



**HEALTH CARE : PROGRAMMES  
AND PERFORMANCE**

**2**

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“शिक्षा मानव को बन्धनों से मुक्त करती है और आज के युग में तो यह लोकतंत्र की भावना का आधार भी है। जन्म तथा अन्य कारणों से उत्पन्न जाति एवं वर्गगत विषमताओं को दूर करते हुए मनुष्य को इन सबसे ऊपर उठाती है।”

-- इन्दिरा गांधी

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*“Education is a liberating force, and in our age it is also a democratising force, cutting across the barriers of caste and class, smoothing out inequalities imposed by birth and other circumstances.”*

—Indira Gandhi

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Block

# 2

## **HEALTH CARE : PROGRAMMES AND PERFORMANCE**

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**Prof. H.P. Dikshit**  
Vice-Chancellor, IGNOU

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## **Expert Committee**

---

Prof. A.B. Bose  
Former Director, SOCE  
IGNOU

Dr. Rajaratnam Abel  
Director, RUSHA  
Tamilnadu

Dr. Joseph Xavier, Sj  
Professor of Social Work,  
Loyola College  
Madras

Dr. C.A.K. Yesudian  
Professor of Social Work,  
Tata Institute of Social Sciences  
Bombay

Dr. S. Peppin  
Reader in Women's Education  
IGNOU

Dr. K.R. Nayar  
Associate Professor,  
Centre of Social Medicine and Community  
Health  
Jawaharlal Nehru University  
New Delhi

Dr. Mira Siva  
Head, Public Policy Division  
VHAI  
New Delhi

Dr. P.K. Dutta  
Former Director, SOHS  
IGNOU

Dr. R. Sapru  
NIHFW,  
New Delhi

---

## **Course Preparation Team**

---

Dr. Suvanand Sahu  
Formerly at Centre of Community Medicine,  
All India Institute of Medical Sciences  
(AIIMS), New Delhi

Dr. S. Peppin  
Reader,  
School of Continuing Education  
IGNOU

Dr. S.K. Basu  
Former Head of the Department of Population  
Genetics and Human Development,  
National Institute of Health and Family Welfare  
(NIHFW), New Delhi

**Course Coordinator**  
Dr. S. Peppin, IGNOU

**Assitant Block Editor**  
Dr. S. Peppin, IGNOU

**Block Coordinator**  
Dr. Gurchain Singh, IGNOU

**Acknowledgements**  
R. Pillai

**Block Editor**  
Dr. Rashmi Peppin  
Coorinator, Community Health  
Emmanuel Hospital Association  
New Delhi-110019

---

## **Print Production**

---

Prof. Prabha Chawla  
Director  
SOCE  
IGNOU, New Delhi

Rajiv Girdhar  
Section Officer (Publication)  
SOCE  
IGNOU, New Delhi

Hemant Kumar Parida  
Proof Reader  
SOCE  
IGNOU, New Delhi

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## INTRODUCTION TO BLOCK 2

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In India, State plays a crucial role in providing health care services to the people, particularly those living in rural areas. India's health programmes are well known. The National health Policy and the National Population Policy speaks of India's commitment to health and family welfare programmes. However, despite such commitments, some of the health problems are still haunting our rural population.

We are introducing four units in this Block viz. Units 6,7,8 and 9. As you will learn in this Block, communicable diseases are the major problems in rural India. Therefore, in unit 6 an overview of communicable diseases is given. The measures taken to prevent and control communicable diseases is presented in unit 7. Poor environmental sanitation and hygiene is yet another factor influencing the health status of the people. How far it is affecting the health status and the steps taken to promote good environmental sanitation and hygiene are two important issues discussed in unit 8.

Women and children constitute 62 percent of India's population and they are the major victims of all forms of ill health. Therefore, the programme, popularly known as Reproductive and Child Health (RCH), implemented to deal with the health problems of mothers and children is presented in detail in unit 9.

As you go through the unit of this block you will appreciate that they are not presented in an analytical form, rather they are presented in a descriptive manner. This is because, we want you to be familiar with some of the important health care programmes initiated by the State so that you can take necessary steps to avail these facilities both for you and for the people for whom, you may be working. However, we urge you to be aware of the factors which are limiting the success of these programmes. We wish you ALL THE BEST.



# INTRODUCTION TO BLOCK 2

The National Health Service (NHS) is a public body that provides a wide range of health services to the people of the United Kingdom. It is a not-for-profit organization and is funded by the government. The NHS is responsible for the majority of health care in the UK, including primary care, hospital care, and public health. It is a large and complex organization, and it is constantly evolving to meet the needs of the population. The NHS is a key part of the UK's health system, and it is essential for the well-being of the nation.

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# UNIT 6 COMMUNICABLE DISEASES IN INDIA — AN OVERVIEW

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- 6.0 Aims and Objectives
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## 6.0 AIMS AND OBJECTIVES

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Communicable diseases in India have been taking a heavy toll since ancient times. This unit aims at giving you an overview of the situation of communicable diseases in India with special reference to rural community. This will enable you to appreciate and critically appraise the control measures directed against these diseases, which will be discussed in a subsequent unit.

After reading this unit, you will be able to:

- describe certain concepts in the epidemiology of communicable diseases.
- state the problem of communicable diseases in India.
- identify the causative factors.
- diagnose simple common communicable diseases.

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## 6.1 INTRODUCTION

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Morbidity and mortality due to communicable diseases cause significant amount of burden in the rural community of India. It is important, therefore, that you are able to make a realistic assessment of their impact on the rural community, identify etiological factors and diagnose some common diseases in the community.

In this unit we shall first learn some concepts in the epidemiology of communicable diseases. Then we will make an assessment of the problem of communicable diseases in rural India. Then we will go on to identify the factors responsible for the causation of these diseases. Finally, we will take a brief look at how common diseases can be identified by you.

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## 6.2 CONCEPTS

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Before going into communicable diseases let us understand certain terminology used to describe the distribution and transmission of these diseases.

### 6.2.1 Epidemiology

Epidemiology is the study of frequency, distribution and determinants of diseases or health in populations. This knowledge is then applied to control diseases. You have already learnt in detail the concept of epidemiology in unit 1 of Block 1. However, it

may be useful for you to know again what epidemiology is. This you may do by knowing some of the basic concepts related to epidemiology in the ensuing part of this section.

### 1. Disease 'Frequency'

By disease 'frequency' we mean – How often is the disease occurring in a community. There are two major ways of measuring disease frequency in population. They are incidence and prevalence rates.

- i) **Incidence:** Incidence rate is defined as "the number of NEW cases of a disease occurring in a defined population during a specified period of time". It is given by the formula:

$$\frac{\text{Number of NEW cases of specific disease during a given time period}}{\text{Population at risk}} \times 1000$$

For example, if there had been 300 new cases of a disease in a population of 30,000 in a year, the incidence rate would be:  $300/30,000 \times 1000 = 10$  per 1000 per year.

Note : Incidence rate must include the unit of time.

- ii) **Prevalence:** It refers to all current cases (OLD and NEW) existing at a given point in time or over a period of time at a given population. Prevalence is of two types:

- Point prevalence
- Period prevalence

Point prevalence is defined as the number of all current cases (OLD and NEW) of a disease at one point in time in relation to a defined population. It is given by the formula:

$$\frac{\text{Number of all current cases (OLD and NEW) of a specified disease existing at a given point in time}}{\text{Estimated population at the same point in time}} \times 1000$$

When the term "prevalence" is used, without any further qualification, it is taken to mean 'point prevalence'.

Period prevalence is less commonly used. It measures the frequency of all current cases (OLD and NEW) existing during a defined period of time (e.g. annual prevalence).

Period prevalence is given by the formula:

$$\frac{\text{Number of all current cases (OLD and NEW) of a specified disease existing during a given period}}{\text{estimated mid-interval population at risk}} \times 1000$$

Note: Since population at the end of the period will be more or than the population at the beginning, the mid-interval population is taken as denominator.

Prevalence depends upon the incidence and duration of illness. Thus the relationship between incidence and prevalence can be expressed as:

$$\text{Prevalence} = \text{Incidence} \times \text{mean duration of disease}$$

This implies that the longer the duration of a disease, the greater its prevalence. On the other hand, if the disease is acute and of short duration either because of rapid recovery or death, the prevalence rate will be relatively low compared with the incidence rate. In such acute diseases incidence rate is more important. From the above mentioned equation, it is clear that we can decrease prevalence of a disease by either decreasing incidence (occurrence of new cases) or by decreasing the duration of illness (by early diagnosis and treatment).

Prevalence rates are useful for (a) administration and planning purposes; (b) to estimate the magnitude of a disease problem and compare with different populations; (c) to measure the trend of the disease occurrence by comparing over time.

## 2. Disease 'Distribution'

In the definition of epidemiology the word 'distribution' means—How the disease is distributed over time, place and person? Therefore, in order to understand disease distribution, we must know the distribution of (i) time, (ii) place and (iii) person.

i) **Time distribution:** Three types of time trends or fluctuations in disease occurrence have been identified:

- Short-term fluctuations
- Periodic fluctuations
- Long-term or secular trends

### a) Short-term fluctuations

The best known short-term fluctuation in the occurrence of a disease is an epidemic.

**Epidemic:** (Epi = upon; demos = people). It is "the occurrence in a community or region of cases of an illness or other health-related events clearly in excess of normal expectancy". "Normal expectancy" is taken as the endemic frequency of the disease. It is the usual frequency of the particular disease, at the same season of the year, and among the specified population. The number of cases that would qualify as "clearly in excess of" is flexible and is usually taken as more than a limit of two standard errors from the endemic frequency.

The term "out-break" is sometimes used for a small, usually localised epidemic in the interest of minimising public alarm. It is also used to describe a situation where the endemic frequency of the disease has been exceeded but the number of cases are not enough to label it as an epidemic. Epidemics are further classified into:

- Common-source epidemics ;
  - Single exposure or "point source" epidemic
  - Continuous or multiple exposure epidemics
- Propagated epidemics

In single exposure epidemics the exposure to the disease agent is brief and essentially simultaneous e.g. food poisoning at a community dinner.

In continuous or multiple exposure epidemics the exposure to the disease is necessarily from a common source but may be prolonged – continuous or repeated—not necessarily at the same time or place. For example, a prostitute carrying S.T.D. or a well of contaminated water may be common-source of multiple exposures.

In propagated epidemics the transmission is from person to person (e.g. epidemics of hepatitis A and cholera).

### (b) Periodic fluctuation

**Seasonal trend:** e.g. upper respiratory tract infections show a seasonal rise during winter months. Diarrhoea and gastroenteritis are prominent in summer months. Polio cases usually occur in the rainy seasons. Measles and chicken pox are at their height during early spring.

### (c) Long-term or secular trends

For example, in developed countries there is a decline of such diseases as typhoid, diphtheria, polio, cholera etc. and a gradual increase in cancers, diabetes and coronary heart diseases. By monitoring time trends we get information about which diseases are decreasing and which are emerging health problems. We also get to know the effectiveness of measures to control diseases.

The other terms used to describe the time distribution of disease are:

**Endemic:** (En = in; demos = people). It refers to constant presence of disease or infectious agent within a given geographic area or population group, without

importation from outside. For instance, common cold is endemic because somebody always has one. Most communicable diseases discussed later in this unit are endemic in the country.

**Sporadic:** Sporadic means scattered about. The cases occur irregularly, haphazardly from time to time and generally infrequently. For example, polio and tetanus occurs sporadically.

Any disease occurring endemically or sporadically in a community may develop into an epidemic if conditions become favourable for its transmission.

**Pandemic:** An epidemic usually affecting a large proportion of the population occurring over a wide geographic area such as the entire country, continent or the world is known as pandemic. For example, cholera is known to occur in pandemics covering many countries at a time.

## (ii) Place distribution

This is the study of distribution of disease in different populations residing in different geographical areas (also known as geographical pathology). There are fascinating differences in disease patterns not only between countries, but also within countries like India which have different geographical regions. For example, guinea worm disease is seen in Rajasthan and filariasis is seen in coastal India. Similarly, there may be differences between rural and urban areas. In general, rural areas have more communicable diseases whereas urban areas have comparatively more non-communicable diseases.

Variations in place distribution of disease is best studied with the aid of "spot maps". These maps show areas of high frequency and low frequency and the patterns of disease distribution in a geographical area. Such "spot maps" are specially useful in epidemics e.g. such a map may show clustering of gastroenteritis cases round a water source which may be acting as a common source, thus making control measures easier.

## (iii) Person distribution

It means describing the persons who develop the disease by age, sex, occupation, social class, habits and other host factors. For example, measles and polio commonly occur during childhood.

## 6.2.2 Other Concepts

Besides epidemiology, there are some more concepts we need to understand. They are (i) incubation period, (ii) Zoonosis, and (iii) communicable diseases.

### • Incubation Period

It is the time interval between invasion by an infectious agent and appearance of the first sign or symptom of the disease. The length of the incubation period is specific for of each disease. Most of the diseases are not communicable during the incubation period, but measles, chickenpox, hepatitis, whooping cough and AIDS are communicable during the incubation period. The importance of this is that these diseases can be transmitted from one person to the other before the former develops symptoms of the disease.

### • Zoonosis

Certain diseases are transmissible from vertebrate animals to man. Such diseases are known as zoonosis. Examples are Rabies and plague. Rabies which is caused by a virus is transmitted by the bite of an infected animal, commonly dog. Plague is transmitted from rat to man by the bite of rat flea.

### • What are communicable diseases?

Communicable diseases are illness due to specific infectious agents or its toxic products capable of being directly or indirectly transmitted from man to man, animal to man or from the environment (through air, dust, soil, water, food etc.) to man.

• **Communicable diseases transmission**

Communicable diseases are transmitted from the reservoir / source of infection to a susceptible host. Thus in the "chain of transmission" there are three basic links, viz., the reservoir / source, modes of transmission and the susceptible host.

Source or Reservoir	Modes of Transmission	Susceptible Host
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**Source:** Source is any person, animal or object from which an infectious agent passes to the host.

**Reservoir:** Reservoir is any person, animal, arthropod, plant, soil or object in which an infectious agent lives and multiplies, on which it depends primarily for survival, and where it reproduces itself in such a manner that it can be transmitted to a susceptible host. Human reservoirs may be either cases or carriers (Presence of a specific infectious agent in the absence of discernible clinical disease; they serve as potential source of infection for others). Carriers are less infectious than cases but they are more dangerous because they escape recognition.

**Modes of transmission:** Depending upon the infectious agent, portal of entry and the local ecological conditions communicable diseases are transmitted in many different ways. They are:

**Direct transmission**

- Direct contact e.g. STD, leprosy, skin and eye infection.
- Droplet infection e.g. Respiratory infections, Tuberculosis.
- Contact with soil e.g. tetanus, hookworm.
- Inoculation into skin or mucus membrane e.g. Rabies, HBV.
- Transplacental (vertical) from mother to foetus e.g. HIV, syphilis, rubella.

**Indirect Transmission**

- Vehicle borne e.g. water & food borne diseases.
- Vector borne e.g. malaria, filaria, plague.
- Air-borne e.g. respiratory infections, T.B. Measles.
- Fomites-borne e.g. diarrhoea, skin and eye infection.
- Unclean hands and fingers e.g. diarrhoea, worm infestations.

Some of these transmissions are explained below:

- Droplet infection is the direct projection of a spray of droplets of saliva and throat secretions during coughing and sneezing. Whereas, air-borne infection is an indirect transmission in which the residues of droplet (droplet nuclei and dust) get air-borne and transmit infection.
- Vehicle-borne transmission implies transmission of the agent through the agency of water, food, blood and blood products or tissue.
- Vectors are any living carrier that transport the infectious agent to a susceptible host. Most vectors are insects.
- Fomites on the other hand, are inanimate articles like towel, mattresses, bed sheets etc. which can transmit diseases.
- The vehicle-borne infections which are transmitted by water and food are usually the result of contamination of water and food with fecal material. The water/food is then orally ingested. Therefore, this route of transmission is called "feco-oral" route.

### 6.2.3 The Epidemiological Triad

Not all exposed to the organism causing tuberculosis develop tuberculosis. Similarly not all staying in a cholera affected area get cholera. So, merely the presence of the disease causing organism (agent) or the presence of favourable environment for transmission is not enough for disease causation. There are several factors relating to the host (human being) and the environment which are important to determine whether or not disease will occur in a host who is exposed to the agent. Thus disease causation in a broader concept depends on the complex interaction between 'agent', 'host' and 'environment'. This interaction is known as epidemiological triad which is the basis for understanding disease causation. If we take the example of tuberculosis again -- the agent is the T.B. bacteria, one of the host factors which facilitate transmission may be decreased immunity and one of the environmental factors may be overcrowding. If these three interact it may lead to tuberculosis in the host. For more details on epidemiological triad, please read Block 1, Unit 1.

### 6.2.4 Disease Eradication and Elimination

Eradication means "taking out by roots". It is the termination of all transmission of infection by extermination of infectious agent through surveillance and containment. It implies that the diseases will no longer occur in a population. To-date, only one disease has been eradicated, that is small pox. Consorted efforts are being made to eradicate other diseases. In the state of our present knowledge two other diseases can be eradicated soon - polio and guinea worm disease. Although measles and diphtheria have been identified as diseases having a potential for eradication, yet eradication prospects at present do not seem to be bright. Similarly, progress toward eradication of leprosy has been slow. Malaria has long been targeted for eradication with a National Eradication Programme functioning since 1958 but except for the early 1960s the programme has not achieved what it was supposed to achieve. Recently there have been discussions to discontinue the goal of eradication and focus on control of malaria.

#### Disease Elimination

There are some diseases which cannot be eradicated but can be virtually eliminated by sustained efforts. For example, neonatal tetanus is caused by a bacteria which is present in soil in the form of spores. We can stop transmission of the disease by clean delivery practices and by immunisation of mothers in antenatal period but the day we stop immunisation and deviate from clean delivery practices we can expect a return of the disease because the disease causing spores lie in the soil. Thus for neonatal tetanus if the pre-defined target of less than 1 per 10,000 live birth has been attained then we would say that the disease is virtually eliminated. But, sustained efforts are needed to maintain the elimination status of the disease.

#### Check Your Progress -1

Notes-i) Write your answer in the space provided.

ii) Check your answer with the model answers given at the end of the unit.

1) Name the three basic links in the chain of transmission of communicable diseases.

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2) List five modes of indirect transmission of diseases with one example each.

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- 3) Name two communicable diseases where prospects of eradication in the near future is high.

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### 6.3 THE PROBLEM OF COMMUNICABLE DISEASES IN RURAL INDIA

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Let us now understand and sensitize ourselves to the problem of communicable diseases in rural India. For this we require to know the major communicable diseases in rural India, how many people are affected by them, how are the disease distributed over different parts of the country and whether the problem has changed with time.

#### 6.3.1 Communicable Diseases in India

The major communicable diseases in rural India are the following:

##### Respiratory infections

- Chickenpox
- Measles
- Mumps
- Rubella (German Measles)
- Diphtheria
- Whooping Cough (Pertusis)
- Tuberculosis
- Acute Respiratory Infections (ARI) including pneumonia.

