Recovery: Recovery is used to describe the activities that encompass the three overlapping phases of emergency relief, rehabilitation and reconstruction.

Rehabilitation: Rehabilitation includes recovery to Normal health including physio-Occupational therapy, psychosocial support, the provision of temporary public utilities and housing as interim measures to assist long-term recovery.

Steps in Disaster Management

GOLDEN HOUR-Rushing to Site from nearest health facility

- In the period immediately after the disaster occurs action has to be taken on war-footing by local and district health authorities to render definite medical care which gives relief to affected and also help them to overcome the trauma. If a critical trauma patient is not given definite medical care within one hour from the time of accident, chances of his ultimate recovery reduce drastically, even with the best of medical attention thereafter. This initial one hour period is generally known as "The Golden Hour". Arrest bleeding and restore blood pressure within hour. Persons under shock shall immediately be relieved of shock. Transport the casualties to the nearest hospital.

During this Golden Hour, following efforts should be made:

- Any person whether Government or Non-Government shall pass on the information quickly to the nearest health facility about the incidence. They shall render first-aid and take the help of other volunteers from the site of incidence.

- MO at the site will inform the Block as well District office about the incidence and the nature of assistance required.

Arrival of Taluka Team

On receipt of information regarding the accident where casualties are expected, the doctor on emergency duty in the hospital casualty would inform all other doctors and Para Medical Staff concerned. Two teams of Doctors and Para Medical Staff should be formed. Team 'A' and Team 'B'.

Team 'A' - headed by THO in charge will rush to the accident site immediately along with 10-12 doctors and 15-20 paramedical. Team 'B'- headed by the Medical Superintendent Rural Hospital will stay back at the rural hospital. Bare minimum number of doctors should be left behind for manning Team 'B' and most of the available doctors should be rushed to accident site as part of Team 'A" Such decision should be taken only by the nodal officer i.e. Civil Surgeon of the district.

Attending to injured persons:

- One team will be asked to provide medical treatment to injured persons immediately after their evacuation from sites.
- Ensure stabilization of condition of injured person already taken out from sites, before they are dispatched to hospitals by road.
- In case of patients in critical condition where stabilization of condition at site is not possible, they should be moved immediately by ambulance.

Preparing list of persons:

- Collect list of injured passengers prepared by local authority and assess the situation.
- Separate lists to be prepared site wise. The list should contain following details:
- If found Conscious: Name, sex, age, identification marks, address,
- If found Unconscious: Approximate age, sex, identification marks, other particulars if relatives and friends are available.

Transportation of serious persons in nearby Public or Private Hospital by Govt. ambulance

Use of 108 EMS system for transportation.

Hospital care after admission:

- One doctor, one supervisor should be deputed round the clock at each hospital.
- If large no. of hospitals are involved 2/3 hospitals may be given to one doctor.
- Decide whether the patient needs to be shifted to other hospital with better facilities and arrange to shift the patient.

Dealing with dead bodies:

- Dismembered bodies begin emitting foul odour after two days. Target should be to extricate all dead bodies within 24 hrs. Dead bodies should be dealt with site wise; otherwise bodies taken out from different sites get mixed up.
- Put label written by Marker pen on each dead body in the pocket provided in body bag.
- Date _____ Dead body Serial No._____
- Name _____ Age _____Sex_____
- site_____

- In case of unidentified dead bodies, against the item 'name' it should be written as unidentified-1/unidentified-2 etc. 5 colored Photographs preferably by digital camera should be taken of each injured and dead body. Two should be close up of face from in front and sideways, third should be of full length of the body.
- If possible each body should also be video photographed.

7.3.3 Nodal Authority

The Director of Health Services is the State control authority for Disaster management in the state. The Joint Director of Health Services (Malaria, Filaria & waterborne Diseases) is the State Nodal officer for Disaster Management. At district level, the Civil Surgeon is Nodal Officer for the same.

7.3.4 Disease Surveillance

Integrated Disease Surveillance Program (IDSP) would be the backbone of the Surveillance network. Collection, collation, analysis and information flow would use both terrestrial and satellites based information technology and cover all districts. The IDSP reporting system has provision of reporting new disease causing public health havoc and locally important diseases of public health importance. It has additional provision of reporting conditions that becomes important in a disaster setting.

Sanitary & Entomological surveillance

In disease prone/high risk villages special sanitary surveillance (including water quality testing for contamination & TCL testing) & Entomological surveillance (including House to House container survey, vector density assessment) need to be carried out as a part of regular pre-disaster activity.

Common disasters and Role of Medical Officers

Floods And Cyclones

Small floods can be foreseen by watching the water level after heavy rains and regularly listening to the weather forecasts. Hurricanes and cyclones often occur during the rainy season, when particular vigilance must be exercised. They are often announced several hours or days before they arrive. Usually, sufficient time is available for taking necessary measures

During a flood

- Turn off the electricity to reduce the risk of elecrocution.
- Beware of water contamination – if the taste, colour, or smell of the water is suspicious, it is vital to use some means of purification.

After flood

- Wait until the water is declared safe before drinking any that is untreated;
- Clean and disinfect any room that has been flooded;
- Sterilize or wash with boiling water all dishes and kitchen untensils.

Epidemiologic surveillance and disease control

A survey of all public water supplies should be made. This includes distribution system and water source. It is essential to maintain bacteriological and chemical quality of water supplied. The main public safety aspect of water quality is microbial contamination. The first priority of ensuring water quality in emergency situations is chlorination. It is the best way of disinfecting water. It is advisable to increase residual chlorine level to about 0.2-0.5 mg/liter. All water tankers should be inspected to determine fitness, and should be cleaned and disinfected before transporting water.