##### Water and Food borne infections

- Diarrhoea and dysentery
- Cholera
- Food poisoning
- Typhoid (Enteric Fever)
- Amoebiasis
- Giardiasis
- Viral Hepatitis
- Polio
- Worm Infestation

### Contact diseases

- Leprosy
- Sexually Transmitted Diseases (STD) and AIDS
- Trachoma and Conjunctivitis (affecting eye)
- Fungal infections of skin
- Pyoderma

### Arthropod (Insect vector) born diseases

- Malaria
- Filaria
- Dengue
- Japanese Encephalitis (J.E.)
- Kala-azar
- Plague
- Kyasanur Forest Disease (KFD)

### Zoonosis

- Rabies (Plague KFD and J.E. are also Zoonosis)

### Others

- Tetanus
- Guinea worm disease

## 6.3.2 Morbidity and Mortality due to Communicable Diseases

Communicable diseases in endemic or epidemic form have been taking a very heavy toll of human lives throughout history.

### 1. Mortality due to communicable diseases

Out of the total deaths in India, communicable diseases are responsible for a significant proportion of deaths. Some of the communicable diseases cause significant mortality while others are responsible for significant morbidity.

Different communicable diseases affect different age groups. In the neonatal period (0-28 days) Neonatal tetanus is an important cause of death that is typical to this age group. The others are septicemia and pneumonia.

In the period of infancy other than neonatal period (e.i. 28 days to 1 year) the two major causes of death are pneumonia and diarrhoea.

In the age group of 1 to 4 years again pneumonia and diarrhoea are common causes of death. Together, they are responsible for nearly half of childhood deaths. In children under five years of age, another common causes of death (from communicable diseases) is measles. Measles and its complications including malnutrition, secondary pneumonia, diarrhoea and encephalitis cause a significant proportion of mortality in children.

In adults, tuberculosis affects people at the prime of their life causing a considerable amount of premature deaths. Tuberculosis is responsible for nearly half million deaths in a year, in our country.

Malaria which was mostly an endemic disease in India, has recently occurred in epidemics in different parts of our country. The official figures of deaths due to Malaria is reported to be around 200 to 400 per year. However, most experts feel this is a gross under-estimate. The Malaria Research Centre, New Delhi has recently estimated that over one lakh deaths due to Malaria occur every year in our country.

The pandemic of AIDS (caused by HIV) started in 1980s. The serosurveillance report in India shows a seropositivity rate of 26.22/1000 (e.g. out of every 1000 blood sample screened 26 to 27 come positive for HIV). It is estimated that in mid 1998 our country had about 3.5 million people living with HIV and AIDS. According to world-wide projections Sub Saharan Africa will lead the tally of HIV positives by 2000 A.D. Out of the HIV positive patients some have already developed AIDS and have either died or are very close to death. Others will soon follow similar fate as death is inevitable in the disease. Like tuberculosis most of those affected by HIV are young people. Their premature death cause considerable economic loss to their family as well as the country. Contrary to the earlier belief AIDS is as much a rural problem as it is an urban problem. (Source: NAW surveillance for HIV infection AIDS cases in India. Period of report since 1986 to 29th Feb 2000).

Other causes of deaths due to communicable diseases in adults are typhoid, cholera, tetanus, Japanese encephalitis (J.E.) and Kala-azar.

Mention must be made of the plague epidemic in India in 1994. Fifty four people (official figures) died of plague in the epidemic which affected mainly Surat and Delhi. Plague deaths were not reported in our country since 1968. But, the sudden out-break of plague in 1994 was a warning that control measures are still inadequate.

## 2 Morbidity due to communicable diseases

### Malaria:

Nearly 2 million cases of Malaria are reported every year under the National Malaria Eradication Programme (NMEP). However, experts have calculated from anti-malaria drug consumption pattern that 35.5 million episodes of malaria occur every year in addition to malaria cases treated under NMEP.

### Tuberculosis

The prevalence of tuberculosis in the country is 1.5 to 2 percent. Out of these 1/4th i.e. 0.4 to 0.5 percent are sputum positive tuberculosis (i.e. they excrete the organism in the sputum) and are sources of infection for others around them. It is estimated that India has 14 million people suffering from active tuberculosis of which 3-3.5 million are sputum positive cases. Every year nearly 1 million people are treated and cured another 0.5 million die. But, approximately 1.5 million new T.B. patients are detected every year which means that the total pool of T.B. patients is remaining constant and we are not being able to reduce it. In fact, the prevalence of tuberculosis has remained static for nearly 4 decades.

### Leprosy

Out of 10 million cases of leprosy in the world one fourth (2.5 million) are estimated in India (1991). 5 to 15% of these leprosy patients suffer from various type of deformities. The prevalence rate of leprosy is 2-3 per 1000 population in India. The magnitude of the problem cannot be defined in terms of numbers alone as there is an age old social stigma attached to the disease.

### Polio

Polio is one of the diseases targeted for eradication. It has to be eradicated by 2000 A. D. and it is reflected in the World Health Day, 1995 slogan which says "Target 2000- a world without polio". While the western hemisphere is now free of polio, India contributes about 60% of all cases of paralytic polio world-wide. The official statistics have been grossly under-reporting the number of cases, since they are limited to giving information on the hospitalised cases. To overcome this problem, polio has been made a nationally notifiable disease and any acute onset flaccid paralysis is to be reported immediately. This sensitive surveillance system may initially pick up more cases distorting the official figures but in the long run will help eradicate the disease. One should recollect that during the eradication of small pox the surveillance system was similarly made more sensitive and even cash prizes were announced for reporting of cases.

### Measles

Measles not only causes morbidity but some of the complications are life threatening. It is endemic in our country and from time to time cause outbreaks in different places. It mainly affects children between 6 months to 3 years, but following high coverage with measles vaccine the disease is now seen even in older age groups. Measles tends to be very severe in the malnourished child, carrying a higher mortality than in well nourished children having measles. Even in a healthy child, an attack of measles may be followed by malnutrition and infections.

### Diarrhoea

Diarrhoea and acute respiratory infections including pneumonia constitute about 30 to 50% of all hospital admission in pediatric age group in our country. They are the commonest illnesses during childhood. It is estimated that every child suffers from 2-3 attacks of diarrhoea per year. In developing countries the annual incidence rate of pneumonia in children 0-4 year of age, according to WHO is 7-18 (or higher) per 1000 children.

### Other Diseases

Simple cough and cold (common cold) is another common morbidity occurring in all ages. Although it is a self limiting and mild disease yet usually it incapacitates a person and reduces his capacity to work.

Worm infestation is specially seen in children. It causes anemia, malnutrition and occasionally pain abdomen. It is endemic in rural India.

An estimated 19 million people in India have chronic lesions due to filariasis. The disease causes nearly 6 million acute attacks per year in the country. Filariasis is a disease which considerable amount of morbidity but negligible mortality.

Guinea worm disease in the past was endemic in some states of India where step wells or ponds were used as source of drinking water. This disease has been successfully controlled and is on the verge of eradication.

Typhoid is endemic throughout India. It is one of the major causes of prolonged fever. The highest incidence is in the age group of 5-19 years.

Kala-azar occurs in parts of Bihar and West Bengal where it is endemic.

Hepatitis A and E viruses are endemic in India causing what is commonly known as Jaundice. They are water or food borne. They cause epidemics from time to time. Hepatitis B and C viruses are transmitted parenterally mostly through contaminated syringes, needles and infected blood and blood products and cause severe illnesses which may lead to cirrhosis of liver and liver malignancy. In fact, the most common cause of primary liver malignancy in India is Hepatitis B virus (HBV).

### 6.3.3 Regional Variation in Disease Occurrence

As discussed earlier a part of epidemiology is the study of disease distribution. Having discussed disease frequency, morbidity and mortality let us now see how different diseases are distributed over our vast country. We will discuss the distribution of important disease, one by one.

#### Tuberculosis

Tuberculosis is a health problem in all regions of the country. It affects equally the urban as well as the rural people. But, since majority of Indian reside in rural areas, the majority of TB cases are also seen in rural areas.

#### Malaria

Malaria is endemic throughout the country. Predominantly two types of malaria parasites are seen in India –vivax and falciparum. The falciparum variety is particularly dangerous with a high mortality. Falciparum malaria is seen mainly in Orissa, M.P. and North Eastern States and is particularly common amongst the tribal population. Recently there have been epidemics in Rajasthan and Assam with high mortality. It has

been observed that irrigation projects, development projects and other digging activities by man are partly responsible for spread of malaria. The epidemic in Rajasthan in 1994 was linked to the construction of the Indira Gandhi Canal (an irrigation project). Such projects if improperly planned create sites for stagnant water collection where mosquitoes breed. Recently the malaria situation in the country has been divided into eight epidemiological types in which tribal malaria, irrigation malaria and project malaria have been identified as separate entities.

### Filariasis

Filariasis is endemic all over India except in Jammu and Kashmir, Himachal Pradesh, Punjab, Haryana, Delhi, Rajasthan, Nagaland, Manipur, Tripura, Meghalaya, Sikkim, Arunachal Pradesh, Mizoram and Dadra and Nagar Haveli. Heavily infected areas are found in U.P., Bihar, Andhra Pradesh, Orissa, Tamil Nadu, Kerala and Gujrat (except U.P. and Bihar all others are coastal states). Two types of filarial infection occurs in India – Bancroftian filariasis and Brugian filariasis. 98% of the infection is of the bancroftian type and brugian filariasis is localised mainly in the central part of Kerala along the coast.

### Leprosy

Like filariasis, leprosy is again a disease which is unevenly distributed in the country. The worst affected states/ Union Territories are Bihar, Orissa, Tamil Nadu, A.P., Pondicherry and Lakshadweep. Punjab and Haryana have a significantly low prevalence of leprosy.

### AIDS

The HIV virus transmission is now reported from all states in India. Throughout the country the pre-dominant mode of transmission is heterosexual (i.e. through sex between men and women) but in the North Eastern states especially in Manipur the proportion of HIV transmission through Intravenous drug abuse is significantly high. The problem due to HIV in rural areas is almost similar to that in urban areas. Unprotected high risk sexual inter-course (the predominant mode of transmission) occurs both in urban as well as rural society. Further, increased contact between the urban and rural society due to urban migration and employment in urban areas has extended the problem to rural areas. In Africa, there are example of almost whole villages being wiped out due to HIV leaving behind only orphan children. We have to take action before such a situation occurs in India.

### Other Diseases

The mosquitoes transmitting Japanese encephalitis generally breed in irrigated rice fields. Therefore, J.E. is common in the rice growing belt of the country. The states affected are Assam, Bihar, Orissa, A.P., Goa, Karnataka, Maharashtra, M.P., T.N., U.P. and West Bengal.

Kala-azar occurs mostly in Bihar, W. Bengal, Assam and Eastern districts of U. P. To a lesser extent, it also occurs in the foothills of Sikkim, T.N. and Orissa.

Kyasanur Forest Disease (K.F.D.) is a disease transmitted to man by bite of infected ticks, it is seen in Kyasanur forests of Shimoga district of Karnataka.

Most communicable diseases other than the ones discussed above occur all over India with no significant patterns of geographical distribution.

### 6.3.4 Time Trend

The prevalence and incidence of most communicable diseases in India have decreased over time. We have been able to eradicate smallpox. In 1977, India was declared smallpox free and in 1980 WHO declared the eradication of small pox from the world.

In 1953, it was estimated that annually 75 million cases of malaria were occurring in the country. The National Malaria Control Programme (NMCP) which was started in 1953 was converted into National Malaria Eradication Programme (NMEP) in 1958, inspired by the initial success. In 1961, there were only 50 thousand cases of malaria (the all time low figure). However, after that the number started increasing gradually to

peak at 6.4 million cases per year in 1976. In 1977 the modified plan of operation (MPO) was launched and the number of cases dropped gradually to a constant level of about 2 million cases each year in the early 1990s. As discussed earlier, this figure is an under-estimate. In 1994-95, the disease has occurred in epidemics in different parts of the country. During this period the proportion of falciparum malaria cases has also gone up.

Tuberculosis as discussed earlier has been occurring at a more or less fixed rate since the last 3 decades. But, two aspects are causing concern in recent years.

- (i) The advent of HIV – as the HIV infected people are especially prone to T.B. Moreover, the cheapest and widely used Anti TB drug Thiacetazone causes severe side effects in people with HIV.
- (ii) The emergence of multidrug resistant TB which does not respond to the usual Anti TB drugs. This is partly due to inadequately treated tuberculosis which empowers the bacteria to develop resistance against the action of the same drugs in future.

The incidence of diphtheria, whooping cough, tetanus, polio and measles have decreased due to high level of coverage against them in infancy, under the universal immunisation programme. These diseases were once upon a time causing considerable mortality and morbidity in children. Polio has been targeted for eradication by 2000 A.D. Although the number of measles cases has decreased it still occurs in small outbreaks throughout the country.

Epidemics of cholera have been occurring in the country since time immemorial. There have been 7 pandemics of cholera in the world. Six of them have started from Bengal (mostly Bangladesh). The seventh started from Indonesia. The seventh pandemic differed from the earlier six in that it was caused by the 'El tor' variety of cholera organism and not the classical variety. Recent reports from Bangladesh and India have reported an entirely new strain (cholera 0139 or non 01 strain) responsible for some of the recent cholera epidemics. This novel strain of cholera organism has been isolated only in India and Bangladesh and nowhere else in the world. The present day epidemics of cholera do not cause as much mortality as in the past due to increased use of "oral rehydration solutions (ORS)" and "home available fluids (HAF)".

### 6.3.5 Economic Implications

When a man suffers from an illness, he loses his capacity to work, either partially or completely. As a result he loses an opportunity to earn money. When he goes to the hospital to seek treatment, he and those accompanying him again lose opportunity to earn money by spending time in the hospital. The cost incurred by the patient by loss of opportunity to engage in economically productive work is known as **Opportunity Cost**. The patient has to further spend money on his treatment. From the government point of view, money is spent in building health infrastructure, providing training and maintaining health personnel, acquiring equipment and drugs. From the society's point of view man-days of work are lost due to illness. Had the person been healthy, he would have contributed economically to the society. Thus for any kind of illness a cost is incurred by the patient, his family, his society and the government.

Diseases such as tuberculosis and AIDS cause untimely death of people at the prime of their economically productive life. Their family loses an earning member. Diseases like malaria affect all age groups resulting in death or incapacitation for the period of the illness leading to decreased work output.

The union health budget is only 2-3 per cent of the total budget expenditure. Given this budgetary constraint a public health expert needs to apply the principles of health economics to optimize the output. For economic evaluation of health programmes, there are techniques available such as cost analysis, cost minimisation, cost-effectiveness analysis, cost benefit analysis and cost utility analysis. Appropriate use of these techniques optimize the output from limited resources.

## 6.4 THE ETIOLOGY OF COMMUNICABLE DISEASES

After understanding the extent of the problem of communicable diseases in India, let us now understand how they are caused. Each disease is caused by a causative organism. Certain social, cultural and environmental factors contribute to the occurrence of some of the diseases. From the outset it should be clear that although social and cultural factors are discussed separately they are components of the 'total environment' which was referred to in the epidemiological triad. These factors are sometimes referred to as social environment and cultural environment, as distinct from physical environment.

### 6.4.1 Causative Agents

The causative agents are many. We may, for our understanding, classify the agents as diseases caused by (i) bacteria, (ii) viruses, (iii) bacteria and viruses, (iv) parasites and (v) other causes such as socio-cultural factors and environmental factors. We shall discuss them briefly.

The following table gives the diseases caused by bacteria causative organisms and the predominant route of transmission of some of the communicable diseases.

**Table 1. Diseases Caused by Bacteria**

Sl. No.	Disease	Causative Organism	Predominant route of transmission
1.	Tuberculosis	Mycobacterium	Droplet infection
2.	Diphtheria	C. diphtheria	Droplet infection
3.	Pertusis (whooping cough)	B. pertusis	Droplet infection
4.	Cholera	V. Cholerae 01 (classical or El tor) V. Cholerae non 01 (or 0139 Bengal)	Feco-oral (water and food borne)
5.	Enteric fever (typhoid)	S. Typhi	Feco-oral (water and food borne)
6.	Leprosy	M. leprae	Direct contact Droplet infection
7.	Trachoma	C. trachomatis	Through direct contact of fomites or fingers.
8.	Plague	Y. pestis	Vector borne (rat flea) Droplet infection (pneumonic plague)
9.	Tetanus	C. tetani	Wound contamination
10.	S.T.D. (Sexually transmitted diseases)	Gonococcus	Sexual contact.

**Table 2. Diseases Caused by Viruses**

Sl. No.	Disease	Causative Organism	Predominant route of Transmission
1.	Chicken Pox	Varicella-Zoster virus	Droplet infection
2.	Measles	Measles virus (Myxovirus)	Droplet infection
3.	Mumps	Mumps virus (Myxovirus)	Droplet infection
4.	Rubella (German Measles)	Rubella virus	Droplet infection
5.	Influenza	Influenza virus (type A, B & C)	Droplet infection

Sl. No.	Disease	Causative Organism	Predominant route of Transmission
6.	Polio	Polio virus (type 1, 2 & 3)	Feco-oral
7.	Viral hepatitis	Hepatitis A Virus Hepatitis B Virus Hepatitis C Virus Hepatitis D Virus Hepatitis E Virus	Feco-oral Through infected blood or blood products
8.	Dengue	Dengue virus (arbovirus)	Vector borne (Mosquito)
9.	J.E.	J.E. Virus (arbovirus)	Vector borne (mosquito)
10.	K.F.D.	K.F.D. virus (arbovirus)	Vector borne (ticks)
11.	AIDS* (acquired immuno deficiency syndrome)	Human Immuno-deficiency virus (HIV)	Hetero-Sexual contact

\* AIDS can be transmitted by:

- a) Sexual intercourse
- b) Receiving infected blood or blood products
- c) Use of infected needles for injections
- d) From infected mother to baby

#### Diseases that can be caused by bacteria and viruses

There are some disease which can be caused by both bacteria and viruses. They are mentioned below:

##### 1. Diarrhoea, Dysentery and food poisoning

— Predominant route of Transmission:

- Feco-oral

— Causative organism

- Rota virus
- E.coli
- Shigella
- Salmonella
- Staph. aureus

##### 2. Acute Respiratory Infections (A.R.I.)

— Predominant route of Transmission

- Droplet infection
- Air borne

— Causative organism

- S. Pneumoniae
- H. influenza
- Staph. aureus
- Rhinovirus
- Adenovirus

- R.S. Virus
- Influenza virus

### Diseases that are caused by parasites

The diseases caused by parasites are as follows:

1. Amoebiasis
  - Predominant route of Transmission
    - Feco-oral
  - Causative organisms
    - *E. histolytica*
2. Giardiasis
  - Predominant route of Transmission
    - Feco-oral
  - Causative organisms
    - *Giardia lamblia*
3. Malaria
  - Predominant route of Transmission
    - Vector borne (mosquito)
  - Causative organisms
    - *P. Vivax*
    - *P. falciparum*
4. Filariasis
  - Predominant route of Transmission
    - Vector borne (mosquito)
  - Causative organisms
    - *W. bancrofti* (Bancroftian Filariasis)
    - *Brugia malayi* (Brugian Filariasis)
5. Kala-azar
  - Predominant route of Transmission
    - Sand fly
  - Causative organisms
    - *L. donovani*
6. Guinea worm disease (Dracunculosis)
  - Predominant route of Transmission
    - Through consumption of water containing Cyclops harbouring the parasites
  - Causative organisms
    - Guinea worm



## 7. Worm infestation

### — Causative agent

- round worm
- tape worm
- hook worm

### — Predominant route of transmission

- feco-oral (round worm)
- through ingestion of undercooked beef or pork or uncooked vegetable (Tape worm).
- Penetration into skin of the feet (Hookworm).