Earthquakes

What to do before hand

- The movement of the ground in an earthquake is rarely the direct cause of injuries; most are caused by falling object or collapsing buildings. To reduce the destructive effects of earthquakes a number of precautions are essential for people living in risk areas:

During Earthquake

- Keep calm, do not panic. People who are indoors should stay there but move to the central part of the building. Keep away from the stairs, which might collapse suddenly.

After an earthquake

- Obey the authority's instructions.
- Do not go back into damaged buildings since tremors may start again at any moment.
- Give first-aid to the injured and alert the emergency services in case of fire, burst pipes, etc.
- Make sure that water is safe to drink and food stored at home is fit to eat (in case of electricity cuts affecting refrigerators and freezers).

Accidents

India has the highest No. of road traffic accidents according to WHO.

Actions to be taken by Medical Officer after an accident

First assess the extent of injuries. For e.g. blood from the head, neck, arms legs, abdomen back etc. Check if the person is breathing and if he has a pulse. Clear the airway. If there is no pulse, start CPR. If there is bleeding from the mouth or the patient is vomiting, turn the person to his/her side. This will avoid any chances of the person choking. If there are extensive wounds, try to control the bleeding using pressure to the area using a torniquet. Always suspect spinal injuries. If the person's neck is in an awkward position (not normally placed) or the person is unconscious, do not move the patient. Get help immediately. Usually, accident victims feel excessively cold due to shock. Therefore, keeping them warm is essential to survival. Do not give water or anything through the mouth, it could lead to the patient choking.

While shifting a patient to the hospital, here are a few things you should keep in mind:

The patient should be transported on a stretcher or stiff board. Keep the person's neck and back straight. You could place a rolled up towel or thick cloth under the neck for better support. Ensure that the person is lying down flat. In case of a bleeding injury, lift the injured part above the body level and apply pressure Make sure the person has a

pulse and is breathing on the way to the hospital. If he/she stops breathing, be prepared to start CPR or EAR in the vehicle.

Laws regarding Road traffic accidents:

According to a Supreme Court Judgement, an accident victim is entitled to immediate emergency medical care. A doctor on duty bound to provide primary care to the patient and informing the police is the hospital's responsibility. In the case of an accident the police will be called by the hospital, while they file an MLC (medicolegal cases) . If the hospital is not equipped to handle the patient's injuries, it is the hospital's responsibility to stabilize the patient and provide an ambulance to be transferred to another better equipped hospital. The hospital also has no right to delay first aid or life saving measures on the basis of procedural delays for reasons such as absence of a relative to sign forms etc. According to the law, this is a punishable offence.

Institutional Care

Hospitals/ PHCs must have a Disaster plan/ Manual for public health emergencies. The primary responsibility of infrastructure strengthening for mass casualty management, isolation and critical care etc. lies with the State Government.

Communication

Clear, accurate and timely communication is necessary to ensure informed decision-making, effective collaboration and cooperation, and public awareness and trust

Surge capacity

Surge capacity – defined as the ability of a health service to expand beyond normal capacity to meet increased demand for clinical care – is an important factor of hospital disaster response and should be addressed early in the planning process

Human resources

Effective human resource management is essential to ensure adequate staff capacity and the continuity of operations during any incident that increases the demand for human resources

Logistics & supply management

Continuity of the hospital supply and delivery chain is often an underestimated challenge during a disaster, requiring attentive contingency planning and response.

Continuity of essential services

A disaster does not remove the day-to-day requirement for essential medical and surgical services (e.g. emergency care, urgent operations, maternal and child care) that exists under normal circumstances. Rather, the availability of essential services needs to continue in parallel with the activation of a hospital emergency response plan.

7.3.5 Role of NGOs/Private Sector

Non-Governmental organizations/ Private Sector institutions such as Indian Medical Association, Public Health Foundation of India, professional bodies and their associations like FOGSSI, IMA, IAP, NIMA , resources from private medical colleges & private practitioners should be approached to define their role and contribution during public health emergencies.

7.3.6 Important actions to be taken by Medical Officers during disaster situations

- Disease surveillance
- Constitution of rapid response teams
- Determine the types of diseases expected as well as the drugs and other medical items required in the context of specific disasters
- Identify hospitals, laboratories, transport and other facilities which could be used for emergency services
- Determine the emergency medical service needs expected in the case of specific natural disasters
- Stockpile essential medicines, drugs and vaccines
- Identify requirements of resources in the affected areas
- Develop adequate human resources for providing assistance
- Constitute teams and provide training for assessment and monitoring on sanitation and hygiene
- Take appropriate measures for vector control as per local assessments, including physical, environmental and chemical protection
- Launch mass media campaigns for the promotion of sanitation, health and hygiene
- Deploy assessment and monitoring teams in the affected areas
- Mobilize private sector resources for assistance
- Disaster Management Committees are formed at village level, Taluka level & District level whereas MO is member at taluka level Disaster Management Committee

7.3.7 Powers and Functions of District Authority (DDMA)

- Preparation of District Disaster Management Plan of the District and guidelines for
- local bodies on disaster management.
- District Disaster Management Plan and DDMA should implement the all measures should be made on the lines of National Policy, State Policy, National plan and State plan.
- DDMA should directed the various department for the identification of hazard affected areas of the district and based on that prevention and mitigation activities to be done and standard operating procedure to be made by very department has to be submitted by the district Authority.
- Responsible for preparation of district level response plan, organizing yearly meetings.
- Organization of different training for government officers, officials and NGOs on disaster
- management, and search and rescue.