### Other Causative Factors

#### 1. Social and cultural factors contributing to disease occurrence

The spread of some communicable diseases are aided by certain social and cultural factors. For example, social factors associated with tuberculosis are low socio-economic status, under-nutrition, poor quality of life, poor housing, overcrowding, illiteracy, large family etc. Further, illiteracy and ignorance prevents people to seek appropriate health care. Certain beliefs and practices also spread communicable diseases. For example, tetanus of the new-born (neonatal tetanus) used to occur because of the practice of putting cow-dung over the umbilical cord. Fortunately this practice is now no longer seen. Eye infection (Trachoma and conjunctivitis) can be transmitted while applying "Kajal" to the children's eyes in the mistaken belief that it beautifies the eyes and protects children from the "evil eye". Certain cultural practices increase the mortality due to communicable diseases. For example, the practice of stopping fluid intake in case of diarrhoea may kill the child.

#### 2. Environmental Factors

Of the three factors (agent, host and environment) responsible for disease the role of environment is often ignored by physicians. Yet frequently, the key to the nature, occurrence, prevention and control of disease lies in the environment.

India is still lagging far behind many countries in the field of environmental health. The basic problems of safe water supply and sanitary disposal of human excreta are yet to be solved. Since more than 70% of the population of India live in rural areas, the problem is one of rural sanitation. Some of the environmental factors which play an important role in the spread of communicable diseases are discussed below in brief:

##### (i) Drinking water

In many rural regions of the country, the predominant water supply source is the open well which can be easily contaminated. Worse is the case where people use pond or tank water for drinking purposes. Cholera, diarrhoeal disease, polio, typhoid and hepatitis are some of the diseases spread by unsafe drinking water. Tube wells have been found to be a safe water source for the rural community. Chlorinated piped water supply has also been provided in some places in the country. The "Rajiv Gandhi National Drinking Water Mission" of the government of India is going ahead with providing safe drinking water to the rural community in India.

##### (ii) Excreta disposal

In rural areas, by and large, people have not accepted latrines with any enthusiasm and even when installed a few use them regularly. While adults go to the field, the children defecate near the house. The faeces may contaminate food either directly or through fingers, flies, water or soil. The aim of safe excreta disposal is to provide a sanitation barrier between faeces and man. All water and food borne diseases transmitted through feco-oral route can spread due to faulty excreta disposal.

**(iii) Housing**

Poor ventilation and over-crowding help in the spread of diseases transmitted through droplet infection or droplet nuclei (air borne).

**(iv) Drainage**

Poor drainage can lead to collection of stagnant water where mosquitoes can breed. In some places like rural Haryana piped water supply has been provided to villages without making arrangements for drainage. This causes collection of water near the tap-sites which are potential mosquito breeding spots.

**(v) Garbage and litter disposal**

Piling of garbage and litter facilitates fly breeding and also attracts rats. Therefore, there should be an efficient collection, removal and disposal system for solid wastes.

**Check Your Progress - 2**

Note: i) Write your answer in the space provided.

ii) Check your answer with the model answers given at the end of the unit.

1) Name two commonest causes of death in children aged one month to four years.

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2) List four mosquito born diseases.

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3) Name five environmental factors which play an important role in the spread of communicable diseases.

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## 6.5 IDENTIFYING CHARACTERISTICS OF COMMON COMMUNICABLE DISEASES

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To control communicable diseases one of the strategies is to pick up those diseased from the community and treat them early so that they do not transmit the disease to

others. For doing so one needs to know essential clinical features as well as important laboratory findings of common diseases.

Identifying characteristics of some common communicable diseases are mentioned below (especially emphasising on identifying from the rural community). After identifying any disease it is however important to confirm the diagnosis from a M.B.B.S. doctor.

### 1. Tuberculosis

Any person suffering from cough with or without expectoration for more than 15 days should arouse suspicious of tuberculosis. Additional symptoms of haemoptysis (blood in sputum), chest pain and low grade fever (especially with evening rise of temperature) may also be present. Any such patient is labeled as a "chest symptomatic". Another feature of tuberculosis is weight loss. A "chest symptomatic" has to be identified and sent to a hospital where sputum examination can be done. Sputum smears can be made at the sub centre by the male health worker. But, the nearest place for sputum examination is the primary health centre (PHC). If the sputum is positive for Acid Fast Bacilli (AFB) then the person is labeled as a "case of tuberculosis and treatment is started. If the sputum is negative then the person is labeled as a "suspect" and an x-ray chest is advised. If the x-ray is positive then the person is called "sputum negative x-ray positive" and treatment is started. The tuberculosis discussed above is the most common type — the pulmonary tuberculosis (affecting lungs or its covering pleura). Any tuberculosis affecting organs other than the lungs is grouped under the label of "extra pulmonary tuberculosis" the diagnosis of which require specialised investigations at a hospital. It should be emphasised here that the sputum positive cases are the ones who are most likely to transmit the disease because they are excreting the organism in the sputum. So identifying sputum positive case is of utmost importance.

### 2. Malaria

Malaria is characterised by fever of sudden onset with chills and rigor. The patient desires to be covered by blankets. The temperature rises and may go up to 106° F. The high temperature remains for about 2 to 6 hours. There may be headache. This is followed by profuse sweating and the fever comes down. This febrile episode occurs usually every third day. However, due to large scale use of anti-malarial and antipyretics (fever reducing drugs) this typical fever is no longer common in malaria. Therefore, any high grade fever with chills and rigor should be suspected to be due to malaria. Accordingly, the male health worker is required to make malaria blood smears to detect malaria parasite (M.P.) for any fever case he comes across in the village. The same practice is followed in the PHC out patient department. If blood smear is positive for M.P. then malaria is confirmed. In India, malaria is caused by plasmodium vivax as well as plasmodium falciparum. The malaria due to falciparum is particularly dangerous because it can lead to cerebral malaria (malaria affecting the brain) which is a fatal disease. In cerebral malaria the fever is accompanied by loss of consciousness. The malaria due to P.vivax is usually not as fatal as P. falciparum but, if not treated radically it often cause relapses.

### 3. Leprosy

Leprosy is suspected when one or more of the following features are present:

- Hypopigmented patches (patches on the skin which are lighter in colour than the surrounding)
- Partial or total loss of skin sensation in affected areas.
- Presence of thickened nerves (can be examined only by a doctor).

It is confirmed in the laboratory by examining smears from the skin and the mucus membrane of nose. Signs of advanced disease are presence of nodules, loss of finger or toes, depression of the nose, painless ulcers on feet and other deformities.

### 4. Filariasis

In the acute stage there is pain and swelling in the legs, scrotum and groin. Lymph nodes in the groin may be enlarged. There may be fever. Later in the chronic stage (years later) there may be hydrocele (accumulation of fluid in the scrotum) and

elephantiasis (Huge swelling of the legs which makes it look like that of an elephant). Some patients may remain symptom free for a long time. Diagnosis is confirmed by taking blood smears at night and identifying the organism in the laboratory.

#### 5. Diarrhoea and Cholera

Diarrhoea is the passage of loose watery stool more than 3 times a day. In dysentery mucus and /or blood is present in the stool. Gastroenteritis (G.E.) is the term used to describe diarrhoea with vomiting.

Cholera causes watery diarrhoea and the stool has the appearance of "rice water".

All kinds of diarrhoea cause dehydration (the body fluids are drained out by diarrhoea). The cause of death in diarrhoea is dehydration. In children dehydration develops very rapidly. Dehydration is most marked in cholera. Cholera usually occurs in epidemics. On suspicion of cholera, stool samples are collected by the medical staff and sent for culture which is confirmatory.

#### 6. ARI and Pneumoniae

Acute respiratory infections (ARI) are either upper respiratory infections or lower respiratory infections. Upper respiratory infections are usually characterised by running nose and cough and are self limiting. The lower respiratory infection (pneumonia) is common cause of morbidity and mortality in children. In a child below 5 years with cough and fever, pneumonia can be reasonably well diagnosed by counting the resting respiratory rate. A respiratory rate more than 60, 50 and 40 for children of age respectively below 2 months, 2 months to 1 year and more than one year, indicates pneumonia. Along with a rapid respiratory rate, if there is indrawing of the lower part of the chest during inspiration (in inspiration, all parts of the chest and the abdomen move outwards) or there is inability to feed or the child becomes blue then a diagnosis of severe pneumonia is made and the child rushed to a hospital immediately. As such, any pneumonia in children below 2 months of age should be treated at the hospital.

#### 7. Typhoid (Enteric Fever)

It is characterised by continuous fever for 2 to 3 weeks. Diagnosis is done by doing a 'WIDAL' test.

#### 8. Polio

Less than 1% of polio infections results in paralysis (paralytic polio). Polio usually affects children. The paralysis is asymmetrical (more in one limb) and flaccid (limp). Patients gives history of fever at the onset of paralysis. The typical history is fever followed by inability to walk. Often, intramuscular injections precipitate paralysis. The paralysis persists and leads to atrophy (thinning out) of the limb. Any suspected polio case has to be immediately notified to the health authorities (PHC or district health officer or district immunisation officer). Diagnosis is confirmed by identification of polio virus in the stool of the patient.

#### 9. Measles

Measles usually occurs in children. It begins with fever, cough, running nose and redness of eyes. This is followed by appearance of dusky-red rashes which begins behind the ears and spreads rapidly in a few hours over the face, neck and down the body (in that order) taking 2-3 days to reach the legs. The rash fades in the same order of appearance. The dreaded and fatal complication of measles are pneumonia, diarrhoea and encephalitis (infection of the brain). After an attack of measles, there can be growth retardation, Vitamin A deficiency and other infections.

#### 10. Neonatal Tetanus

The symptoms of the disease typically start between 5 to 15 days after birth, there is excessive unexplained crying followed by refusal to feeds. The jaw is clenched and does not open - "lock jaw". Muscles go into spasm at the slightest stimuli of touch, noise or bright light. Ultimately the child dies.

### 11. Sexually Transmitted Diseases (S.T.D.)

AIDS—the virus HIV can remain in the blood of a patient without symptoms for long periods of 6-10 years. However, this is the time when the virus can be transmitted. The only way of identifying it is by doing an ELISA test for HIV. One ELISA may give a false positive result so at least two ELISAs with different kits need to be done before branding a person HIV positive. It should also be remembered that ELISA test can be negative for as long as 6 months following the infection of the person with HIV, even if the person has the virus. This is because ELISA does not detect the virus but the antibodies to the virus which may take a maximum time of 6 months to develop. Before advising an ELISA test a "pre testing counselling" is to be done to the patient to inform him/her about the test and its interpretation. Similarly, a "post test counselling" according to the result is to be done when the result of the test is available.

OTHER STDs: They cause genital ulcers or discharges.

### 12. Hepatitis

Hepatitis A and E viruses are transmitted feco-orally. They cause jaundice (yellow colouration of skin and mucus-membrane especially that of the eye). There may be loss of appetite, vomiting and fever. Usually complete recovery takes several weeks.

Hepatitis B, C and D are transmitted mainly through injections or inoculation into the skin of infected blood or blood products. It can also be transmitted from mother to child and by sexual intercourse. They also cause jaundice but may cause severe complications like liver cancer and cirrhosis. Confirmation is done by blood test for the antibodies.

### 13. Plague

There are two types:-

- a) Bubonic plague; transmitted by rat fleas. It is characterized by fever with swelling and pain in the lymphnodes of the groin.
- b) Pneumonic plague; transmitted from person to person as droplet infection. It is highly fatal. It is characterized by fever, cough with often blood tinged sputum, and fast breathing. Patient deteriorates and dies soon.

### 14. Kala-azar

It is transmitted by the bite of sand flies. Typical features are fever, weight-loss, enlargement of liver and spleen and darkening of the urine. If left untreated has a high mortality. Diagnosis is confirmed by laboratory, identification of the organism from tissues.

### Check Your Progress - 3

Note: i) Write your answer in the space provided.

ii) Check your answer with the model answers given at the end of the unit.

1) Who is a 'chest symptomatic' in tuberculosis?

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2) Mention three identifying characteristics of leprosy.

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- 3) Which disease in childhood can be diagnosed reasonable well by counting respiratory rate?

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## 6.6 LET US SUM UP

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Communicable diseases in India have been taking a heavy toll since ancient times. In this unit, we discussed the concepts in the epidemiology of communicable diseases. We noted how disease frequency is measured in terms of prevalence and incidence rates. We read about how disease distribution is described in terms of time, place and person. We saw how different communicable diseases are transmitted from source / reservoir to the susceptible host by different modes of transmission. We gave a brief account of the interaction between agent, host and environment (the epidemiological triad) to produce disease.

We made an assessment of the morbidity and mortality due to major communicable diseases. We noted the differences in the geographic distribution of these diseases in the country. We also noted how the situation has changed with time. We gave a brief account of the economic implications emphasizing on opportunity cost and optimisation of limited resources.

We learned about the causative agent and predominant mode of transmission of the diseases. We noted that certain social and cultural factors can aid in the process of disease causation. We also noted that unsafe drinking water, unsanitary disposal of human excreta and garbage, improper drainage and poor housing are aiding in the spread of communicable diseases.

Lastly, we learnt about the identifying characteristics of common communicable diseases of public health importance.

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## 6.7 KEY WORDS

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**Morbidity:** The state of being ill by any disease.

**Mortality:** The deaths due to a disease.

**Surveillance:** it is the systematic and regular assessment of disease frequency. In a broader sense it is the continuous scrutiny of all aspects of occurrence and spread of a disease.

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## 6.8 SUGGESTED READING

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## 6.9 MODEL ANSWERS

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### Check Your Progress - 1

- 1) • Source or reservoir

Modes of transmission

Susceptible host

- 2) • Vehicle-borne e.g. cholera

Vector-borne e.g. malaria

Air-borne e.g. tuberculosis

Fomites-borne e.g. eye infection (trachoma)

Unclean hands and fingers e.g. worm infestation

- 3) • Polio

Guinea worm disease

### Check Your Progress - 2

- 1) • Diarrhoea

Acute respiratory infections

- 2) • Malaria

Filaria

Japanese Encephalitis

Dengue

- 3) • Drinking water

Excreta disposal

Housing

Drainage

Garbage and litter disposal

### Check Your Progress - 3

- 1) 'Chest symptomatic' is any person suffering from cough with or without  
expectoration for more than 15 days, with or without haemoptysis or chest pain or  
low grade fever.
- 2) • Hypopigmented patches
- Partial or total loss of skin sensation in affected areas.
  - Presence of thickened nerves.
- 3) • Pneumonia

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# UNIT 7 PREVENTION AND CONTROL OF COMMUNICABLE DISEASES IN RURAL INDIA

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## Contents

- 7.0 Aims and Objectives
- 7.1 Introduction
- 7.2 Interventions for Control of Communicable Diseases
- 7.3 Management of Epidemics
- 7.4 National Programmes for Control of Communicable Diseases
- 7.5 Successes, Failures, Future Goals and Prospects
- 7.6 Let Us Sum Up
- 7.7 Key Words
- 7.8 Suggested Readings
- 7.9 Model Answers

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## 7.0 AIMS AND OBJECTIVES

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Communicable disease control has been a major challenge to human endeavors to stay healthy. This unit will provide you with a comprehensive understanding of the interventions and national programmes directed against communicable diseases in rural India.

After reading this unit, you will be able to:

- describe the interventions available for control of communicable diseases.
- outline the management of epidemics.
- critically appraise the National programmes for control of communicable diseases with special emphasis on the working of these programmes in rural areas.
- list the successes, failures, future goals and prospects in control of communicable diseases.

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## 7.1 INTRODUCTION

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You know by now that communicable diseases are prevalent throughout the country causing significant morbidity and mortality. You have also learned about the etiology and identifying characteristics of major diseases.

In this unit, we shall first learn about the interventions available against communicable disease, then we shall learn to manage epidemics. Later, we will get familiarised with the working of the National Programmes against communicable diseases. We will also briefly assess failures, successes and the future of communicable diseases control.

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## 7.2 INTERVENTIONS FOR CONTROL OF COMMUNICABLE DISEASES

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Every disease has certain weak points susceptible to attack. The basic approach in controlling disease is to identify these weak points and break the weakest link in the chain of transmission by using appropriate interventions. In this section let us understand the levels and modes of intervention and the major interventions for control of communicable diseases.

## 7.2.1 Levels and Modes of Interventions

Interventions against a disease can be applied at different points in the natural history of the disease. Accordingly there are three levels of intervention.

**Primary prevention** : Primary prevention is the action taken prior to the onset of the disease, which removes or reduces the possibility that a disease will ever occur. It is accompanied by measures designed to promote general health and well-being, and quality of life of the people (**Health promotion**) or by specific protective measures against specific disease (**Specific protection**). Example : polio vaccination is a specific protective measure against polio, whereas improving the nutritional status of a community is a health promotion activity, which may prevent the occurrence of many communicable diseases especially in children. Primary prevention measures may be applied to the whole population. Often however, due to limited resources better results are obtained if these measures are directed against high-risk groups who have a greater probability of acquiring the disease.

**Secondary prevention** : Secondary prevention is the action which halts the progress of a disease at its incipient stage and prevents complications. This is achieved by **early diagnosis and adequate treatment**. The problem in rural India is that people seek health care only when the disease has progressed considerably. By this time they might have infected several other people. The problem is further complicated by a significant proportion of the patients reporting to the so called quacks who do not adequately treat the disease. Therefore, in order to diagnose disease early, the whole community should be screened by using appropriate questionnaire or screening tests. Many communicable diseases in our country are under surveillance. Active surveillance as in the case of malaria is done to detect cases in the community by a visiting health functionary.

**Tertiary prevention**: Tertiary prevention includes all measures available to reduce or limit impairments and disabilities, minimise suffering caused by existing departures from good health and to promote the patient's adjustment to irremedial conditions. For example, treatment, even if undertaken late in the natural history of disease may prevent sequelae and limit disability (**disability limitation**). When defect and disability are more or less stabilised, **rehabilitation** may play a preventable role. Tertiary prevention extends the concept of prevention into fields of rehabilitation. Rehabilitation aims at restoring a patient's maximum attainable functional capacity so that he is least dependent on anybody. Modern day rehabilitation includes medical, psycho-social and vocational components.

The Primary Health Centre (PHC) plays an important role in making these interventions more efficient. Therefore, at this juncture, it is important to know the function of PHC, particularly its staffing pattern.

The Primary Health Centre (PHC) looks after about 30,000 population distributed in different villages. Under one PHC there are about 5 sub-centres, each manned by a male and a female health worker [multipurpose worker (MPW) male and female] and looking after 5,000 population. These figures of 30,000 and 5,000 are the prescribed norms for plain areas. For hilly, tribal and backward areas the norms are 20,000 and 3,000 respectively. At the PHC there is a health assistant male and a health assistant female who supervise the male and female health workers. The PHC also has a medical officer in charge and other hospital staff. At the village level, there are village health guides, trained dais, anganwadi workers (under ICDS scheme, HRD ministry) and link persons in some States. The key persons who actually carry out any programme are the male and female health workers (MPWs). In their day to day work they take help from the functionaries at the village level.

## 7.2.2 Immunisation

Immunisation plays an important role in health care interventions. Therefore, let us discuss the salient features of immunisation programmes.

One effective way of controlling the spread of infection is to strengthen the host defences. This may be accomplished by active immunisation, which is one of the most powerful and cost-effective weapons of modern medicine. There are some

communicable diseases whose control is solely based on immunisation, e.g. polio, tetanus, diphtheria, pertussis and measles. The human body has a defence system which has the capacity to fight against any infection. This is called the body's immunity. Disease results when the infection overpowers the immunity. The objective of active immunisation is to strengthen the immunity of the body against specific diseases.

### 1. Active Immunisation

In active immunisation the body's immune system takes active part in building up immunity against disease and it differs from passive immunisation in which antibodies from an external source is administered into the body (the body's immune system remains passive). Active immunisation is always better than passive immunisation. In active immunisation either the whole organism (killed or attenuated) or a part thereof is generally used as vaccine. Commonly used vaccines are of the following types:

- 1) Live vaccines e.g. BCG, measles, oral polio vaccine
- 2) Inactivated or killed vaccines e.g. pertussis
- 3) Toxoids e.g. tetanus, diphtheria
- 4) Combination vaccines e.g. DTP, DT, MMR
- 5) Passive immunizing agents: immunoglobulins, antisera and antitoxins.

The use of such vaccines become more clearer if we know something about the national immunisation programme.

### 2. The National Immunisation Programme

In late 1970s India started its expanded programme of immunisation (EPI) for children. Upto 1984 the coverage of children with immunisation was very less. In 1985-86 the Universal immunisation programme was started with an objective of universal coverage of all infant (0-12 months). The focus here changed from children to infants. Immunization was also made one of the technological missions of the government of India, thereby getting high priority. The result was that immunisation coverage increased to about 80% (govt. figures) by 1993. Although the recent national family health survey shows very poor coverage in some part of the country, there is no doubt that the immunisation programme is one of the few successful health programmes of our country. The contact we have established with the infants and their mothers in routine immunisation sessions is now being used to deliver other health packages aimed at child survival and safe motherhood.

In the rural areas the health worker male and female are the people who conduct immunisation sessions. Previously each worker was required to visit every day a fixed number of houses and vaccinate the eligible children. To reduce chances of infection and to properly maintain the cold chain this practice was replaced by "fixed day fixed site" strategy. Here, each village has a fixed day in the week as immunisation day when immunisation is given at a fixed site in the village. Both the day and the site are widely advertised so that the mothers bring their children and get them immunized. The Anganwadi workers and their helpers assist in bringing the children belonging to their area for immunisation. Each mother during her pregnancy gets a "mother and child immunisation card". All immunisation given to the mother and the child are recorded in it. The health workers as well as the anganwadi workers also maintain an immunisation register with them. Usually BCG and measles are given by the male worker and DPT and TT are given by the female worker. However, both male and female workers work together and complement each others work. The national immunisation schedule is as follows:

Beneficiaries	Age	Vaccine	No. of doses	Route of administration
Infants	6 wks	DTP	3	Intra muscular
	to	Polio	2	Oral
	9 months	BCG	1*	Intra-dermal
	9-12 months	Measles	1	Subcutaneous
Children	16-24 months	DTP	1**	Intra muscular
		Polio		Oral
	5-6 years	DT	1**	Intra muscular
	10 years	TT	1**	Intra muscular
	16 years	TT	1**	Intra muscular
Pregnant woman	16 to 36 weeks	TT	2@	Intra muscular

\* for hospital deliveries BCG should be given at birth.  
 \*\* Booster dose  
 @ if 2 doses of TT have been given within last 3 years, then only 1 dose is required.  
 Note: The minimum gap between two doses of the same vaccine should be 4 weeks.

### 3. Vaccines

Vaccines are the backbone of all the immunisation programmes. Let us know more about the uses of these vaccines.

- DTP** : It is a combination vaccine containing diphtheria toxoid, tetanus toxoid and killed pertussis vaccine giving protection against 3 diseases viz. diphtheria, pertussis and tetanus.
- Polio** : It is a live vaccine which is orally administered.
- BCG** : It is a live vaccine giving protection against the severe forms of tuberculosis.
- Measles** : This is also a live vaccine.
- TT**: It contains tetanus toxoid. In pregnant women it is given to prevent neonatal tetanus in the baby.
- DT**: It contains Diphtheria and Tetanus toxoid. DTP if given to children above 3 years of age can cause severe reactions (due to pertussis component), so DT is given instead.

### 4. Cold Chain

Vaccines get damaged when exposed to atmospheric temperatures. To maintain their potency they have to be stored and transported at low temperatures. Cold chain consists of a series of equipments used to store and transport vaccines at low temperatures from the manufacturer to the beneficiaries. Vaccines are transported in cold boxes. They are stored at the zonal and state levels in "walk-in" coolers and freezers. At the district, subdistrict and primary health centre hospitals they are stored in "Deep freezers" and "Ice Lined Refrigerators (ILR)". The deep-freezer runs at subzero temperatures whereas the ice-lined refrigerator maintains temperature between 2-8 degree centigrade. The ice-lined refrigerator is lined on the inside with ice packs. Once the ice in the packs is frozen it maintains temperature even if electricity is not there for a considerable period of time. It is better suited for rural India than an ordinary refrigerator, because power cuts are quite common in the villages. The male and female health workers carry vaccines from the PHC to the villages in a vaccine carrier which is made of insulated material and lined by ice packs. The most heat sensitive vaccine is polio vaccine. Polio and Measles are stored at subzero temperatures in the deep-freezers. All other vaccines are stored between 2-8 degree centigrade in the ILR.

### 4. Health education

Health education, apart from enabling the people to take corrective measures, also plays a vital role in immunisation.

Health education is a process that informs, motivates and helps people to adopt and maintain healthy practices and lifestyles. Health communication and information,

education and communication (IEC) are often used as synonym for health education. The various methods used for health education are:

- Lectures, Group discussions, Symposium, Workshop
- Role playing
- Demonstrations
- Mass media : TV, radio, press, films, posters etc.

### Check Your Progress - 1

Note: a) Space is given below for your answer

b) Check your answers with the ones given at the end of this unit

1. At what age DTP, Polio and BCG vaccine are to be given to infants?

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2. Define active immunisation

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3. Why is BCG given ?

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### 7.2.3 Vector Control

Most of the vector borne diseases can be controlled by vector control measures. Important vectors transmitting disease in our country are the following:

- Mosquito : transmits malaria, filaria, Japanese Encephalitis, dengue
- Housefly : transmits food borne diseases
- Sandfly : transmits kala-azar
- Rat flea : transmits plague
- Cyclops : transmit guinea-worm disease

Vector control can be achieved by one or more of the following measures:

1. **Environmental control** : It is the best approach to vector control because it is sustainable and the results are likely to be permanent. Examples of environmental control are elimination of breeding places (mosquitoes breed in stagnant water, flies breed in excreta and garbage), provision of good drainage system, carefully planned water management, cleanliness in and around houses, proper disposal of excreta and refuse etc.
2. **Chemical control** : A wide range of insecticides are available for vector control. This method is efficient and economical therefore, it is widely used in our country. However, it suffers from two disadvantages — (i) insects are rapidly developing resistance against most insecticides and, (ii) toxic insecticides residues are accumulating in the environment and also food products.

3. **Biological control** : There is a variety of fish known as *Gambusia* which eat mosquito larvae (young developmental forms of mosquitoes living in water). This fish is bred in places of stagnant water and ponds to control mosquito. Research is continuing to develop other biological agents like fungi, bacteria etc. which can kill mosquitoes without having any harmful effect on humans.
4. **Newer methods** : The most promising is the genetically engineered breeding of mosquitoes which are defective and cannot reproduce. This method is known as genetic control. Other newer methods are insect growth regulators, chemosterilants etc. It should be noted at this point that many activities of man creates breeding places for vectors. It is important that each responsible citizen creates an environment around his or her house or work place where vectors cannot breed. This is particularly easy in rural areas where the sanitation and environment are in the hands of the residents and not with municipal corporations. The need is to educate people and ensure community participation.

#### 7.2.4 Water, Sanitation, Personal Hygiene and Housing

Providing safe drinking water is an effective method of reducing the incidence of water borne diseases. Safe drinking water should be free from all pathogenic agents. In rural India, the most common water source is the open well. Handpumps, tube wells, ponds and rivers are other water sources. Recently, chlorinated water supply has been provided to many villages. Safe water sources are chlorinated piped water supply pump operated deep tube wells and properly constructed and maintained handpump. Ponds and rivers should not be sources for collecting drinking water. Similarly open wells should not be used but till the time other alternatives are provided they can be used if regular chlorination is being done. The male health worker is responsible for chlorination of wells using bleaching powder. After collecting water it needs to be stored in a covered utensil. Water should be taken out of the storage vessel using long handled tumblers so that hands do not dip into the water or it can be poured into glass directly. The Rajiv Gandhi National Drinking Water Mission has been created to provide safe and adequate supply of drinking water especially in rural areas.

Sanitation and personal hygiene prevents many communicable diseases. Use of sanitary latrines, proper disposal of excreta and garbage, handwashing after defecation and before meals, proper drainage in and around the house are some of the healthy measures.

A healthy house should have good cross ventilation, adequate lighting and adequate space. The house should have pucca impervious floor, cracks and crevices free walls, and height of the roof not be less than 10 feet. In the absence of mechanical ventilation at least 500 c. ft. of air space per capita should be there. Cooking should be done in a separate room or in the open. Overcrowding and poor ventilation favours spread of droplet and airborne infections. However, we must not forget the fact that the majority of the poor in India can have such houses only if they enjoy a reasonable economic status.

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### 7.3 MANAGEMENT OF EPIDEMICS

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Epidemics are emergency situations demanding prompt action from health authorities. The management of epidemics involves two activities:

- investigation of an epidemic
- initiation of control measures

#### 7.3.1 Investigation of an Epidemic

Investigation of an epidemic is needed to initiate suitable control measures and also to prevent further recurrences of similar epidemics in the area. The objectives of an epidemic investigation are:

- to define the magnitude of the epidemic or involvement in terms of time, place and person.

- to determine the conditions and factors responsible for the occurrence of the epidemic.
- To identify the source(s) of infection and mode of transmission. In the previous section, we have discussed the salient features of control of communicable diseases under normal circumstances. In this section let us see what measures can be taken to control diseases during epidemics.
- To make recommendations to prevent recurrence.

The steps involved in epidemic investigation are the following:

- (i) Verification of diagnosis :** Sometimes reports of epidemic may be spurious. Therefore, the first step is verification of diagnosis on the spot, as quickly as possible.
- (ii) Confirmation of the existence of an epidemic :** After confirming the diagnosis of the disease the number of cases occurring is compared to the usual frequency of occurrence of cases in the area during the same period of the year. Often the existence of an epidemic is obvious needing no such comparison. At this stage notification of the epidemic is done to the district health officer.
- (iii) Defining the population at risk:** This is done by a quick enumeration of people at risk. This can also be estimated from existing census records. A map of the area is also obtained or prepared showing important landmarks, streets, colonies, dwelling unit, water sources etc.
- (iv) Rapid search of all cases and their characters :** Search and identification of cases should be carried on every day. Each patient or his relatives are asked a set of questions. The format of recording information from each case is designed. This format is known as the "case interview form" or the "epidemiological case sheet". It includes name, age, sex, occupation, social class, travel, time of onset of disease, signs and symptoms of illness, personal contacts, exposure to common vehicles such as food and water, history of attending parties or social events etc.
- (v) Evaluation of ecological factors :** Ecological factors which have made the epidemic possible should be investigated such as movement of human populations, atmospheric changes, breakdown in the water supply system, floods etc.
- (vi) Further investigation of population at risk :** A study of the population at risk or a sample of it may provide additional information. This may involve medical examination, laboratory tests, examination of suspected food etc.
- (vii) Data analysis :** An epidemic curve is prepared. This may show time clustering of cases, time relationship with exposure and whether it is a common source epidemic or a propagated epidemic. A spot map showing the geographical distribution of cases may show clustering of cases around a source. It helps in identification of source and gives an indication about the mode of spread. The data is further processed and rate of attack in people with different characteristics are calculated with an objective of identifying the host characters which help in the spread of the epidemic.
- (viii) Formulation of hypothesis :** After collecting and analysing data a hypothesis is formulated in terms of possible source, causative agent, possible modes of spread, and the environmental factors which enabled it to occur.
- (ix) Testing of hypothesis:** When multiple hypothesis are formulated each need to be weighed by comparing the attack rates in various groups for those exposed and those not exposed to a suspected factor. This helps to ascertain which hypothesis is consistent with all known facts.
- (x) Writing the report :** This is the final step in epidemic investigation.

It must be remembered that all these steps are to be done within a short period of time. Some steps can be done concurrently. It may also be necessary to implement control measures at the commencement of an epidemic on the basis of known fact of the disease. Later these measures may be modified or replaced in the light of new knowledge acquired by the epidemic investigation.

### 7.3.2 Control Measures for Epidemics

Control measures differ from epidemic to epidemic. It usually involves isolating or rapidly treating the source, cutting off the modes of transmission and protecting the susceptible host. Rapid spread of correct information is essential to allay fears and anxiety, to educate people on how to protect themselves and what action to be taken for those affected. Intersectoral action is needed to control epidemics and all available resources in the community should be used.

#### Check Your Progress - 2

Notes: a) Space is given below for your answer

b) Check your answers with the ones given at the end of this unit.

1. What are the vectors transmitting diseases in our country?

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2. What is Gambusia?

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3. Mention the two important activities related to management of epidemics

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## 7.4 NATIONAL PROGRAMMES FOR CONTROL OF COMMUNICABLE DISEASES

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To control communicable diseases the government runs several programmes against diseases that are a public health problem. We shall discuss these programmes one by one.

### 7.4.1 National Malaria Control Programme

The national malaria control programme underwent many changes as various strategies were followed to deal with the problem of malaria. Let us discuss some of the important strategies.

1. **From control to eradication:** Just after independence (1947-1950) India was having 75 million malaria cases and 0.8 million deaths annually. Malaria was India's number one health problem. In April, 1953 government of India launched National Malaria Control Programme (NMCP). The objective of NMCP was to reduce malaria morbidity in the country to such a low level that the disease would cease to be a major public health problem. The encouraging results obtained during NMCP prompted the government to switch the strategy from control to eradication. So in 1958 the National Malaria Eradication Programme (NMEP) was launched. It was implemented in four phases — preparatory phase, attack phase, consolidation phase and maintenance phase. The programme made spectacular progress and in 1965 there were only about 1 million

cases of malaria and no deaths. Thereafter malaria resurged and in 1976 nearly 6.5 million cases were reported. Three types of failures were identified in the programme.

- **Technical failure** : It was found that mosquitoes were becoming resistant to insecticides and malaria parasite was developing resistance to antimalaria drugs.
- **Administrative failure** : These were shortage of insecticides and anti-malarial drugs, rising cost of anti-malarial operations, difficulty in recruitment of labour for spray work, diversion of funds to other health programmes, inability of the states to take charge of malaria control in the maintenance phase and laxity in national commitment.
- **Operational failure** : The epidemiological principles for the eradication of malaria were not properly understood. There was inadequate surveillance, inadequate coverage by insecticides, premature take-off into consolidation and maintenance phases, and early dismantling of malaria eradication services during the maintenance phase. Work in malaria lost its prestige and experienced people left the service for other jobs.

**2. Modified Plan of Operation:** In 1977 the strategy was again revised and Modified Plan of Operation (MPO) was launched. The working of the NMEP (MPO) is as follows:

Objectives:        Elimination of deaths due to malaria.  
                          Reduction of morbidity due to malaria.

Endemic areas in the country have been stratified according to annual parasite index (API) into:

- (i) areas with API less than 2
- (ii) areas with API more than 2

$$\text{(Note : API} = \frac{\text{Confirmed cases of malaria in one year}}{\text{Population under surveillance}} \times 100$$

In areas of API less than 2 the following activities are undertaken :

- focal spraying if a falciparum case is detected
- surveillance
- treatment of cases
- epidemiological assessment (assessment of the frequency and distribution of malaria).

In areas of API more than 2 the following activities are undertaken:

- regular spraying activity throughout the area
- surveillance
- treatment of cases
- entomological assessment (assessment of type and density of mosquitoes, their behaviour, biting and resting habit etc.)

In regular spraying, insecticides used is DDT or malathion. Spraying is done inside all dwelling units covering all walls. This is based on the finding that malaria transmitting mosquitoes usually rest indoors. In focal spraying about 50 houses are sprayed around a house in which falciparum malaria is detected. In rural areas the male health worker visits each house every fortnight and enquires about any fever cases in the family. This method of detecting malaria cases by active participation of the health workers is known as active surveillance. Some fever cases report to the nearest PHC or health facility and this is known as passive surveillance. On detection a fever case a blood smear is made and presumptive treatment of malaria given.

The tablets are to be taken together, after a light meal. Blood smear slides are sent to the laboratory. Radical treatment for malaria is given for any case whose slide is positive for malaria parasite (MP). Radical treatment consists of the following:

For vivax malaria :

1st day 4 tablets chloroquine  
+ 15 mg primaquine

2nd-5th day 15 mg primaquine

For falciparum malaria:

Day 1 Chloroquine tablets 4  
followed 6 hours later by another 2 tablets

Day 2 2 tablets chloroquine

Day 3 2 tablets chloroquine  
then primaquine 30-45 mg single dose

In areas where chloroquine resistance is known to be present other drugs like sulphadoxine / pyrimethamine or quinine are used.

In some villages drug distribution centres (DDC) and fever treatment depots (FTD) are functioning. Both are manned by community volunteers. In DDC only presumptive treatment of malaria is given whereas, in FTD blood smear is also taken by the volunteer. These slides are collected by the male health worker during his visits to the village.

The NMEP (MPO) has not been able to reduce the malaria problem in the country. It depends almost entirely on vector control and early detection and treatment. We have been doing vector control mostly by spraying of insecticides. These insecticides and their residues are non-biodegradable and toxic to humans. People, also do not readily allow spraying inside the house as it causes inconvenience to them and the benefit is often not clearly perceived. Mosquitoes have developed resistance to insecticides due to their indiscriminate use. Therefore, emphasis needs to be shifted to other methods of vector control. Active surveillance has also not been sensitive enough to detect all cases of malaria. Many fever cases report to unqualified private practitioners in the village who do not give adequate treatment against malaria. Many poorly planned development activities create mosquito breeding environment. The problem of malaria is different in different parts of our country. The type of malaria, etiological factors, environmental factors, mosquito bionomics, people's behaviour, and outcome of disease are different in different parts of the country. But, unfortunately, the control programme is uniform and is planned centrally.

**3. National Malaria Control Strategy:** Recently a National Malaria Control Strategy (NMCS) has been drafted to supersede the MPO. Some of the features of the NMCS are :

- Decentralisation of malaria control including planning.
- Selective and sustainable vector control tailored to the local environment.
- Intersectoral coordination.
- Primary preventive responsibility of vector control to lie with the sectors/industries/projects responsible for generating malariogenic conditions, at their own cost.
- Strengthening of the surveillance system.
- Prediction and early detection of epidemics.
- Classification of endemic areas of the country into eight epidemiological types needing different approaches to malaria control.