- Holding regular meetings at District and Sub-Division level to reviewing the readiness of the administrative machinery to deal with disasters.
- Constitution of Relief Committees at all levels.

7.3.8 Triage in Disaster Management: Saving Lives Under Pressure

In disaster situations, healthcare professionals face a critical challenge: limited resources with overwhelming demand. Triage becomes an essential tool to prioritize patient care and maximize impact during these chaotic times. Here are some key notes on triage for healthcare in disaster management:

Goals:

- Maximize survival: Allocate resources to those with the highest chance of survival and benefit from treatment.
- Minimize harm: Prevent further deterioration of patients' conditions while waiting for care.
- Efficient resource utilization: Ensure resources are directed towards those who need them most urgently.

Types of Triages:

- Pre-hospital Triage: Conducted at the disaster scene, often by first responders, to rapidly categorize patients based on severity and prioritize transport.
- Hospital Triage: Performed at healthcare facilities upon arrival, refining patient categorization and allocating appropriate treatment areas.
- Resource Triage: Deciding how to allocate scarce resources like medications, equipment, and personnel when demand exceeds supply.

Triage Systems:

- START (Simple Triage and Rapid Treatment): Used in pre-hospital settings, categorizing patients into immediate, delayed, and minimal care groups.
- SALT (Sort, Assess, Lifesaving interventions, Treatment): Similar to START, but with additional focus on identifying patients with spinal cord injuries.
- CTAS (Canadian Triage and Acuity Scale): Used in hospital settings, assigning a numerical score based on urgency and resource needs.

Challenges:

Limited resources: Balancing the needs of many patients with insufficient supplies and personnel.

Time pressure: Making quick decisions under chaotic conditions with incomplete information.

Ethical considerations: Prioritizing care while navigating complex decisions about who benefits most and who faces imminent risk.

Best Practices:

The colour system used in triage management can vary depending on the specific system being used and the setting in which it is being applied. However, some of the most common color systems include:

- START (Simple Triage and Rapid Treatment):
- Red: Immediate (requires immediate resuscitation)

- Yellow: Urgent (requires treatment within 30 minutes)
- Green: Delayed (can wait for treatment)
- Black: Expectant (deceased or unlikely to survive)

Triage Category	Priority	Color	Conditions
Immediate	1	RED	Chest wounds, shock, open fractures, 2-3 Burns
Delayed	2	YELLOW	Stable abdominal wound, eye and CNS injuries
Minimal	3	GREEN	Minor burns, minor fractures, Minor Bleeding
Expectant	4	BLACK	Unresponsive, high spinal cord injury

Fig: START Triage System

Reference:

https://www.slideshare.net/nclexvideos/emergency-nursing-critical-care

Section 8

PHC Manual Annexure QR Code

Chapter	Topic	Link	QR Code
Volume II			
Section 1 (Vol II): Background (No Annexures)			
Section II (Vol II): Medical Care			
Annexure 2.1 (Vol II)	Normal values: - For important investigations	https://drive.google.com/file/d/1WGkTSFJIUai6WTldZyJmmkCsLVtd1QZY/view?usp=sharing	
Annexure 2.2 (Vol II)	Tests Conducted at PHC (by Outsource agency)	https://drive.google.com/file/d/1Dd-K4MreUGRG66LIbrfw95tEmkHs7K2C/view?usp=sharing	
Annexure 2.3 (Vol II)	Regarding the expansion of Mahatma Jyoti Rao Phule Jan Arogya Yojana and Ayushman Bharat - Pradhan Mantri Jan Arogya Yojana together.	**https://drive.google.com/file/d/1k3a9_ghtVv2VWnl8zqbkhnSKYkCDvSIh/view?usp=sharing**	

Annexure 2.4 (Vol II)	MJPJAY- Specialty and Procedures	https://drive.google.com/file/d/1vYsUwQ6skSgdZIop-7jR5TBVQ_22rJCX/view?usp=sharing	
Annexure 2.5 (Vol II)	Bio-medical wastes categories and their treatment and disposal options	https://drive.google.com/file/d/1zIVrFimYmjMY_55MS-DX0cMv97tpw5fA/view?usp=sharing	
Annexure 2.6 (Vol II)	Index of important Index of Important Government resolutions of Mahatma Jyotirao Phule Jan Arogya Yojana (MJPJAY) (Excluding Financial Matters)	**https://www.jeevandayee.gov.in/MJPJAY/FrontServlet?requestType=CommonRH&actionVal=RightFrame&page=undefined%3E%3E%3Cb%3ERGJAY%20Government%20Resolution%3C/b%3E&pageName=RGJAY_Government_Resolution&mainMenu=About&subMenu=RGJAY_Government_Resolution.**	
Section III (Vol II): Reproductive & Child Health Programme (Maternal Health)			
Annexure 3.1 (Vol II)	*MDSR Reporting Format (English)*	https://drive.google.com/file/d/1tzY9aD5tKXa6e5Jb-Xm-FW8T4U--IGJA/view?usp=sharing	

Annexure 3.2 (Vol II)	Maternal Death-Marathi Formats Parishishta 2, Prapatras 1,2,3,4)	https://drive.google.com/file/d/1crrqwXATKOZuaJoVpvkRtIEZrjfFK5TL/view?usp=sharing	
Annexure 3.3 (Vol II)	Roles and Responsibilities in WIFS programme	https://drive.google.com/file/d/1ZZJbbdIoxOjUKa4RmWADGtvqns_QFXki/view?usp=sharing	
Annexure 3.4 (Vol II)	All reporting formats (Adolescent Health Program)	https://drive.google.com/file/d/10Tsw6lYPBNuBhRzmm6YMA-1SxjB8m6dz/view?usp=sharing	
Annexure 3.5 (Vol II)	Eclampsia Management	https://drive.google.com/file/d/1KzIs1PCaDleBVU2k9YTG8hyqAvubOUHG/view?usp=sharing	