## 7.4.2 National Tuberculosis Control Programme

The National Tuberculosis Control Programme (NTP) was started in 1962 with the aim of reducing tuberculosis problem in the country to such an extent that it ceases to be a public health problem. Prior to 1940s tuberculosis was treated by good diet, fresh air, and a life in sanitarium. Antitubercular drugs were discovered in the 1940s and 1950s. BCG vaccine was also introduced during the same time. The Tuberculosis Research Centre, Madras and the National Tuberculosis Institute (NTI), Bangalore were started in 1956 and 1959, respectively, to develop tuberculosis control strategies for the country. It was proved beyond doubt that domiciliary treatment was more cost-effective than hospital or sanitarium treatment. Therefore NTP was started with the strategy of treating patients nearest to their homes. The activities under the NTP are the following:

- 1) **Case finding:** It was observed in different studies that most tuberculosis patients are conscious of their symptoms and seek health care on their own. So, a passive case detection system is undertaken. Any person complaining of cough for more than 3 weeks duration (recently changed to more than 2 weeks duration); with or without chest pain, blood in sputum and fever is taken as a chest symptomatic. A sputum smear examination is done with the help of the microscope for all such chest symptomatics. This can be done at the nearest PHC. If sputum is positive for AFB then the person is diagnosed as a case of tuberculosis and treatment is started. If sputum is negative it may be repeated and if still negative the person is referred to the nearest centre having X-ray facility (usually a Community Health Centre or district hospital or District Tuberculosis Centre). Under the NTP tuberculosis is diagnosed as Sputum positive or X-ray positive or Extra-pulmonary.
- 2) **Treatment :** Early diagnosis and treatment is the most effective way of controlling TB. There are mainly two types of treatment regimens:
  - Short course chemotherapy (SCC):  
drugs used : INH + Rifampicin + Pyrazinamide + Ethambutol or Streptomycin for 2 months followed by INH + Thiacetazone for 6 months
  - Standard regimen (SR) :  
drugs used : INH + Thiacetazone for 12 months

All drugs except streptomycin are orally consumed preferably before breakfast on a regular daily basis. Streptomycin is an injectible drug. It must be remembered that the above mentioned regimens are the standard forms used at present, under the NTP. Other treatment regimens also exist. The drugs are supplied from the nearest PHC free of cost. Under the NTP priority is given to sputum positive cases. SCC is the ideal for all tuberculosis patients but because of scarcity of resources, SCC, which is costly, is given to only sputum positive cases. X-ray positives are given the SR. However, if the person can buy the drugs it is advisable to give SCC even for the X-ray positives, provided the treating physician is convinced that the person can buy drugs regularly. On starting treatment a TB card, containing identification particulars of the patient, the diagnosis, treatment plan and due dates of drug collection, is made for the patient. It is important to counsel patients at the start of treatment regarding: dates of drug collection from the hospital, need to continue treatment regularly and complete the regimen, and not to stop treatment but to report to the hospital in case of any drug adverse effects. Some common harmless side effects like red coloration of urine and other secretions due to rifampicin should be explained to the patient. The patient should also be advised to keep a handkerchief in front of the mouth during coughing and to collect the sputum in a container and burn it. In case the patient does not report for drug collection a reminding letter is sent to his address (first default action). In case he still doesn't report a visit is made to his house (second default action). If still there is no response he is declared as a defaulter. It is the work of the male health worker to motivate patients to complete treatment. It must be pointed out here that SCC has not yet been implemented in all the districts of the country although efforts are on. In such districts SR is the only regimen available free of cost to all patients.

- 3) **BCG vaccination :** This is part of the national immunisation programme. BCG vaccine's protective action against pulmonary TB is controversial, but it gives protection against the severe varieties of TB.

- 4) **Recording and reporting** : Particulars of patients treated under NTP are sent by the PHCs and other peripheral health institutions to the district tuberculosis centre (DTC) where a district TB index is maintained. Reports from different districts and states are sent to the office of the Director General Health Services, New Delhi and to the NTI, Bangalore. The NTI, Bangalore is responsible for monitoring the programme.

#### **District T.B. Programme**

The District Tuberculosis Programme is the backbone of the NTP. The District Tuberculosis Centre (DTC) is the nucleus of the district tuberculosis programme. All institutions engaged in TB case finding and treatment, other than the DTC are known as Peripheral Health Institutes (PHIs). PHIs are of three types: (i) X-ray centre, which has X-ray facilities, (ii) microscopy centre, which has only sputum examination facility e.g. PHC, and (iii) referring centre, which can only identify chest symptomatics and refer for investigation.

The tuberculosis problem in our country has not reduced inspite of having a control programme for the last four decades. The prevalence of tuberculosis now is the same as that in 1956 i.e. 1.5 to 2 percent, out of which 1/4th are sputum positive cases. We have only managed to decrease the proportion of patients who die i.e. the case fatality rate. In 1992, WHO, SIDA and ICMR reviewed NTP. Their salient findings were:

- Inadequate budgetary outlay and shortage of drugs.
- Undue emphasis on X-ray diagnosis and not on sputum examination. The latter is cheaper and identifies sputum positive cases who are infectious.
- Poor quality of sputum microscopy leading to missing of lot of cases.
- Emphasis on case detection rather than cure. The cure rate was found to be 30%. By starting treatment but not curing them we are contributing to drug resistance.
- Poor organisational set up and support for TB.
- Multiplicity of treatment regimens especially amongst the private practitioners.

Default has been a constant problem with tuberculosis control. After a few days of anti-tubercular treatment the person starts feeling better and the symptoms almost disappear. Thereafter he does not feel the necessity of continuing drugs. He no longer feels it worthwhile to go to the hospital and spend time at the hospital in getting the drugs. Discontinuation of treatment before the disease is fully cured leads to the emergence of drug resistant Tuberculosis. Increased drugs resistance and the advent of HIV has further worsened the situation.

In 1993 a Revised Strategy of National Tuberculosis Control Programme was launched in 5 pilot project areas. The salient features of the revised strategy are : (i) to achieve 90% cure rate of infectious cases through supervised SCC involving peripheral health functionary, (ii) Augmentation of case finding activities through quality sputum microscopy to detect atleast 70% of estimated cases, (iii) NGO involvement (iv) Improved Management Information System and (v) Operational Research.

Initial reports have shown significant results and the pilot project has been extended into second phase where 5 states and 10 cities will be covered.

#### **7.4.3 National Leprosy Eradication Programme**

Prior to 1955 anti-leprosy activities were primarily concerned with treatment of patients and organised by charitable missions and NGOs. The National Leprosy Control Programme (NLEP) was launched in 1955. To begin with, the programme did not have a clearly defined policy or operational objective. Only in 1980 leprosy control was accorded a high priority and included in the prime minister's 20 point programme. The prevalence of the disease was 57/10,000 in 1981. In 1983 the programme was renamed as National Leprosy Eradication Programme (NLEP) with a goal of eradicating the disease by 2000 A.D. The NLEP operates as a vertical programme with specially trained staff in endemic areas having a prevalence of more than 5 per 1000

population. Leprosy control units are established in such areas. In areas of endemicity less than 5 per 1000 population, leprosy services are provided by the general health services within the framework of the primary health care set-up. In these areas survey education and training centres (SET centres) are attached to the PHCs. The strategy of NLEP is as follows :

- (i) Early detection and regular treatment of patients.
- (ii) Provision of multi — drug therapy (MDT) to all patients.
- (iii) Education of patients, their families and communities about the disease and its curability.
- (iv) Rehabilitation of patients with a view to making them economically self-reliant and socially acceptable.

**Multidrug Therapy (MDT) :** Till 1982 treatment was based on only one drug- Dapsone. However, the resistance of the bacteria to dapsone became widespread making treatment increasingly ineffective . In addition, the long term and often lifelong treatment required with drug led to poor patient compliance and ineffective disease control in general. In 1982, MDT was started in the country to effectively shorten the treatment period and rapidly treat patients so as to break the chain of transmission. MDT consists of three drug Dapsone, Rifampicin and Clofazimine given for multi-bacillary leprosy for a period of atleast two years; and two drugs Dapsone and Rifampicin for paucibacillary leprosy for a minimum period of six months. Leprosy has been classified in different ways but from treatment point of view two types of leprosy needs to be distinguished : multibacillary and paucibacillary depending on number of bacteria present in microscopic examination of skin smears. By March 1998 the prevalence rate had come down to 5.3/10,000 population.

**Case detection :** In the past leprosy was a disease which was rarely self-reported because of social stigma. In recent years there has been increase in the proportion of leprosy patients who report to a health care setup out of their own volition. It indicates not only greater awareness of the disease but also a degree of confidence on the part of the community regarding the efficacy of available treatment and a reduction of social stigma. This passive method of case finding is supplemented by population surveys, school surveys, and contact surveys in areas of high endemicity. It is important to diagnose patients early and treat them effectively so as to reduce transmission of the disease to their contacts and to prevent occurrence of deformities.

BCG has been found to provide some cross-immunity against leprosy and the research is continuing to develop a specific vaccine against leprosy. However, with the absence of any effective primary preventive approach to date, such as an effective vaccine, MDT remains the sheet anchor of leprosy control. Because of the optimism that developed as a result of MDT, WHO in 1992, adopted a resolution to eliminate leprosy as a public health problem by the year 2000, and defined elimination as attaining a level of prevalence below 1 per 10,000 population. It is believed that when such low levels are reached the transmission of infection will be so minimal that the disease will eventually die out.

### Check Your Progress - 3

Notes: a) Space is given below for your answer

b) Check your answers with the ones given at the end of this unit.

1. Why default has been a major problem of T.B. Control?

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2. What is the technical failure of NMEP?

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3. What is MDT?

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### 7.4.4 National Filaria Control Programme

In 1949 a pilot project for control of filaria was started in the state of Orissa. On the basis of results of the pilot project the National Filaria Control Programme (NFCP) was launched in 1955. The strategy consisted of mass treatment of the population with Diethyl carbamazine citrate, DEC (the drug against filariasis), and recurrent anti-mosquito spaying operations. In 1960 the ICMR assessment committee observed that the programme was ineffective because of two chief reasons: (i) severe reaction with DEC in some apparently healthy microfilaria carriers. (Microfilarial carriers are those who have microfilaria in their blood but do not have any symptoms). (ii) development of resistance against insecticides in mosquitoes.

Therefore, the programme was modified. Mass treatment with DEC and anti-adult mosquito measures were abandoned. Recurrent anti-mosquito larva spray in urban areas was however continued. In 1970 the 2nd assessment made by the ICMR recommended treatment of microfilaria carriers and survey of un-surveyed areas. It further pointed out that antifilarial measures were also needed in rural areas. These recommendations were accepted by the government of India, but could not be implemented expeditiously.

Currently under the NFCP the following measures are undertaken :

1. Delimitation of the problem in hitherto unsurveyed areas.
2. Detection and treatment of clinical cases and microfilarial carriers with DEC (diethyl carbamazine). This is done by 198 filaria clinics in endemic areas throughout the country.
3. Control in urban areas through recurrent anti-larval measures undertaken by 206 control units in endemic areas.

During the 8th plan, it has been envisaged to detect and treat microfilaria carriers and clinical cases by "Detection cum treatment" units to be attached to the PHCs in rural areas of endemic states.

The other methods which are to be tried in rural areas are:

- (i) Low dose DEC mass treatment
- (ii) DEC medicated salt

DEC can be added to common salt (table salt) used for household consumption. Since salt is an universally consumed commodity, DEC thus can reach the entire population. Trials with DEC medicated salt have been successfully conducted in UP, Lakshadweep and Pondicherry. But progress in introduction of DEC medicated salt has been slow due to preoccupation with Iodine fortification of salt.

The NFCP has the following limitations :

- (i) The coverage till recently was mainly of urban areas.
- (ii) Filaria carrying mosquitoes have developed resistance against commonly used insecticides.
- (iii) Microfilaria carriers act as sources of filarial infection but they are difficult to identify. Identification can only be done by a blood test done late in the night (the parasite comes into the blood only during the night).
- (iv) The drug - DEC has no action on the adult parasite. It only kills the microfilaria which can again be reproduced by the adult parasite.
- (v) The drug - DEC sometimes causes severe reactions in microfilaria carriers.
- (vi) There has been no political commitment. No goals or targets have been set. This is because filaria does not kill people, and so, is not perceived by policy makers as an important health problem.

#### 7.4.5 National AIDS Control Programme Including Blood Safety and STD Control

AIDS has defied all efforts of health professionals and scientists to find an effective cure or vaccine against it. AIDS is not just a medical problem. It is vitally linked to other social and ethical issues pertaining to segregation, confidentiality, voluntary testing, legal rights, employment etc. which further compound the problem. Of preventive measures, the two most pragmatic approaches to this complex problem are to prevent and contain the spread of the human immuno-deficiency virus, through positive changes in risky sexual practices, and by stopping transmission through blood.

Realising the gravity of the situation, the National AIDS Control Programme which had been operational since 1987, was strengthened and consolidated in 1992. The programme is being funded through assistance from the World Bank by a soft loan of US \$ 84 million and technical assistance from the World Health Organization.

For an effective implementation of National AIDS Control Programme, a separate organization, the National AIDS Control Organization (NACO) was set up by the Ministry of Health and Family Welfare.

The National AIDS Control Programme has the following components :

##### (i) Programme Management

NACO is primarily involved in planning, consulting, implementing and monitoring the various activities under the project through the AIDS control cells at the state / UT level.

##### (ii) Behaviour Change through Information, Education and Communication (IEC)

The programme seeks to carry out intensive public awareness and community support through mass media and sustained dissemination of information and health education about HIV and AIDS to all levels and categories of personnel. Communicating about AIDS/HIV is extremely difficult as such communications necessitate discussion of sexual practices. To be effective such communications must be brought to a very personal level. Only if each individual examines his/her personal behaviour in the light of the AIDS epidemic and makes a positive behaviour change can any impact be made. Consistent messages from all channels mass media, traditional media, health care workers and inter-personal channels need to work in tandem to achieve this objective.

**Important messages to be communicated to the people should include :**

- The modes of spread of HIV/AIDS (mentioned in the earlier unit).
- The modes by which HIV/AIDS does not spread (e.g. by social contact, handshake, use of public toilets, mosquito bites etc.). This is important to prevent segregation or discrimination against AIDS patients.
- The need to have a single mutually faithful life partner after marriage and abstinence before marriage.

- If this cannot be followed then use of condom during sexual intercourse to reduce the risk of infection.
- Use of sterilised needles and syringes.
- Use of only HIV screened blood or blood products for transfusion purposes and discouraging blood donations by professionals (professional blood donors are often drug addicts and indulge in high risk sexual practices). They sell blood to earn money.
- Ear and nose piercing and tattooing should also be done with sterilised needles.
- Intravenous drug users are also prone to HIV infection because of the practice of sharing needles for drug injections. If they cannot give up their habit or can not use sterilised needles they should be asked to clean their needles with bleaching powder solution.

Every individual in the community is at risk of acquiring HIV infection but certain groups like sex workers, intravenous drug users, truck drivers, migrant workers etc. have a high risk. Therefore, special health education activities are needed for these target groups. But, care should be taken in designing the messages so that these groups are not blamed for spread of HIV/AIDS.

### (iii) Surveillance

HIV testing laboratories, designated as surveillance centres, located all over the country screen blood for HIV. The results of this surveillance activity have shown that HIV infection has reached almost all parts of the country and that heterosexual transmission is the major mode of spread. Now, it has been planned to have only a few selected "sentinel" sites for surveillance (sentinel surveillance) so that good quality data can be generated.

### (iv) Control of Sexually Transmitted Disease (STD)

The following is the relationship between AIDS and other STD:

- Predominant mode of transmission of both is sexual.
- Many of the measures for preventing sexual transmission of HIV and STD are the same.
- Many STD, particularly genital ulcer disease, significantly facilitate the acquisition and transmission of HIV.
- Trends in STD incidence and prevalence can be useful indicators of changes in sexual behaviour, are easier to monitor than trends in HIV seroprevalence and are therefore valuable for determining the impact of HIV/AIDS control programme.

A national STD programme has been in operation in India since 1946. This programme was based on STD clinics in Medical Colleges and in some district hospitals and other city hospitals. Most STD are curable, but unfortunately very few people seek treatment at the STD clinic. This is because people do not want to be seen attending a clinic which has a label "STD clinic" and where confidentiality and privacy are difficult to maintain. Therefore, it has now been planned to provide STD treatment facility at the primary health centre level. Health personnel are being trained to meet this objective. STD control now forms a part of the National AIDS Control Programme.

### (v) Condom Programming

Barring abstinence or limiting one's sexual relations to a monogamous, uninfected partner, the only other method to avoid infection during sexual intercourse is the proper and consistent use of an intact latex rubber condom. Thus, promotion of good quality, low cost condoms is essential.

The objective of the condom programming component is to ensure easy access to good quality, affordable and acceptable condoms. Condoms under the brand name "NIRODH" are supplied free of cost at government health facilities including PHC and

sub-centre. Condoms are also available on payment under the social marketing scheme and in the commercial market.

#### (vi) Blood Safety Programme

The blood safety programme is an integral part of the National AIDS Control Programme. The following activities are undertaken :

- Screening of all blood in blood banks for HIV, and use of only HIV negative blood or blood products for transfusion.
- Promotion of voluntary donation of blood.
- Modernization of blood banks
- Promotion of rational use of blood.
- Training and manpower development.
- Quality control

#### (vii) Reduction of Impact

HIV/AIDS victims are often discriminated against. Many lose their job and friends. No one takes care of them. To reduce the impact of HIV/AIDS the following needs to be provided.

- Maintaining confidentiality — the diagnosis should not be divulged without permission of the patient.
- Repeated counselling for (a) preventing transmission of HIV infection to others, and (b) providing psychosocial support.
- To ensure proper care and treatment.
- To arrange for home care with proper support and back up from the community and local health facilities.

### 7.4.6 Guinea Worm Eradication Programme

Guinea worm disease is transmitted through consumption of water containing Cyclops harboring the infective forms of the parasite. The adult female parasite in the human body migrates to the lower limbs, forms a blister underneath the skin which bursts on coming in contact with water and the larvae are released into the water. These larvae are taken up by cyclops and thus, the cycle continues. This disease is seen in areas where step wells and ponds are used as drinking water source.

The National Guinea Worm Eradication Programme was started in 1982. At that time the control techniques were available and Tamil Nadu had applied these techniques resulting in reduction of cases by 90%. Eradication of small pox had just been achieved leading the inspired health planners to think in terms of next candidate disease. 1981-90 had also been declared as the International Water Supply and Sanitation Decade. Thus the environment for the launch of the programme was perfect.

The programme had the following strategy:

- (i) Early identification of all cases through house to house search by health workers (Male and female).
- (ii) Management of all detected cases.
- (iii) Identification of unsafe drinking water sources and their regular treatment with temephos (insecticides against the infection carrying cyclops present in water). Unsafe drinking water sources are mainly step wells and ponds.
- (iv) Provision and maintenance of safe drinking water sources (e.g. piped water supply, tube well and covered well).
- (v) Health education — the key messages in health education were :

- Not to step into water source (to prevent contamination of water with larvae of the parasite).
- Filtering or boiling of water before drinking (to remove cyclops).
- Reporting of cases to health authority.
- Not to use step wells or ponds as a source of drinking water.

Guinea worm disease was a disease which could be controlled by :

- (a) identifying and treating all cases.
- (b) providing safe drinking water.

The identification of guinea worm disease is quite easy. The treatment is taking out the adult worm (which is long) slowly, day by day, wrapped on a piece of cotton, without breaking the worm. This is done by the trained health workers. Safety of drinking water is ensured by educating people not to step into water sources, by regular temphos treatment of potentially contaminated water sources, or by boiling / filtering water before consumption. The Rajiv Gandhi National Drinking Water Mission has been providing safe drinking water sources like tube wells, hand pumps and piped water supply.