Annexure 3.6 (Vol II)	Management of Antepartum Haemorrhage	https://drive.google.com/file/d/1r8-yNHeP3Te33IfEm1wxpFH5Lweha1_P/view?usp=sharing	
Annexure 3.7 (Vol II)	Protocols to be displayed in Labour Room	https://drive.google.com/file/d/16u9s8hU_0xxXXXgTieHdv296v5diitC9/view?usp=sharing	
Annexure 3.8 (Vol II)	Primary PPH & Retained Placenta Management	https://drive.google.com/file/d/19stEnUae60_YeH7AqI_eQNlPmXgHl3SG/view?usp=sharing	
Annexure 3.9 (Vol II)	STDs Syndromic Cases Management threw Colour code drug Kit	https://drive.google.com/file/d/1WqjC-JoFcVhGkJ3jHS7OJ2dmWeuItywn/view?usp=sharing	

Annexure 3.10 (Vol II)	STI_RTI syndromic Management Chart	https://drive.google.com/file/d/1V3u70ursXrtRUBzXtt4luUDqcYCxFzqj/view?usp=sharing	
Annexure 3.11 (Vol II)	- Standards and Quality Assurance in Sterilization Services (Book)	https://drive.google.com/file/d/1vXC-0lB8LF18kMSeC3tN82rbZrdboI9H/view?usp=sharing	
Annexure 3.12 (Vol II)	Family Planning Indemnity Schem GR with manual and annexures 9 May 2013.	https://drive.google.com/file/d/1KJvFT-GpKMZ44QDXVypcLl-0pwaIVjfI/view?usp=sharing	
Annexure 3.13 (Vol II)	Formats Related to Sterilization Operation	https://drive.google.com/file/d/19u8cm7OjopGu13drMHIFMirlU1KWEeLD/view?usp=sharing	

Annexure 3.14 (Vol II)	GR MTP Beyond 24 weeks	https://drive.google.com/file/d/1Qyf56CvY06fU4CtMeBt9neQNWlZdH4Ns/view?usp=sharing	
Annexure 3.15 (Vol II)	MTP Forms	https://drive.google.com/file/d/1YpiFqoXLsa_JS4Ofhsip1AXuveh3aGtS/view?usp=sharing	
Section IV (Vol II): : Reproductive & Child Health (Child Health)			
Annexure 4.1 (Vol II)	BLS, Management of Shock, Neonatal resuscitation steps	https://drive.google.com/file/d/1DLN5iuEDLkEQEtkGzIsGaInpcP78_JfL/view?usp=sharing	
Annexure 4.2 (Vol II)	Treatment of Diarrhoea	https://drive.google.com/file/d/1xq10XwyZLtnhaLmEerazn ViTdOLWy8G2/view?usp=sharing	

Annexure 4.3 (Vol II)	Facility Based Care of Severely Malnourished Child at RH/SDH/DH level	https://drive.google.com/file/d/1h5zo5UmGvScwgzONfhISuQtDGVIFiNeH/view?usp=sharing	
Section V (Vol II): : RCH (Child Health) Immunization Programme			
Annexure 5.1 (Vol II)	Immunization Handbook for Medical Officers	https://drive.google.com/file/d/1G8zIHbhubbgZG9OLs9ORNjXpA-r-c5Br/view?usp=sharing	
Annexure 5.2 (Vol II)	Some of important RI formats	https://drive.google.com/file/d/1ehMBekUmPkNCpJN1nDHsXwA0FopMD3CW/view?usp=sharing	
Annexure 5.3 (Vol II)	Vaccinator's logistic diary format	https://drive.google.com/file/d/1NQEg-ETcpBcC2GTmqIICD9_7f7ilCCsh/view?usp=sharing	

Annexure 5.4 (Vol II)	Immunization CIF and CRF Forms	https://drive.google.com/file/d/1dbEwrMgA6_JpahucKZndOj2YWNXkhs4B/view?usp=sharing	
Annexure 5.5 (Vol II)	FAQ'S Related with Immunization	https://drive.google.com/file/d/1gbX_aBBAXvBxlnbZle_yeLqOSkM9PaTN/view?usp=sharing	
Section VI (Vol II): : Communicable Diseases			
Annexure 6.1 (Vol II)	Standard Cases Definition P Form	https://drive.google.com/file/d/1D1P7TFrQhhustRWYhKaC_V_XUiQoqePI/view?usp=sharing	
Annexure 6.2 (Vol II)	S Form, P Form and L Form	https://drive.google.com/file/d/1OuYi1J8apcdDfYlxawtupfAjSRcQYmwP/view?usp=sharing	

Annexure 6.3 (Vol II)	Case Definitions L Form	https://drive.google.com/file/d/1i7NwskYtrVwKPPm8pXMQZzSqK7q1Wnf_/view?usp=sharing	
Annexure 6.4 (Vol II)	Online Format for Passive Surveillance on IHIP-IDSP Portal	https://drive.google.com/file/d/1wxSh-dJ1Jk57cJE3T2avFIZ9sABtRYm5/view?usp=sharing	
Annexure 6.5 (Vol II)	Form A & B (survey & Patient information)	https://drive.google.com/file/d/1qvZwZ2yMhR4KTm5hs2aX6rgjbZaY4muf/view?usp=sharing	
Annexure 6.6 (Vol II)	Reporting/Record / Certificate Formats Related to Water Supply	https://drive.google.com/file/d/1IcvJb9ROMLpt2Ipee-hnkIQOAqzGG8jI/view?usp=sharing	

Annexure 6.7 (Vol II)	Reports /Formats Related to Epidemics	https://drive.google.com/file/d/1wqYCLXBvbGahg5N3UZg9i5A18F-vzgzC/view?usp=sharing	
Annexure 6.8 (Vol II)	District level action plan for NVBDCP	https://drive.google.com/file/d/17x2FdPAnVA0f1mTvnFFHtFwyd6bssidv/view?usp=sharing	
Annexure 6.9 (Vol II)	Summary of responsibility of health staff under NLEP	https://drive.google.com/file/d/1i7R3JGH2YtVkxHLcaws1Qdxz4BUGUSV-/view?usp=sharing	
Section VII (Vol II): Non-Communicable Diseases (NCD) & Other Important Health Problems			
Annexure 7.1 (Vol II)	CBAC Form	https://drive.google.com/file/d/1fkDmrP9sgV-KMargbCAe3W1uDy5UDy0a/view?usp=sharing	

Annexure 7.2 (Vol II)	Formats in NPCB-VI	https://drive.google.com/file/d/1qe9Heb7e6J4qQ8At6HlR05K1KmWVByJ3/view?usp=sharing	
Annexure 7.3 (Vol II)	Classification psychiatric illnesses	https://drive.google.com/file/d/1cpo0jPGDbm4PHhu-kSWdDMTz4awwLZSK/view?usp=sharing	

Section 8

Abbreviations Vol II

AAA	Asha, Anganwadi Sevika, ANM
AAM	Ayushman Aarogya Mandir
AB- PMJAY	Aayushman Bharat- Pradhan Mantri Jan Arogya Yojana
ABHA	Ayushman Bharat Health Account
ACF	Active Case Finding
ACT	Artemisinin Combination Therapy
AD	Auto-Disable
ADA	American Dental Association
ADHS	Assistant Director of Health Services
ADS	Auto-Disabled Syringe
AEFI	Adverse Events Following Immunization
AFHC	Adolescent Friendly Health Clinic
AFHS	Adolescent Friendly Health Services
AFI	Annual falciparum Incidence
AFP	Acute Flaccid Paralysis
AHD	Adolescent Health Day
AIC	Airborne Infection Control
AMTSL	Active Management of Third Stage of Labor
ANC	Ante Natal Care
ANM	Auxiliary Nurse Midwife
APD	automated peritoneal dialysis
APH	Ante Partem Haemorrhage
ARM	Artificial Rupture of Membranes
ARS	Anti-Rabies Serum
ART	Assisted Reproductive Techniques
ART	Antiretroviral Therapy
ARV	Anti Rabies Vaccine
ASHA	Accredited Social Health Activist
ASV	Anti-Snake Venom
AV	Audio-Visual
AVPU	Coma Scale: Alert, Voice, Pain, Unresponsive
AW	Anganwadi
AWC	Anganwadi Centre
AWH	Anganwadi Helper
AWS	Anganwadi Supervisor
AWW	Anganwadi Worker
AYUSH	Ayurveda, Yoga and Naturopathy, Unani, Siddha and Homoeopathy
BCC	Behaviour Change Communication
BCP	Blister Calendar Pack
BDO	Block Development Officer
BDQ	Bedaquiline
BI	Breteau index
BIS	Bureau of Indian Standards
BL	Bacterial larvicides
BPL	Below Poverty Line
BS	Blood Smear
BT	Blood Transfusion
CAPD	Continuous Ambulatory Peritoneal Dialysis
CBAC	Community Based Assessment Checklist
CBCDR	Community Based Child Death Review
CBE	Clinical Breast Examination
CBNAAT	Cartridge-Based Nucleic Acid Amplification Test
CC	Conventional Contraceptives
CCE	Cold Chain Equipment
CCHF	Crimean-Congo Haemorrhagic Fever
CCP	Cold Chain Point
CDA	Child Death Audit
CDPO	Child Development Project Officer
CEO	Chief Executive Officer
CH	Civil Hospital
CHC	Community Health Centre
CHO	Community Health Officer
CI	Container index
CLD	Central Leprosy Division
CME	Continuing Medical Education
CNAA	Community Needs Assessment Approach
COTPA	Cigarettes and Other Tobacco Products Act
CP	Continuation Phase
CPD	Cephalopelvic Disproportion

CPHC	Comprehensive Primary Health Care
CPT	Cotrimoxazole prophylaxis therapy
CQ	Chloroquine
CRF	Case Reporting Form
CRT	Condensed Radical Treatment
CS	Civil Surgeon
CSC	Common Service Centre
CSR	Corporate Social Responsibility
CSSM	Child Survival and Safe Motherhood
CST	Care, Support and Treatment
CTAS	Canadian Triage and Acuity Scale
CTC	Child Treatment Centre
DBT	Direct Benefit Transfer
DDHS	Deputy Director of Health Services
DDMA	District Disaster Management Authority
DDR-TBC	District DR TB Centre
DEC	Diethyl Carbamazine Citrate
DEIC	District Early Intervention Centre
DF	Dengue Fever
DGHS	Directorate General of Health Services
DH	District Hospital
DHF	Dengue Haemorrhagic Fever
DHO	District Health Officer
DHR	Department of Health Research
DHS	Directorate of Health Services
DIC	Disseminated Intravascular Coagulation
DIHFW	District Integrated Health & Family Welfare Society
DIO	District Immunization Officer
DLHS	District Level Household Survey
DLM	Delamanid
DLO	District Leprosy Officer
DLS	District Leprosy Society
DMC	Designated Microscopic Centre
DMHP	District Mental Health Program