The disease was endemic in seven states — Andhra Pradesh, Tamil Nadu, Gujarat, Karnataka, Madhya Pradesh, Maharashtra and Rajasthan. The Guinea Worm Eradication Programme was successful in making all the states, except Rajasthan, free of the disease by mid 1995. By the end of 1995, it was planned to eliminate the disease from the country. If progress continues at the same rate, guinea worm disease will soon be eradicated from the globe.

#### 7.4.7 Polio Eradication

Eradication of polio is to be achieved by 2000 A.D. The western hemisphere has already eradicated polio. According to the recommendations of WHO and experiences of countries which have eradicated polio, the following strategy has been worked out for polio eradication in India.

- (i) Strengthening of routine polio immunisation as done under the National Immunisation Programme, the emphasis being on increasing coverage to above 80% of infants in all parts of the country.
- (ii) Carrying out extra rounds of immunisation ("mop up rounds") in areas where cases have been occurring in the previous years.
- (iii) Holding of National Immunisation Days (Pulse Polio) where all children below 3 years of age are given polio vaccine of the same day throughout the country. The vaccination is done on 2 days every year separated by 4 to 8 weeks. It is usually held in winter season when transmission of polio is lowest.
- (iv) Having a sensitive surveillance system to detect polio cases. On detection of a polio case, all children below 3 years in the locality are given a dose of polio vaccine. This is known as containment immunisation.

#### 7.4.8 Control of Acute Respiratory Infections (ARI) and Diarrhoea

The diarrhoeal disease control programme was started during the sixth plan. The pilot projects for acute respiratory infection control programme were started in 1990. Both have been merged into the child survival and safe motherhood (CSSM) programme since 1992.

The ARI control component of CSSM programme consists of identification and correct case management of acute respiratory infections. Any child below 5 years complaining of cough or difficulty in breathing, and having an increased respiratory rate, is diagnosed to have pneumonia. If, in addition, there is chest indrawing or inability to feed, then a diagnosis of severe pneumonia is made. All children below 2 months of age suffering from pneumonia should be referred to a hospital. For children between 2 months to 5 years pneumonia can be managed at home, but if the child has severe

pneumonia he/she should be referred to a hospital. For those cases managed at home, cotrimoxazole is the antibiotic of choice. Steam inhalation is also helpful. For those who do not have pneumonia, steam inhalation and saline nose drops will suffice. The female health worker is trained in identification and correct case management of ARI.

The Diarrhoeal disease control component of the CSSM Programme is based on preventing or treating dehydration and thereby preventing deaths due to diarrhoea. It is mainly based on the promotion of Oral Rehydration Therapy (ORT). Children are especially prone to dehydration during diarrhoea. Features of dehydration are dryness of the mouth and tongue, sunken eyes, absence of tears and skin pinch going back slowly. The patient is irritable, thirsty and drinks eagerly. If the patient is not able to drink and becomes lethargic, a diagnosis of severe dehydration is made. All cases of severe dehydration are referred to a hospital for intravenous fluids. Dehydration which is not severe can be corrected at home by giving ORT to the child. Oral fluids given from the start of diarrhoea prevents dehydration. Oral rehydration salt packets are available free of cost at the PHC, subcentre of the village ORS depot. In the absence of ORS, sugar-salt solution (one glass water, 1 level teaspoonful sugar and one pinch salt) can be used. Any other home available fluid such as rice water, green coconut water can also be a substitute. To prevent dehydration the child should be allowed to drink  $\frac{1}{4}$  to  $\frac{1}{2}$  glass after each loose motion. Antibiotics are not required unless there is blood / mucus in stool or cholera is suspected. It is important to convince the mother that feeding of the child should not be stopped because of diarrhoea.

Diarrhoea in children can be prevented by :

- (a) Handwashing before meals.
- (b) Consumption of safe drinking water, hygienically prepared and stored food.
- (c) Promotion of breast feeding.
- (d) Discouraging bottle feeding. The bottle and nipple are difficult to clean so any top milk given to children should be given in spoon and bowl.

These messages should be emphasised during health education of mothers.

#### 7.4.9 Elimination Neonatal Tetanus

A target had been set to eliminate neonatal tetanus by the end of 1995. Elimination was defined as achieving an incidence rate of 1 or less per 1000 live births. The strategy consisted of :

- (i) Increased coverage with tetanus toxoid immunisation during pregnancy.
- (ii) Promoting clean delivery practices.
- (iii) Increasing the sensitivity of surveillance for neonatal tetanus.

For promoting clean delivery practices birth attendants (dais) are being trained in observing five cleans : clean hands, clean surface, clean cut (of cord using sterile new blade), clean tie (of the cord using sterile thread) and clean stump (nothing to be applied on the umbilical cord stump). Pregnant mothers are being provided with disposable delivery kits during the later part of their pregnancy. These kits contain one soap piece, 2 pieces of thread, one blade and a piece of gauze. All the contents are sterilised and packed into a packet. This kit is to be used during delivery.

Measures against neonatal tetanus are a part of the CSSM programme. The incidence of neonatal tetanus has considerably decreased in most districts of the country. But, measures directed against neonatal tetanus have to be sustained because tetanus spores are present in plenty in the environment.

#### 7.4.10 Kala-azar Control

Kala-azar is a serious health problem in Bihar and West Bengal. Following a resurgence in early seventies, about 36 districts of Bihar and 10 districts of West Bengal are affected by Kala Azar. In 1997 total cases and deaths due to kala-azar have been 17,429 and 255 respectively.

Kala-azar control activities are undertaken only in endemic areas. The strategy includes 3 major activities :

- (i) Interruption of transmission by reducing vector (sandfly) population. This is done by undertaking insecticide spraying operations twice a year.
- (ii) Early diagnosis and treatment of kala-azar cases.
- (iii) Health education for community awareness.

In 1950s and 1960s massive insecticide spray under malaria eradication programme drastically reduced the incidence of kala-azar. In 1970s incidence of kala-azar again started rising. Control measures specifically against kala-azar was started in 1977. Till 1990 the financial assistance for kala-azar control was being provided by the government of India out of the National Malaria Eradication Programme. From 1990-91, the assistance for kala-azar control has been provided separately.

The problem in control of the disease is that it is difficult to diagnose the patient and the drugs for treatment are costly.

#### 7.4.11 Control of Other Communicable Diseases

Besides the control programmes mentioned above various other communicable diseases are diagnosed and treated at the PHCs throughout the country. Patients who can not be treated at the PHCs are referred to the secondary level hospital (community health centres and district hospitals) or to Medical Colleges.

Hepatitis B and C which are chiefly transmitted through blood or blood products are diseases of public health importance in India. Blood for transfusion is routinely screened for Hepatitis B, but the screening for Hepatitis C is not yet available in most blood banks in the country. Vaccines against Hepatitis B are expensive and therefore, can not be recommended for the entire population. Research for developing cheaper vaccines are continuing.

Diseases transmitted feco-orally can be prevented by good personal hygiene, handwashing before meals, consumption of hygienically prepared and stored food and control of flies. Hookworm infection can be prevented by discouraging people to walk barefoot, specially in fields/areas used for open defecation.

In general, most diseases caused by virus do not have effective treatment. However, most (like chicken pox, mumps, rubella, influenza) are self-limiting disease. Treatment consists of preventing complications. Measles is a disease which can have fatal complications especially in a malnourished child. The major complication of measles are pneumonia and diarrhoea.

In general, most bacterial disease respond to appropriate antibiotics. But such antibiotics should be prescribed only by a qualified doctor.

Vector borne diseases can be effectively controlled by vector control measures. For preventing eye infections frequent washing of eyes with running water should be advised. Prompt treatment of eye infection will prevent further complications including blindness.

#### Check Your Progress - 4

Notes: a) Space is given below for your answers

b) Check your answers with the ones given at the end of this unit.

- 1. What are the important messages to be communicated to people on AIDS?

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2. What are the features of dehydration?

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## 7.5 SUCCESS, FAILURES, FUTURE GOALS AND PROSPECTS

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In our fight against communicable diseases we have succeeded in controlling a few and there is optimism for some diseases to be controlled in the future. However, we have failed in controlling a number of communicable diseases. Efforts are being made to identify reasons for failure and to overcome them in future.

The successes achieved are eradication of small pox, eradication of guinea worm disease and decrease in the incidence vaccine preventable diseases as a result of the National Immunisation Programme. The chief failures have been in controlling tuberculosis, malaria and filaria.

The requirements for a communicable disease control programme to be successful are :

1. Availability of cost effective intervention(s) against the disease.
2. It should be feasible to apply the intervention(s) throughout the country.
3. Clearly defined objectives, targets and goals for the control programme.
4. Development of scientifically and epidemiologically sound strategy to be followed for the control of the disease.
5. Decentralized planning of activities.
6. Strong and sustained National and International political as well as financial commitments.
7. Effective communication strategy so as to ensure full community participation in the programme. People should perceive the benefits of the programme and should feel the need to use the services provided under the programme.
8. There should be intersectoral coordination and involvement of Non Governmental Organisation (NGO).

### Future goals and targets

- (i) Eradication of polio by 2000 A.D.
- (ii) Elimination of neonatal tetanus by 2000 A.D.
- (iii) Elimination of leprosy as a public health problem by 2000 A.D.

Besides, there is hope for eliminating diarrhoea deaths, ARI deaths and deaths due to measles.

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## 7.6 LET US SUM UP

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Communicable diseases need to be controlled using appropriate interventions. In this unit we discussed about interventions that are available for control of communicable diseases. We described briefly the primary, secondary and tertiary levels of prevention. We learned about immunisation, the National Immunisation schedule and described the National Immunisation Programme in detail. We noted the important vectors and the environmental, chemical, biological and newer methods in vector control. We gave a brief account of the role of water, sanitation, personal hygiene and housing in

communicable disease control. We discussed about how to investigate an epidemic and initiate control measures.

We discussed the working of National Programmes for control of communicable diseases. We saw that after initial success in Malaria control there was resurgence of malaria. We listed the failure in the malaria eradication programme. We discussed the working of the modified plan of operation (MPO) based on stratification of areas on the basis of API. We noted the changes made in the National Malaria Control strategy. We described the National Tuberculosis Control Programme and noted that it is based on early detection and treatment. We identified the reasons for failure of tuberculosis control and listed the changes made in the revised strategy. We discussed about leprosy eradication programme emphasising on case detection and multidrug therapy (MDT) as the means of achieving it. We mentioned that filaria control activities, at present, were mainly restricted to urban areas and only recently rural areas have been targeted. We discussed in detail the AIDS control programme. We learned how, behaviour change through IEC and promotion of condom use can prevent HIV transmission. We also learned about important messages to be communicated to the community regarding AIDS. We noted that STD and AIDS are inter related. We mentioned in brief about blood safety programme. We discussed ARI and diarrhoea control as components of CSSM programme. We emphasized correct case management in ARI and oral rehydration therapy in diarrhoea. Next, we saw how guinea-worm disease is being successfully controlled. Thereafter, we noted the strategy to eradicate polio and eliminate neonatal tetanus. We also briefly described measures against Kala-azar and other communicable diseases. Finally, we listed out the successes, failures and future goals for communicable disease control.

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## 7.7 KEY WORDS

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- Health Promotion** : Health promotion means initiating necessary steps not only to prevent diseases but also to cure and arrest the occurrence of disease in the future. This includes not only medical care but also provision of facilities aimed at improving the living standard of the people (poor).
- Cold Chain** : Cold chain consists of a series of equipments used to store and transport vaccines at a requisite temperature from the manufacturer to the user.
- Intra-dermal** : In between the layers of the skin.
- Subcutaneous** : Below the skin.

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## 7.8 SUGGESTED READINGS

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## 7.9 MODEL ANSWERS

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### Check Your Progress - 1

1. For infants at the age of 6 weeks to 9 months.
2. Active immunisation takes place when the body's immune system takes active part in building up immunity against diseases. In active immunisation either the whole organisms (killed or attenuated) or a part thereof is generally used as a vaccine.

### Check Your Progress - 2

1. The vectors transmitting diseases are:
  - mosquito – malaria, filaria
  - Housefly – food born diseases
  - Sandfly – kala-azar
  - Rat flea – plague
  - Cyclops – guinea-worm
2. Gambusia is a kind of fish bred in stagnant water to eat away the mosquito larvae.
3. i) Investigation of epidemic  
ii) Initiation of control measures

### Check Your Progress - 3

1. Default is a major problem of TB control because after a few days of treatment the person starts feeling better and the symptoms almost disappear. Therefore, the patient does not feel the necessity of treatment.
2. The technical failure of NMEP was that the mosquitoes became resistant to insecticides.
3. Multi Drug Therapy (MDT) is a treatment given for leprosy. It consists of 3 drugs viz. (i) Dapsone, (ii) Rifampicin, and Clofazimine given for multibacillary leprosy for a period of at least two years.

### Check Your Progress - 4

1. Important messages to be communicated to the people should include :
  - the modes of spread of HIV/AIDS (mentioned in the earlier unit).
  - the modes by which HIV/AIDS does not spread (e.g. by social contact, handshake, use of public toilets, mosquito bites etc.). This is important to prevent segregation or discrimination against AIDS patients.
  - the need to have a single mutually faithful life partner after marriage and abstinence before marriage.
  - if this cannot be followed then use of condom during sexual intercourse to reduce the risk of infection.
  - use of sterilised needles and syringes.
  - use of only HIV screened blood or blood products for transfusion purposes and discouraging blood donations by professionals (professional blood donors)

are often drug addicts and indulge in high risk sexual practices). They sell blood to earn money.

- ear and nose piercing and tattooing should also be done with sterilised needles.
  - intravenous drug users are also prone to HIV infection because of the practice of sharing needles for drug injections. If they cannot give up their habit or can not use sterilised needles they should be asked to clean their needles with bleaching powder solution.
2. The features of dehydration are dryness of the mouth and tongue, sunken eyes, absence of tears and skin pinch going back slowly.



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# UNIT 8 ENVIRONMENTAL SANITATION AND HYGIENE

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## Structure

- 8.0 Aims and Objectives
- 8.1 Introduction
- 8.2 Basic Concepts
- 8.3 Sanitation in Ancient and Modern India
- 8.4 Major Environmental Sanitation Problems
- 8.5 Socio-cultural Factors in Environmental Sanitation and Hygiene
- 8.6 Measures for Improvement of Environmental Sanitation and Hygiene
- 8.7 Let Us Sum Up
- 8.8 Key Words
- 8.9 Suggested Readings
- 8.10 Model Answers

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## 8.0 AIMS AND OBJECTIVES

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This unit aims at familiarising you with the problem of environmental sanitation and hygiene, cultural notions and socio-cultural factors prevailing among rural communities of India including tribals and the measures for their improvement. After studying this unit, you will be able to:

- understand the concept of environmental sanitation and hygiene.
- enumerate the scenario of sanitation in ancient and modern India.
- discuss the major environmental sanitation problems.
- identify the perception, cultural notions and socio-cultural factors prevailing in rural communities and tribal populations about environmental sanitation and hygiene.
- suggest measures for improvement.

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## 8.1 INTRODUCTION

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Needless to say that the environment in which we live is changing rapidly. The reasons for such a change are solely related to the pursuit of development path based on meeting the greed of the rich against the needs of the poor.

The rapid degradation of our environment is increasingly becoming a threat to the survival of human beings. Among the major environmental hazards, water and air pollution form the major threat. While the poor economic status of the people, particularly those living in rural areas is responsible for their poor health status, the health problems caused by environmental pollution are more damaging and in some cases they are incurable. It has been pointed out that "poor environmental quality is estimated to be directly responsible for one-fourth of all preventable diseases in the world". The situation in India is even worse.

Against this back drop, an attempt is made in this unit to explain some of the basic concepts, the practices of environmental sanitation in ancient and modern India and some of the socio-cultural factors associated with it.

Let us begin this unit by knowing some of the basic concepts.

## 8.2 BASIC CONCEPTS

Some of the basic concepts we are going to discuss are (1) environment, (2) hygiene and (3) sanitation.

### 1. Environment

Man is constantly exposed to the various agents in the environment namely physical, biological, social and economic which largely affect the human life, development and behaviour in the society. In his physical environment, man is in contact with air, food, water, house, occupation etc. whereas, his biological environment includes animals, insects, parasites and other organisms. Social environment of man comprises of his family and social groups which influence his attitude, family life, mental and emotional activities. The economic environment of man includes his way of living and economic circumstances which largely determine his opportunities in life.

### 2. Hygiene

Hygiene is the science concerned with the maintenance health and embraces all factors which contribute to healthful living. Hygiene aims not only at preserving health, but also at improving it. The purpose of hygiene is to allow man to live in healthy relationship with the environment. Health is related deeply to life style which includes ways of living, personal hygiene, habits and behaviour. The personal hygiene includes all those personal factors which influence the health and well-being of an individual.

### 3. Sanitation

"Sanitation" refers to all conditions that affect health, especially with regard to dirt and infection and specifically to the drainage and disposal of sewage and refuse from houses (Franceys, Pickford, Reed, 1992). The term sanitation covers the whole field of control of the environment with a view to prevent disease and promote health.

Previously, sanitation was centered on the sanitary disposal of human excreta or the construction of latrines. Sanitation is the quality of living expressed in the clean house, clean neighbourhood and the clean community. At its first meeting in 1950, the WHO Expert Committee on Environmental sanitation defined environmental sanitation as a set of activities including the control of community water supplies, excreta and waste water disposal, refuse disposal, vectors of disease, housing conditions, food supplies and handling, atmospheric conditions and the safety of the working environment. Environmental sanitation seeks to control all the factors in the physical environment which exercise or may exercise a deleterious effect on his physical, mental or social well-being (WHO, 1952). It deals essentially with those measures which are found desirable for promoting optimal conditions for man's health and well-being (Ghosh, 1969).

#### • Sanitation and Health

Sanitation is now being replaced by environmental health. Environmental sanitary measures will reduce incidence of those diseases which are commonly acquired or transmitted through excreta, or conveyed to man by contaminated water-supplies, food or drink, or transmitted by vectors of diseases. The general improvement of environment will lead to economic gain and improve the way of living by controlling morbidity, with improvements in environmental sanitation, the expectation of life will progressively increase. The improvement of the hygienic condition will influence favorably the attitude of the people in better pattern of living which is so conducive to social development.

#### • Sanitation Needs

The basic sanitary need is the elimination of the gross causes of communicable diseases. These are usually insanitary water supply, contamination from human excreta and insect vectors of diseases. Therefore if we have to enjoy good environmental sanitation, what we perhaps need are the facilities for a) safe water supply; b) sanitary disposal of excreta; c) sanitary disposal of refuse; d) vector control; e) food sanitation; f) housing; g) control of diseases of animals communicable to man; h) control of air pollution, specially urban and industrial; and i) control of occupational hazards (WHO, 1954).

There has been considerable awareness of community water supply needs, but the problems of excreta and waste water disposal have received less attention. In order to focus attention on these problems a WHO study group defined sanitation as, "the means of collecting and disposing of excreta and community liquid wastes in a hygienic way so as not to endanger the health of individuals and the community as a whole (WHO, 1987). Hygienic disposal that does not endanger health should be the underlying objective of all sanitary programmes.

The need of a healthful environment is common to all people. Activities for the promotion of health through proper environmental sanitation represent a major community health programme. Health authorities in most parts of the world have recognised the importance of environmental sanitation as an important ally of public health. Sanitation programme has been integrated with other health and community activities.

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### 8.3 SANITATION IN ANCIENT AND MODERN INDIA

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India was known for its good sanitation practices. This is evident from some of the earlier historical sources.