DMPA	Depot Medroxyprogesterone Acetate
DNO	District Nodal Officer
DOT	Direct observation of treatment
DOTS	Directly Observed Treatment Short-course
DPDC	District Planning and Development Committee
DPT	Diphtheria, Pertussis, Tetanus
DQAC	District Quality Assurance Committee
DRCHO	District Reproductive and Child Health Officer
DRTB	Drug-Resistant Tuberculosis
DS	Drug-Sensitive
DSM	Diagnostic and Statistical Manual of mental disorder
DSS	Dengue Shock Syndrome
DST	Drug Sensitivity Testing
DSTB	Drug Sensitive Tuberculosis
DSU	Divisional Surveillance Unit
DT	Diphtheria Tetanus
DTO	District Tuberculosis Officer
DVS	District Vaccine Store
Dy. CEO	Deputy Chief Executive Officer
EAR	Expired Air Resuscitation
EBVD	Ebola Virus Disease
EC	Eligible Couple
ECP	Emergency Contraceptive Pill
EDD	Expected Due Date
EDD	Expected date of delivery
EDPT	Early Detection Prompt Treatment
EEFO	Early Expiry First Out
ELA	Expected Level of Achievement
ELISA	Enzyme-Linked Immunosorbent Assay
EMS	Emergency Medical Services
ENL	Erythema Nodosum Leprosum
EPI	Expanded Programme of Immunization
EPTB	Extrapulmonary tuberculosis
EQA	External Quality Assurance
ESRD	End-Stage Renal Disease
EVIN	Electronic Vaccine Intelligence Network

FBCDR	Facility Based Child Death Review
FBMDR	Facility-Based Maternal Death Review
FCM	Ferrous Carboxymaltose
FDC	Fixed-Dose Combination
FEFO	First Expire First Out
FHS	Foetal Heart Sound
FIFO	First In First Out
FL-LPA	First Line-Line Probe Assay
FMT	Forensic Medical & Toxicology
FOGSSI	The Federation of Obstetric and Gynaecological Societies of India
FP	Family Planning
FPIS	Family Planning Indemnity Scheme
FQ	Fluoroquinolone
FRU	First Referral Unit
FSL	Forensic Science Laboratory
FW	Family Welfare
GAVY / GAVI	Global Alliance for Vaccines and Immunization
GBS	Guillain-Barré syndrome
GBV	Gender-Based Violence
GCS	Glasgow Coma Scale
GDM	Gestational Diabetes Mellitus
GDP	Gross Domestic Product
GH	General Hospital
GIT	Gastrointestinal Tract
GLOBOCAN	Global Cancer Observatory
GNM	General Nursing and Midwifery
GP	Gram Panchayat
GR	Government Resolution
HA	Health Assistant
HACC	Health Advice Call Centre
HAF	Home Available Fluid
HAI	Hospital-Acquired Infection
HAV	Hepatitis -A Virus
HBIG	Hepatitis B Immunoglobulin
HBNC	Home-Based Newborn Care
HBYC	Home Based Care For Young Child
HCL	Hydrochloric Acid
HCV	Hepatitis - C Virus
HCW	Health Care Worker
HD	Haemodialysis

HDI	Human Development Index
HDL	High-Density Lipoprotein
HDV	Hepatitis - D Virus
HFA	Height/Length-for-age
HI	House Index
HIB	Haemophilus Influenzae Type B
HMIS	Health Management Information System
HPAI	Highly Pathogenic Avian Influenza
HQ	Head Quarter
HS	Hydrogen Sulphide
HW	Health Worker
HWC	Health and Wellness Centre
IAP	Indian Academy of Paediatrics
ICC	Individual Compliance Card
ICDS	Integrated Child Development Scheme
ICPD	International Conference on Population and Development
ICT	Information and Communication Technology
ICTC	Integrated Counselling and Testing Centre
ICTV	International Committee on Taxonomy of Viruses
IDA	Iron Deficiency Anaemia
IDCF	Intensified Diarrheal Control Fortnight
IDSP	Integrated Disease Surveillance Programme
IF	Infant Feeding
IGRA	Interferon-Gamma Release Assay
IGT	Impaired Glucose Tolerance
IHD	Ischemic Heart Disease
IHIP	Integrated Health Information Platform
ILBS	Institute of Liver and Biliary Sciences
ILI	Influenza-Like Illness
ILR	Ice Lined Refrigerator
IMA	Indian Medical Association
IMNCI	Integrated Management of Neonatal and Childhood Illness
INC	Intra Natal Care
INR	international normalised ratio

IPC	Interpersonal Communication
IPD	In Patient Department
IPPI	Intensive Pulse Polio Immunization
IPV	Inactivated Polio Vaccine
IQC	Internal Quality Control
IRL	Intermediate reference laboratory
IRS	Indoor Residual Spraying
ISM	Indian System of Medicine
ITN	Insecticide-Treated Bed Net
IU	International Unit
IUCD	Intra Uterine Contraceptive Device
IUD	Intrauterine Device
IUGR	Intrauterine Growth Restriction
IVM	Integrated Vector Management
JAS	Jan Arogya Samiti
JSB	Jaswant Singh Bhattacharji Stain
JSSK	Janani Shishu Suraksha Karyakram
JSY	Janani Suraksha Yojana
KFD	Kyasanur Forest Disease
KMC	Kangaroo Mother Care
KV	Kilovolt
LAC	Link ART Centres
LAM	Lactational Amenorrhea Method
LBW	Low Birth Weight
LC	Liquid Culture
LCDC	Leprosy Case Detection Campaign
LDL	Low-Density Lipoprotein
LDR	Labor, Delivery, Recovery
LED	Light Emitting Diode
LEDFM	light emitting diode fluorescent microscope
LHV	Lady Health Visitor
LJ	Lowenstein-Jensen (LJ)
LLIN	Long-Lasting Insecticidal Net
LPA	Line Probe Assay
LR	Labour Room
LSCS	Lower Segment Caesarean Section
LSO	laboratory scientific officer

MAM	Moderate Acute Malnutrition
MAS	Mahila Arogya Samiti
MB	Multi Bacillary
MC	Menstrual Cycle
MCH	Maternal and Child Health
MCPC	Mother and Child Protection Card
MCR	Micro-Cellular Rubber
MDA	Mass Drug Administration
MDI	Metered-Dose Inhaler
MDR	Multi-Drug Resistant
MDSR	Maternal Death Surveillance and Response
MDT	Multi Drug Treatment
MERS	Middle East Respiratory Syndrome
MGIT	Mycobacteria Growth Indicator Tube
MGNREGA	Mahatma Gandhi National Rural Employment Guarantee Scheme
MHCA	Mental Health Care Act
MHE	Mental Health Establishment
MICU	Medical Intensive Care Unit
MIS	Management Information System
MJPJAY	Mahatma Jyotiba Phule Jan Arogya Yojana
ML	Medico Legal
MLC	Medico Legal Case
MLEC	Modified Leprosy Elimination Campaign
MLO	Mosquito Larvicidal Oil
MMDP	Morbidity management and Disability Prevention
MMU	Mobile Medical Unit
MNT	Medical Nutrition Therapy
MO	Medical Officer
MOHFW	Ministry of Health and Family Welfare
MOU	Memorandum of Understanding
MP	Malaria Parasite
MPA	Medroxyprogesterone Acetate
MPW	Multi-Purpose Worker
MR	Measles-Rubella
MRSA	Methicillin-Resistant Staphylococcus Aureus

MSEB	Maharashtra State Electricity Board
MSG	Mission Steering Group
MTP	Medical Termination of Pregnancy
MUAC	Mid-Upper Arm Circumference
MUW	Moderate Underweight
MVA	Manual Vacuum Aspiration
MWRA	Married Women in Reproductive Age
NAAT	Nucleic Acid Amplification Test
NACP	National AIDS Control Programme
NAFL	Non-Alcoholic Fatty Liver
NAFLD	Non-Alcoholic Fatty Liver Disease
NAPRE	National Action Plan for Dog Mediated Rabies Elimination
NASH	Non-Alcoholic Steatohepatitis
NBCC	Newborn Care Corner
NCC	National Cadet Corps
NCDC	National Centre for Disease Control
NCVBDC	National Centre for Vector Borne Diseases Control
NFHS	National Family Health Survey
NHE	Nutrition and Health Education
NHM	National Health Mission
NIMA	National Integrated Medical Association
NIV	National Institute of Virology
NLEP	National Leprosy Eradication Program
NMEP	National Malaria Eradication Program
NMHP	National Mental Health Program
NMS	Non-Medical Supervisor
NOHCP	National Oral Health Care Program
NOHP	National Oral Health Program
NPCB	National Program for Control of Blindness
NPCBVI	National Programme for Control of Blindness and Visual Impairment
NPCC	National Programme Coordination Committee
NPCCHH	National Programme on Climate Change & Human Health
NPCDCS	National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Disease and Stroke
NPHCE	National Programme for Health Care of the Elderly
NPPC	National Programme for Palliative care
NPPCD	National program for prevention and control of deafness
NPPCF	National Program for Prevention and Control of Fluorosis
NPPMBI	National Programme for Prevention & Management of Burn Injuries
NPY	Ni-kshay Poshan Yojana
NQAS	National Quality Assurance Standards
NRC	Nutrition Rehabilitation Centre
NRHM	National Rural Health Mission
NSI	Needle Stick Injury
NSP	National Strategic Plan
NSSO	National Sample Survey Organisation
NSV	No Scalpel Vasectomy
NTCP	National Tobacco Control Program
NTEP	National Tuberculosis Elimination Programme
NTU	Nephelometric Turbidity Units
NUHM	National Urban Health Mission
NVBDCP	National Vector Born Diseases Control Program
NVHCP	National Viral Hepatitis Control Program
NVHMU	National Viral Hepatitis Management Unit
OA	Ophthalmic Assistant
OAE	Otoacoustic Emissions
OC	Oral Contraceptive
OCP	Oral Contraceptive Pill
OGTT	Oral Glucose Tolerance Test
OI	Opportunistic Infection