#### 8.3.1 Sanitation in Ancient India

The basic elements of sanitation and good public health practices were present in ancient India as early as 3000 BC. These were corroborated by the excavations of Harappa and Mohenjodaro of Indus Valley Civilisation which showed relics of planned cities, the systems of drainage and other environmental sanitation measures (Ghosh, 1969). During the Vedic period, reference to various aspects of community sanitation were included in the Darshanas and Vedas. Ayurveda and Manu Sanhita contained several injunctions for the maintenance of sanitation, personal hygiene and prophylaxis for control of contagious diseases. The Great Ramayana and Mahabharata were found to contain several references to practices and principles advocated for the preservation of health in cities and towns. During the reign of Chandra Gupta Maurya (4th Century BC) it was observed that there was a well developed public health system of reporting diseases and the state was responsible for the maintenance of cleanliness and sanitation.

In Kautilya's Artha Shastra, references were found regarding sanitation, town planning, refuse and garbage disposal, disposal of dead bodies, prevention of nuisance etc. Valuable evidences of high standard of sanitation, soakage pits for disposal of wastes and sullage, construction of roads and other useful public works in the ancient city of Patliputra were observed from the edicts of Ashoka. Moreover, in the medieval period, the published poetical works of Bhasa, Kalidasa and Bhavbhuti showed several descriptions of the hygienic practices advocated for the prevention of diseases. Admirable sanitary arrangements such as provision of protected water supply by siphonic arrangements, "Pukka" drain for carrying away waste water etc. were found in the Hampi ruins of the seventeenth century in the era of Vijaynagar empire.

#### 8.3.2 Sanitation in Modern India

We have observed that India had good heritage of environmental sanitation programmes but the current sanitation practice of our country is very poor. India lags far behind many countries in environmental hygiene. There is hardly any sanitation in the villages where about 75 percent of the population lives. The village houses do offer some sort of shelter against sun and rain to dwellers, but majority of them have no latrines. Fields and grounds around tanks and ponds are used as open latrines. The soil is polluted. Mostly there is no protected water supply and no public cleaning. Open wells or ponds (with rotten leaves or other impurities) act as sources of drinking water. Due to want of arrangements for drainage and disposal of garbage, streets in villages are full of dirt and filth. Men and cattle live in close proximity, mosquitoes and flies swarm and rats around in the huts and hovels. Our towns which have grown up haphazardly without any proper plan, fare no better. Even in urban areas, quite good number of people lack protected water supply and amenities of sewerage system. Due to our poor environmental sanitation, we suffer most from the disease carried by filth. Gastro-intestinal disease like cholera, dysentery, diarrhoea, enteric group of fevers,

helminthic infestations, insect borne diseases like malaria, filaria and others continue to remain as our problem diseases. The Bhor Committee in 1944 while examining the unsatisfactory state of environmental sanitation recommended suitable housing, sanitary surroundings and a safe drinking water supply in order to maintain a healthy life.

Environmental Hygiene Committee in 1949 laid special emphasis on the provision of protected water supplies to the entire population under gradual extension plan with graded priorities. Social and cultural factors affecting environmental sanitation in Rural India were examined in depth in a conference held in September, 1956. In 1980, the UN declared the decade 1981-90 as the International Drinking Water Supply and Sanitation Decade and urged the member countries to achieve the goals of providing safe drinking water supply and adequate sanitation facilities to all the people by the year 1990.

The Government of India has designated the Central Public Health and Environmental Engineering Organisation (CPHEEO) of the Ministry of Urban Development as the nodal organisation to serve as the national coordinator and focal point in respect of activities concerning the Decade Programme (Shukla, 1988).

### Check Your Progress - 1

Note: a) Space is given below for your answer

b) Check your answers with the ones given at the end of the unit.

1. Define the following :

a) Physical environment

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b) Sanitation

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c) Environmental sanitation

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d) Hygiene

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2) Name in order of priority the four basic sanitation needs.

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## 8.4 MAJOR ENVIRONMENTAL SANITATION PROBLEMS

The major environmental sanitation problems in India are basically associated with four factors viz., water, air, housing and disposal of wastes. Let us examine each of them briefly.

### 8.4.1 Water

Water is essential for life. Provision of safe and adequate water for human population is a pre-requisite for good health. Ancient civilizations grew up along rivers and places where water was conveniently available. Excavations of Mohenjodaro in Indus river valley and Lothal near Bavla in Ahmedabad district reveal striking achievements in water supply and drainage (Kawata, 1963, Mahajan & Gupta, 1991).

From Sanskrit literature, it was observed that water treatment was done as early as 2000 B.C. Various methods were used for water treatment i.e. keeping water in copper vessels, exposing water to hot sunlight, filtering water through sand and gravel, boiling and dipping hot iron in water (Baker, 1949).

These findings and records reveal a progressive past which was buried in the intervening years. Present day India shows a great lack of adequate and safe water supply. The environmental Hygiene Committee (1949) reported that only 16 percent of India's towns and 6 percent of the rural population have protected water supplies. In 1955, Delhi witnessed one of the most severe infectious hepatitis epidemic which was caused by contamination of water of the river Jamuna. In 1954, the National Water Supply and Sanitation programme was launched by the Government of India as an overall part of the National Health Plan, but achievements in this direction are quite slow. Only 77.7 percent urban population and 31 percent rural population in India was estimated to have safe drinking water supply in 1981 (D'souja, 1985). Safe or wholesome water is defined (Steel, 1960) as one which is pleasant to taste, free from harmful chemical substances, free from pathogenic micro-organisms and usable for domestic purposes. India, being a signatory of the UN deliberations and committed to its goals, launched the water supply and sanitation decade programme in the country on 18th April, 1981, with a view to achieve by 31.3.91. 100 percent urban water supply and rural water supply, 80 percent urban sanitation and 25 percent rural sanitation (low cost sanitary method of disposal). Water supply and sanitation should go hand in hand for healthy living of the community. In India, 60 percent of the diseases can be eliminated by providing clean drinking water to the people. Moreover, nearly 80 percent of the diseases can be cut down by safe water and sanitation facilities.

However, the spread of water borne diseases is on the rise. The State's efforts to contain such diseases have not yielded the desired results. In the urban and rural areas water contamination is a common problem. Pollution of major rivers caused by industrial effluent has become a major threat to India.

While access to safe drinking water and sanitation have proven to be essential to good health and while the availability of water is a requisite for socio-economic development, there also exists a cause and effect relationship between water, health and development. Participants at the United Nations Conference recognised that these three elements form a complex system which will decide the course of future events. Provision of sufficient amount of good quality safe water is now recognised as one of the most important activities of the public health. The drinking water should be cool

and clear, pleasant to taste, free from pathogenic organisms, should not be corrosive and should be free from undesirable physiological effects. Let us see some of the stark realities of health problems related to unsafe drinking water.

1. "Ground water in eight out of sixteen districts of West Bengal contain arsenic. It causes skin abnormalities and thickening of the skin of the palm and sole"  
Down to Earth  
Sept. 30, 1998
2. "Water and sanitation related diseases of the alimentary tract constitute 60 to 80 percent of illness in India".  
Down to Earth  
Sept. 30, 1998

#### 8.4.2 Air Pollution

"More than one person dies every hour due to air pollution in Delhi".  
(Down to Earth, Sept. 30, 1998).

Air pollution is a growing menace to health throughout the world. Air pollution sources may be classified into four broad categories : a) Industrial processes-emission of chemicals into air from chemical and metallurgical industries, oil refineries, fertilizer factories etc.; b) Combustion - burning of coal, oil and other fuels in houses and in factories adds smoke, dust and sulphur dioxide to air; c) Motor Vehicles - through their exhausts, they add to air carbon monoxide, hydrocarbons, nitrogen oxides, lead etc.; d) Miscellaneous e.g. burning of refuse, insecticide sprays in agriculture, nuclear energy programme etc. also contribute to air pollution.

##### Indicators of Air Pollution

The best Indicators of the general level of air pollution are sulphur dioxide, smoke index, suspended particles. Besides, the air content of carbonmonoxide, nitrogen oxide, lead and various oxidants is also used as an index of air pollution.

##### Effects of Air Pollution on Health

"A World Bank study on India estimated that, in 1991-92, some 40,000 people died prematurely due to air pollution caused only by high levels of poisonous gas in the ambient air of 36 Indian cities."

Epidemiological studies have shown that a sudden increase in air pollution has often been associated with immediate increase in mortality and morbidity. Conjunctivitis, dermatitis, chronic bronchitis and lung cancer are due to irritants and carcinogens in smoke and other pollutants. Smoke also adversely affects plants and animal life.

#### 8.4.3 Housing

Housing is part of the total environment and to some extent is responsible for the status of man's health and well-being. Besides 'physical structure' housing also includes the immediate surrounding and the related community services and facilities. The WHO prefers to use the term "residential environment" which is defined as the physical, structure that man uses and the environs of that structure including all necessary services, facilities, equipment and devices needed or desired for the physical and mental health and the social well-being of the family and the individual (WHO, 1971).

Although light, air and space are available in villages and small towns, there is no organised plan for housing. People live in dark, ill ventilated, damp and overcrowded houses built back to back. Most houses are without bathroom or latrine. This is no provision for smoke outlet. Waste water, cowdung, refuse accumulate inside and outside of most houses where flies and mosquitoes breed creating lot of unhygienic surroundings. Poor housing in villages is due to ignorance, poverty, traditions, fear of theft and dacoity, apathy and indifference. Similar haphazard planning is also observed in many old towns and cities. Overcrowded, ill-ventilated and unhygienic housing are

all directly related to increase of morbidity and mortality. They also have indirect effects on mental and social health.

Improper and inadequate housing facilities accentuates indoor air pollution. "Recent estimates of the premature deaths in India from indoor air pollution exposures range from 500,000 to two million per year".

(Down to Earth, Sept. 30, 1998)

#### 8.4.4 Disposal of Wastes

Wastes constitute an important part of the environment of man. Standard of public health largely depends on the efficiency with which all waste products of the community are collected, removed and disposed of. The main waste products of community living are refuse or solid waste, human excreta or night soil and sullage. The term 'refuse' is applied to all solid waste from human habitation and includes public refuse and industrial refuse. The term "litter" is sometimes used in place of refuse for solid waste in rural areas. Excreta or night soil denotes faeces as such. The sullage water containing night soil is called sewage. Sullage comprises all liquid wastes including industrial waste but excludes night soil. (Mahajan and Gupta, 1991).

The methods for disposal of waste are different in rural and urban communities. In villages, methods followed are based on tradition, socio-cultural factors, simplicity and economy. But in urban areas, sanitary measures are enforced by municipal laws.

##### 1. Refuse Disposal

In order to maintain environmental sanitation, refuse is to be disposed properly. Various methods used are dumping on vacant land, sanitary filling or controlled tipping (refuse covered with a layer of earth) incineration or burning, disposal into the sea or rivers, composting (combined disposal of refuse with human or animal excreta forming a good organic manure (compost) for agricultural purposes).

The choice of the method to be adopted for the refuse disposal is generally determined by the local conditions and availability of resources.

##### 2. Excreta Disposal

Human excreta is a source of infection and is an important cause of environment pollution. Safe disposal of excreta is of paramount importance for health and welfare and also for the social and environmental effects it may have in the communities involved. It is of primary importance in any community to make suitable arrangements for the collection, removal and disposal of excreta.

A WHO expert committee on the Prevention and Control of Parasitic Infections (WHO, 1987b) stressed that "the provision of sanitary facilities for excreta disposal and their proper use are necessary components of any programme aimed at controlling intestinal parasites. In many areas, sanitation is the most urgent health need and those concerned with the control of intestinal parasitic infections are urged to promote inter - sectoral collaboration between health care authorities and those responsible for the provision of sanitation facilities and water supply at the community level".

The health hazards of improper excreta disposal are : soil pollution, water pollution, contamination of foods, propagation of flies. The faeces may contaminate food either directly or through fingers, flies, water or soil. The aim of safe excreta disposal is to provide a "Sanitation Barrier" between faeces and man (Park and Park, 1991). In simple terms, this barrier can be provided by a sanitary latrine and a disposal pit. The more elaborate scheme envisage installation of sewerage system and sewage treatment plants. A sanitary latrine should be so constructed that there should be no chance of soil pollution or contamination of water (surface and ground water) nor any exposure to flies and no offence to senses of smell or sight. It should be cheap, easy of construction by local labour with minimum of locally available material, it must be acceptable to the people, it should not involve manual handling of excreta, it should involve the use of very small amount of water, it should be hygienic and sanitary and should not lead to environmental pollution. Villages in India present most difficult problems for the collection and disposal of excreta. Very few village houses have any latrine. The villagers can be induced to put up latrine in their houses if there is good community

leadership, backed by an organisation for technical services. There should be proper health education and community awareness about the use of latrine in usable condition. A cheap and clean latrine will generally create public interest and acceptance. A latrine can be of service type or non-service type. In the service type, manual labour is employed for transport of excreta from the latrine to the place of disposal, basket type of latrine (conservancy method). The method, though unhygienic and unsocial is still used in the country.

In the Non-service type (Sanitary Latrines) there is no employment of manual labour. The disposal of excreta is made either in situ transported by water carriage system to the point of disposal. The various types of sanitary latrines in unsewered areas include : Bore hole latrines, Shallow Pit latrine, Hand flush water seal latrines (Poor flush latrine or PF latrine), Aqua Privy, Septic Tank etc.

The sewered areas consist of water-carriage or sewerage system areas and sewage treatment. The sewerage system implies collecting and transporting of human excreta and waste water from residential, commercial and industrial areas by a net-work of underground pipes called "Sewers" to the place of ultimate disposal.

### 3. Sullage Disposal

Wastes water from houses etc. unmixed with solid excreta is usually known as sullage. In towns and cities, sullage water is disposed either in the sewer system or by the surface drainage system. The problem arises in village where there is no proper arrangement for disposal of sullage water. To avoid haphazard water collections and problems of fly and mosquito breeding, the sullage water can be disposed through construction of Soakage Pits which dispose of waste water by absorption into porous soil on a small scale. It is the cheapest and simplest sanitary method of disposal of waste water in village. Septic Tank and Surface Irrigation-sullage water may be used for irrigation of kitchen gardens.

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## 8.5 SOCIO-CULTURAL FACTORS IN ENVIRONMENTAL SANITATION AND HYGIENE

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The status of rural sanitation presents a complex picture. While some rural areas display good sanitation practices, it is not so good in other areas. This is because of the prevalent socio-cultural practices. In this section therefore, let us briefly analyse some of the factors determining rural sanitation with special reference to tribal communities.

### 8.5.1 Socio-cultural Factors

It has been observed that social and cultural traditions of any community are of significance for the development of environmental sanitation. The value system determines the broad response of the community to the welfare programmes. Moreover, the specific beliefs and practices do influence the response of the community to the various components of the programme. One of the major reasons for the relative low subscription of people to domestic or community hygiene and sanitation is said to be related to the cultural notions of people or social groups. The community Compost Pits Programme, for example did not catch up in several place of Gujarat mainly due to the high caste cultural notions of work that, "only low caste people or servants should / can carry the domestic refuse out through the streets into the community composite pit". (Durga Prasad, 1989).

There is essentially no recognition of the fact that there is a short circuit between the faeces of an unhealthy person and the mouth of a healthy person. There are very few places where individual or communal action is regularly taken to keep well or tank water free from contamination. However, it would be unfair to say that the village people do not care for health and sanitation. But their understanding of the laws of health and sanitation is limited and mixed up with their concepts of ritual purity and pollution. Though there are other factors influencing the socio-cultural practices of environmental sanitation in the rural areas, it is good to know some of them. For instance, they consider faecal matter as something which they should not even look at but they leave it exposed to flies and to the sight of others. The sight and handling of night soil has polluting effect. They prefer field defecation which is linked with the

healthy habit of an early morning stroll. This practice obviates the necessity of latrine construction. Field defecation provides group relaxation for women. They walk to the outskirts of the village or to the nearby field or bushes in small groups and talk about problems of their daily life. They consider it essential to clean the meal mug (lota) very thoroughly with clay after using its water for toilet. But few ever give thought to the current practice in some Indian village of dipping the soiled mug and the bucket etc. into the well or the pond from where they take the drinking water. Water is considered to be one of the most important purifiers in the sanitary as well as the ritual sense. In some parts of India, people take bath every time after defecation. But very few ever bother to maintain the purity of water itself. Some villagers never take bath after sunset believing that this causes various kinds of illness. Neither do they ever bath with warm water. In certain parts of the country people do not like to take food with the clothes which they had on when defecating. They consider these clothes unclean but look upon the cleaning of clothes with soaps as an unnecessary luxury. A large number of villagers do not use any water at all in cleaning the buttocks after defecating. Rather, they apply handfuls of earth from the ground along side. The soiled hands are also not properly washed. There is a very strong prejudice against using the common toilet seat or even using any seat at all. The latrine is a critical area of pollution fears. They rub the brass utensils used for cooking to a polished glaze, but do not mind sharing their cooked food with flies and insects.

The habit of eating out of common utensils and smoking from the same hubble bubble are common among Muslims for they believe that it promotes affections and cordial relations and is a symbol of common brotherhood (Hasan 1967). Among Hindu Castes only wife take her meals in the same utensils in which her husband has taken his and she does this without washing the utensils. The habit of eating out of common utensils and smoking from the same hubble bubble are unhygienic and increase the chances of transferring infections from a sick individual to a healthy person. In short, absence of knowledge about germs carriers of infection and disease causation and their abject poverty are at the root of the unhygienic practices. Improvements in the standard of living and programmes of health education may help village folk in cultivating hygienic habits.

### 8.5.2 Environmental Sanitation in Tribal Communities

The tribal population groups of India, known to be the original people of the land, form about 8 percent of the total population of India (Basu, S. 1974). These tribal groups who inhabit widely varying ecological and geoclimatic conditions (hilly, forest regions, desert, coastal areas etc.) in different concentration throughout the country are distinct biological isolates with characteristic cultural and socio-economic background. Tribal groups are homogeneous, culturally firm, have developed strong magico-religious health care system and they wish to survive and live in their own style. The concept of health, disease, treatment, life and death among the tribes is as varied as their culture. Tribal society is guided by traditionally laid down customs to which every member is expected to conform. Available folklores may provide the model for appropriate health and sanitary practices in a given eco-system. The widespread poverty, illiteracy, malnutrition, absence of safe drinking water and sanitary living conditions, poor maternal and child health services, ineffective coverage of national health and nutritional services have been traced out in several studies as possible contributing factors for dismal health conditions prevailing among the various tribal groups in different parts of India.

The pattern of environmental sanitation among different tribal groups has been found to be very poor. Despite abundance of space, tribal houses are found to be small, built up of mud/stone walls with thatched roof devoid of proper ventilation e.g. Muria, Maria, Bhattra and Halba tribes of Bastar; Bhils; Bhillas of Jhabua Dhar District of M.P. There is no concept of ventilation existing among the tribes. In some tribes like Bhils, Bhillas, the dwelling hut consists of a single room where men and animals stay together under one roof. Due to the absence of ventilation the whole family is exposed of the toxic fumes from the hearth and the hut is extremely dirty and unhygienic.

Among the Bastar tribes the enclosures for animals are made within the household compound which leads to poor environmental sanitation. During rainy season, it becomes a breeding ground for mosquitoes and leads to spread of malaria.