OOPE	Out-of-Pocket Expenditure
OP	Oral Pill
OPD	Out Patient Department
ORI	Outbreak Response Immunization
ORT	Oral Rehydration Therapy
OT	Operation Theatre
OT Test	Orthotoludine test
OVP	Open vial policy
PAIUCD	Post-Abortion Intrauterine Contraceptive Device
PAM	Pralidoxime (2-pyridine aldoxime methyl chloride)
PAP	Papanicolaou test
PB	Pauci Bacillary
PBS	Peripheral Blood Smear
PCPNDT	Pre-Conception and Pre-Natal Diagnostic Techniques
PCR	Polymerase Chain Reaction
PDR	Poly-Drug Resistance
PEM	Protein Energy Malnutrition
PEP	Post Exposure Prophylaxis
PH	Public Health
PID	Pelvic Inflammatory Disease
PIH	Pregnancy Induced Hypertension
PIP	Programme Implementation Plan
PLHIV	People Living with HIV/AIDS
PMDT	Programmatic Management of Drug-Resistant Tuberculosis
PMHS	Promotion of Menstrual Hygiene Scheme
PM-JAY	Pradhan Mantri Jan Arogya Yojana
PMMVY	Pradhan Mantri Matru Vandana Yojana
PMNDP	Pradhan Mantri National Dialysis Programme
PMSMA	Pradhan Mantri Surkshit Matrutv Abhiyan
PMTBMBA	Pradhan Matri TB Mukt Bharat Abhiyan
PMTPT	Programmatic Management of Tuberculosis Preventive Treatment
PNC	Postnatal Care
POA	Period of Amenorrhea

POD	Prevention of Deformity
PP	Postprandial (After Meal)
PPBS	Postprandial Blood Sugar
PPE	Personal Protective Equipment
PPH	Post Partem Haemorrhage
PPI	Pulse Polio Immunization
PPIUCD	Postpartum Intrauterine Contraceptive Device
PPM	Parts Per Million
PPTCT	Prevention of Parent-to-Child Transmission
PQ	Primaquine
PRI	Panchayati Raj Institutions
PROM	Premature Rupture of Membranes
PSAF	Pandemic Severity Assessment Framework
PSBI	Possible Serious Bacterial Infection
PSI	Pounds per Square Inch
PTB	Pulmonary Tuberculosis
QA	Quality Assurance
QI	Quality Improvement
RABV	Rabies Virus
RBSK	Rashtriya Bal Swathya Karyakram
RCH	Reproductive and Child Health
RDD	Rural Development Department
RFT	Released from treatment
RH	Rural Hospital
RI	Routine Immunization
RIG	Rabies Immunoglobulin
RKS	Rugn Kalyan Samiti
RMO (OR)	Resident Medical Officer (Out Reach)
RMP	Registered Medical Practitioner
RNTCP	Revised National Tuberculosis Control Program
ROP	Retinopathy of Prematurity
RPR	Rapid Plasma Reagin
RRT	Rapid Response Team
RSBY	Rashtriya Swasthya Bima Yojana
RSE	Refractory SE
RT	Radical Treatment
RVV	Rotavirus Vaccine

RWA	Resident Welfare Association
SAANS	Social Awareness and Action to Neutralize Pneumonia Successfully
SAB	Skilled Attendance at Birth
SABLA	Rajiv Gandhi Scheme For Empowerment Of Adolescent Girls-SABLA Yojana
SAM	Severe Acute Malnutrition
SAPEL	Special Action Plan for Elimination of Leprosy
SARI	Severe Acute Respiratory Infection
SARS	Severe Acute Respiratory Syndrome
SBE	Self-Breast Examination
SCD	Survey of Causes of Deaths
SDG	Sustainable Development Goals
SDH	Sub-District Hospital
SEARO	WHO Regional Office for South-East Asia
SFD	Small for Date
SHG	Self Help Group
SIHFW	State Institute of Health and Family Welfare
SLE	Systemic Lupus Erythematosus
SMS	Short Message Service
SNC	Sub-National Certification
SNCU	Special Newborn Care Unit
SNO	State Nodal Officer
SRH	Sexual and Reproductive Health
SRS	Sample Registration System
SSK	Sampoorna Suraksha Kendras
SSL	Single Skin lesion
SSU	State Surveillance Unit
STCC	State Tobacco Control Cell
STDC	State TB Training and Demonstration Centre
SUW	Severely Underweight
TAS	Transmission Assessment Survey
TAT	Turnaround Time
TBA	Trained Birth Attendant
TCL	Teraphthaloyl Chloride
TCU	True Colour Unit
TD	Tetanus Diphtheria
THO	Taluka Health Officer
TPT	Tuberculosis Preventive Treatment
TRUENAT	MTB-RIF assay (TrueNat), a nucleic acid amplification test (NAAT
TST	Tuberculin Skin Test
TU	Tuberculosis Unit
UDID	Unique Disability ID
UDST	Universal Drug Susceptibility Testing
UID	Unique Identification
UIP	Universal Immunization Programme
UN	United Nations
UPHC	Urban Primary Health Centre
UPI	Universal Immunization Programme
VB	Voluntary Boarders
VBD	Vector-Borne Disease
VCCM	Vaccine Cold Chain Manager
VCDC	Village Child Development Centre
VCTC	Voluntary Counselling and Testing Centre
VED	Vital-Essential-Desirable
VHND	Village Health and Nutrition Day
VHNSC	Village Health, Nutrition, and Sanitation Committee
VHNSD	Village Health Nutrition and Sanitation Day
VIA	Visual Inspection with Acetic acid
VIN	Vaccine Identification Number
VLDL	Very Low-Density Lipoprotein
VMT	Voluntary Muscle Testing
VPD	Vaccine Preventable Disease
VVM	Vaccine Vial Monitor
WBCT	Whole Blood Clotting Time
WCD	Women and Child Development Department
WFA	Weight-for-Age
WFH	Weight-for-Height
WH	Woman Hospital
WHZ	Weight-for-Height Z-score
WIFS	Weekly Iron and Folic Acid Supplementation
WMF	Wastage Multiplication Factor
WNL	Within Normal Limits
XDR	Extensively Drug-Resistant



DEPARTMENT OF PUBLIC HEALTH

GOVERNMENT OF MAHARASHTRA