The source of water and specially drinking water among many tribes has been found from the ponds ditches, wells, rivutts etc. where all kinds of ablutions and animal washings are performed. The drinking water is thus most unhygienic and contaminated. It has been further observed that some Bastar tribes as a taboo do not take water from the hand pumps which have been dug by the Government Agencies. There is no drainage system in tribal villages. In Jaunsari villages, the sullage water comes out of the house through a small hole and accumulates in a pit dug outside the house. In and around the villages a number of small pits are noticed which are good breeding places for flies and mosquitoes. Malaria is an endemic problem in Bastar District. Latrines are not provided in most tribal houses and villages. Men and women go for defecation purpose to the forests, hills, near streams, water falls, river banks etc. Some tribes like Bhils are observed to use stones or leaves for cleaning after defecation instead of water. The habit of defecation in the open is one of the factors responsible for different types of diseases as infection may be conveyed through bare feet from such places and this maximise the possibility of insects such as flies carrying infections into the house.

There is poor awareness about personal hygiene in many tribal groups and the most affected group is the tribal children. Taking bath, changing clothes, use of soap for washing etc. are not common among the tribal groups. Bhil men and women are averse to take bath for few days or even months. Instead, all of them just prefer to wash the upper part of their torso and the legs. The middle portion is thus left unclean. The reason for not taking complete bath as explained by Bhil tribal people is that a dirty body will ward off evil spirit and prevent sickness. It was further observed that the dirtiest of all houses of the Bhil village usually belonged to the local magico - religious healer. Strangely enough among the Bhil men, women and children of Jhabua and Dhar Districts of Madhya Pradesh, the practice seems to be based on mythological tradition. The practice of cleaning teeth regularly is found to be missing among other tribal groups like Gondas of M.P. and jaunsaris of Jausar - Bawar (Uttar Pradesh).

It has been observed that many tribal groups plant certain types of shrubs strongly against insects. Instead of going for insecticides, these shrubs can be planted since they would not adversely affect the environment and may be more helpful to preserve the ecological balance.

While learning to know some of the practices of sanitation among tribes we must also remember that the practices of people living in urban are still worse. For example, the industrial pollution caused by the rich affects everyone. This is despite the higher educational level of the rich owning industries.

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## 8.6 MEASURES FOR IMPROVEMENT OF ENVIRONMENTAL SANITATION AND HYGIENE

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The problem of rural sanitation has been most neglected. Very little has been done over the year (ICSSR-ICMR, 1981), most village people live in primitive sanitary condition. Some of the good traditions have died and no other facilities have been introduced to take their place. Concerted efforts are required to tackle the environmental sanitation in rural areas. First of all, necessary awareness should be developed among the rural people about the need and urgency of sanitary surroundings. Only through this awareness, the process of acceptance can be accelerated. Any design for the improvement of sanitation in the villages should be such that it fits with the local traditions and customs. It should be with the economic means of an average villager and its' maintenance should be simple. The necessary equipment should be cheap and locally available, within easy reach and technical know-how simple and easily understandable. It is necessary to create right from the start an alternative model wherein the emphasis would be on self help and community participation. For instance, cleanliness of villages should be attempted by allocation of responsibilities to village families and by ensuring their proper discharge through health education and supervision. Proper health education of the rural perople is pre-requisite for the improvement of rural sanitation.

In India, fly-borne diseases are the most formidable health problems in the rural areas. Surveys in community development blocks in states point out that quite a significant percentage of mortality is due to gastro-intestinal disease like cholera, enteric fever, diarrhoea and dysentery. For more details refer to unit 5 of Block 2 which gives an account of such problems in rural India.

To control these diseases, it is necessary to provide a barrier between the diseases producing organism in infected excreta and the susceptible hosts, the human population. The barrier, a latrine, will prevent fecal matter from coming in contact with man or with his food or drinking water. But the disposal of night soil is a major technical problem for the improvement of rural sanitation. A variety of techniques, new and easy to use, should be evolved for the disposal of night soil to suit the needs of different groups of people in a given locality. The possibilities of digesting night soil with animal dung to produce better manure should be explored. Attempts need to be made for much greater use of animal dung for producing gas and manure.

Prevention of disease and preservation of health depends to a large extent upon the environment in which people are born and grow. Lasting protection against diseases can be achieved only by protected water supply and hygienic disposal of human excreta, by ensuring that food is prepared and consumed under hygienic conditions without being contaminated by flies and carriers, and by reducing chances for rats to live in close proximity to man (Report, 1949). Lasting results cannot be achieved if good housing is neglected. The effect of a hygienic environment are more lasting, though perceived more slowly. People in cities and towns are becoming more conscious of the fact that a favourable environment is not merely an aid to health but a fundamental birthright of every citizen. The consciousness will play a large part in raising the standard of living of the people. The education of the public will be an important factor in setting up the pace of implementation of plans.

The World Health Organisation expert committee on Environmental Sanitation (1950) strongly recommended that the basic steps towards the provision of a safe environment in rural areas should include (a) provision of safe drinking water; (b) provision for sanitary disposal of human excreta; and (c) control of insects and animal vectors of diseases in areas where they are of significant importance. The other problems of rural sanitation are housing, drainage, disposal of refuse and animal waste.

The environmental Hygiene Committee (1948-49) appointed by the Union Government was the first agency of its type charged with an overall assessment of countrywide problems in the entire field of environmental Hygiene. The Committee recommended a comprehensive plan to provide safe water supply and adequate sanitation services for 90 percent of the population within a period of 40 years. The task of achieving the decade targets is of great magnitude and calls for careful planning and programming. The selection of projects for providing water supply and sanitation service must be realistic and determined by the resources available, commensurate with the minimum needs of the population to be served. The project should serve the maximum population at appropriate service levels with minimum investment (Sukla, 1988). Concepts of low cost and appropriate technology suiting local conditions will play a crucial role. Onsite sanitation with a pour flush (PF) two pit latrine popularly known as Sulabh Shauchalaya is acceptable and affordable by the majority of population and easily available. Pour flush latrine is recommended for villages, small town and urban slum areas where there is no underground drainage. It should be realised the "Health for all" can not be achieved unless the people are fully oriented with sanitary practices in their daily life. The stress on awareness building needs to be strengthened to use it as the most powerful tool to promote sanitation. The awareness creation and motivational activities need to be supported by a concurrent development of low cost technology as well as effective community based hardware delivery systems. Availability of low cost options would allow people to choose what suits them best depending upon their affordability and cultural practices.

### Check Your Progress - 2

Note: i) Write your answers in the space given below.

ii) Check your answers with the one given at the end of the unit.

1. Fill in the blanks

- a) The term ..... is some times used in place of refuse for solid waste in rural areas.
- b) The sullage water containing night soil is called.....
- c) Combined disposal of refuse with human or animal excreta forms a good manure called.....
- d) Sanitation barrier is between man and.....
- e) Pour flush latrine is ..... seal latrine.
- f) More than one person..... every hour in Delhi due to ..... pollution.
- g) One of the major causes of premature deaths in India is ..... pollution.

Activity 1

Visit a tribal community and observe the practices of environmental sanitation.

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## 8.7 LET US SUM UP

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Environmental sanitation seeks to control all the factors in the physical environment which exercise or may exercise a deleterious effect on his physical, mental or social well-being. Hygiene is the science of health and embraces all factors which contribute to healthful living. The basic elements of sanitation and good public health practices were present in ancient India as early as 3000 BC as corroborated by the excavation of Harappa and Mohanjodaro of Indus Valley Civilisation. But the current sanitation practices of our country are very poor specially in rural areas.

The major environmental sanitation problems are water, air pollution, housing, disposal of wastes. The problem of rural sanitation has been most neglected. The pattern of environmental sanitation and hygiene among different tribal groups in India has been found to be very poor. Tribal society is guided by traditionally laid down customs to which every member is expected to conform.

Necessary awareness should be developed among the rural people including tribals about the need and urgency of sanitary surroundings. Any design for the improvement of sanitation in villages should be simple, cheap, locally available and fits with the local traditions and customs. Pour flush latrine is found to be acceptable in villages, small towns and urban slum areas. It has been observed that social and cultural traditions of any community are of significance for the development of environmental sanitation. The understanding of the village people of the laws of health and sanitation is limited and mixed up with their concepts of ritual purity and pollution. Programmes of improvement of rural sanitation are best implemented by mobilising local communities through manual and unskilled labour.

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## 8.8 KEY WORDS

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<b>Sanitation</b>	:	Refers to all conditions that affect health, especially with regard to dirt and infection and the drainage and disposal of sewage and refuse from houses.
<b>Hygiene</b>	:	The science of health and embraces all factors which contribute to healthful living.
<b>Refuse</b>	:	This includes all unwanted or discarded waste material arising from house and streets and from commercial, industrial and agricultural activities of man.
<b>Excreta or Night Soil</b>	:	It implies faeces as such.
<b>Sullage</b>	:	It is also called waste water or slop water and comprises all liquid wastes including industrial waste but excludes night soil.

<b>Sewage</b>	:	The sullage water containing night soil is called sewage
<b>Composting</b>	:	This is a method for combined disposal of refuse with human or animal excreta. The resulting product, called compost, is a good organic manure for agricultural purposes.
<b>Sanitation Barrier</b>	:	The barrier between faeces and man, can be provided by a "sanitary latrine" and a disposal pit.
<b>Bore Hole Latrine</b>	:	It is a narrow pit or hole (30-40 Cm. Diameter) to a depth of about 6 m. A pucca masonry work is made near the top to support the squatting plate.
<b>Shallow Pit Latrine</b>	:	It is about one meter in depth and 0.5 to 1 meter wide with a wooden squatting place. Night soil has to be covered with loose earth.
<b>Pour Flush or PF</b>	:	The hand flush seal latrine is basically <b>Latrine (Hand flush seal latrine)</b> a pit latrine with the provision of a water seal. It is simple, cheap, sanitary, recommended for villages and needs at the maximum 1-2 litres of water per user.
<b>Aqua Privy</b>	:	A small septic tank for family use where there is no water seal near the squatting plate.
<b>Basket latrine</b>	:	The night soil from latrines is collected by sweepers in buckets and is emptied into night soil carts which carry the excreta to night soil depot.
<b>Septic Tank</b>	:	A water tight masonry tank in which anaerobic digestion occurs within the tank.
<b>Sulabh Shauchalaya</b>	:	It is a handflush water seal latrine and is essentially an improved version of the RCA latrine having a pit size of about one cubic meter, widely used in rural and urban slum areas.

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## 8.9 SUGGESTED READINGS

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## 8.10 MODEL ANSWERS

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### Check Your Progress - 1

1.
  - a) Physical Environment: It normally includes air, food, water, house, occupation etc.
  - b) Sanitation: Refers to all conditions that affect health, especially with regard to dirt and infection and the drainage and disposal of sewage and refuse from houses.
  - c) Environmental sanitation: A set of activities including control of community water supply, excreta and waste water disposal, refuse disposal, vectors of diseases, housing conditions, food supplies and handling, atmospheric conditions and the safety of the working environment.
  - d) Hygiene: Science of health and embraces all factors which contribute to healthful living.
2. The four basic sanitation needs in order of priority are :
  - i) Safe water supply
  - ii) Sanitary disposal of excreta
  - iii) Sanitary disposal of refuse
  - iv) Vector control.

### Check Your Progress - 2

1.
  - a) The term *litter* is some times used in place of refuse for solid waste in rural areas.
  - b) The sullage water containing night soil is called *sewage*.
  - c) Combined disposal of refuse with human or animal excreta forms a good manure called *compost*.
  - d) Sanitation barrier is between man and *facces*.
  - e) Pour flush latrine is *hand flush* seal latrine.
  - f) More than one person *dies* every hour in Delhi due to air pollution.
  - g) One of the major causes of premature death in India is *indoor air* pollution.

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# UNIT 9 REPRODUCTIVE AND CHILD HEALTH PROGRAMME (RCH)

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## Contents

- 9.0 Aims and objectives
- 9.1 Introduction
- 9.2 Maternal and Child Health: Current Scenario
- 9.3 Reproductive and Child Health Programme
- 9.4 Policies and Schemes to Support Reproductive and Child Health
- 9.5 Let Us Sum Up
- 9.6 Key Words
- 9.7 Suggested Readings
- 9.8 Model Answers

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## 9.0 AIMS AND OBJECTIVES

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Children and women are the most vulnerable section of our society. This unit aims at giving you a comprehensive understanding of the interventions aimed at increasing child survival and promoting safe motherhood.

After reading this Unit, you will be able to:

- state the maternal and child health situation in India using commonly used indicators.
- describe the RCH programme with its child survival and safe motherhood components.
- critically appraise the national family welfare programme.
- outline the policies and schemes of the government to support maternal and child health.

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## 9.1 INTRODUCTION

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Mothers and children constitute a significantly large proportion of the population. This group is exposed to the risk of child bearing in case of mothers and growth, development and survival in case of infants and children. If mothers remain healthy, they have healthy babies. Healthy children become healthy adults. Thus, it is of paramount importance that this group gets all the care it needs.

In this unit, we shall first learn about the maternal and child health situation of the country. In the process, we will become familiar with some of the commonly used indicators in maternal and child health. Then we will discuss the RCH programme along with all its components. We will also critically review the family welfare programme. Thereafter, we will go on to outline some of the policies and schemes of the government to support maternal and child health.

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## 9.2 MATERNAL AND CHILD HEALTH: CURRENT SCENARIO

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In order to present the current status of maternal and child health (MCH) let us first see the percentage of mothers and children to the total population.

## 9.2.1 India's Mothers and Children

India is the second most populous country in the world holding about 16% of the world population. Out of the 846.3 million people (1991 census) about 40% are children below 15 year of age. Women in their reproductive age group (15-45 years) constitute about 22% of the population. Thus, together they constitute 62% (almost 2/3) of the population. By virtue of their numbers, mothers and children become the major consumers of health services in India. During the period of childhood and reproductive age of women, they are prone to special types of health problems which can often be life threatening. Many of these health problems may affect both mother and the child, because they are closely associated. Therefore, this large group of the population is a 'high risk group' requiring special care.

India, at present is in a stage of the demographic cycle where both the fertility and mortality rates are falling but the births exceed the deaths, therefore, the population is growing. It has been observed in many countries that decline in mortality rates (especially child mortality) is a pre-condition for decline in fertility rates. Several mechanisms connect lower child death rates to lower birth rates. First, the physiological factor: an infant death means the end of breast feeding, an important "natural contraceptive". In the absence of any other method of birth planning, a new pregnancy becomes more likely. Second, the replacement factor; the death of a child prompts many couples to "replace" the loss by a new pregnancy sooner than would otherwise have been the case. Third, the insurance factor: when child death rates are high, many parents compensate for the anticipated loss of one or more of their children by giving birth to more children than they actually want. Fourth, the confidence factor: empowering parents with today's child survival knowledge helps build the confidence which is a crucial factor in the acceptance of family planning.

## 9.2.2 Indicators of Maternal and Child Health

We will now discuss the situation of maternal and child health in the country using commonly used indicators.

### 1. Mortality rates

- **Infant Mortality Rate (IMR):** This is the probability of dying between birth and exactly one year of age. It is calculated as the number of deaths of infants under one year of age per 1000 live births. In 1951, the IMR in India was above 140. In 1981, this figure had come down to just above 100. It further declined to 79 in 1992 when the CSSM programme was launched. In 1995, the IMR for the whole country was 74 per thousand live births. Whereas the IMR in both rural and Urban area has declined over the years. It has declined to a greater extent in the urban area than in the rural area. The IMR in 1995 in rural areas (82 per 1000 live births) is nearly double the IMR in urban areas (45 per 1000 live births). There is a lot of inter-state variation within the country. Kerala has the least IMR of 13 whereas Orissa and Madhya Pradesh are at the other extreme with IMR of 110 and 106 respectively. Four states, Uttar Pradesh, Madhya Pradesh, Bihar and Rajasthan, account for more than 50% of infant deaths in India. Neonatal mortality rate is the probability of dying within the first month of life and it is responsible for 62-70 percent of infant mortality. IMR has been brought down to 71 by 1997.
- **Under-five Mortality Rate (U5MR):** This is the probability of dying between birth and exactly five years of age. It is given by the number of deaths of children under five years of age per 1000 live births. Trends in U5MR tend to parallel those in infant mortality. The U5MR in India has declined from 236 per thousand live births in 1960 to 177 in 1988 and 109 in 1993. Of the 25 million children born in India every year, close to 2.7 million die before completing five years of age. Of these, nearly two-thirds, or close to 2 million children, die before reaching the age of one, almost the same number that died in 1961. That the same number of infants die in India today as they did 30 years ago is, to a large extent the result of a growing population despite the consistent decline in birth rates and infant mortality rates. People tend to limit their family size only when they have confidence that their children are going to survive. If child survival is low, people go on producing children in the hope that a few may survive to adulthood.

- **Maternal Mortality Rate (MMR):** Maternal Mortality Rate is defined as the number of maternal deaths per 1,00,000 live births. Maternal death is the death of a woman while pregnant or within 42 days of termination of pregnancy, from any cause related to or aggravated by the pregnancy and its management. Systematic data regarding maternal mortality in India does not exist, The National Family Health Survey (1992-93) estimated a maternal mortality rate of 420 per 1,00,000 live births for the country as a whole. The rural MMR (431) was 13% higher than the urban MMR (380). The UNICEF estimates that close to 1,25,000 women die in India each year from causes related to pregnancy and childbirth. It estimates a MMR of 453 per 1,00,000 live births at the national level. The maternal mortality for Kerala is estimated to be only 87. But, the so called 'BIMAROU' (Bihar, M.P., Assam, Rajasthan, Orissa, U.P.) have MMR ranging from 470 to 740. Amongst the causes of maternal mortality in India, the most common cause is hemorrhage (excessive bleeding) either before delivery during delivery or after delivery which account for 24% of maternal deaths. The other common causes are toxemia (15%), abortions (12%) and sepsis (8%).

## 2. Fertility Rates

**Birth Rate (Crude Birth Rate):** It is defined as the number of live births per thousand estimated mid-year population. In 1960, India had a birth rate of 43. By 1997 this had come down to 27.2 per thousand population. The rural India birth rate in 1992-93 was 30.7 compared to the urban area birth rate of 14.3.

**Net Reproduction Rate (NRR):** It is the number of daughters a newborn girl will bear during her lifetime assuming fixed age specific fertility and mortality rates. The present level of NRR is about 1.4. NRR of 1 is the target to be achieved by 2006 A. D. NRR of 1 is equivalent to attaining approximately the 2 child norm.

**Couple Protection Rate (CPR):** This is the percentage of 'eligible couples' effectively protected against child birth by one or the other approved methods of family planning. 'Eligible couples' refers to currently married couples wherein the wife is in the reproductive age group (15-45 years). CPR in 1998 was 45.4. The target of NRR=1 can be achieved only if CPR is at least 60%.

The above mentioned indicators have given us some clue to know the current status of maternal and child health.

### Check Your Progress - 1

Notes a) Space is give below for you answers

b) Check your answers with the ones given at the end of this unit.

1. What is the percentage of children and women?

.....  
.....  
.....  
.....  
.....

2. According to UNICEF estimates how many women die every year due to causes related to pregnancy and child birth?

.....  
.....  
.....  
.....  
.....

3. How does child survival lead to decline in birth rates?

.....  
.....  
.....  
.....

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### 9.3 REPRODUCTIVE AND CHILD HEALTH PROGRAMME

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In our country, women in the reproductive age group and the children constitute about 40% of the total population. In order to improve the health of the mothers and the children a number of programme activities have been undertaken by the Department of Health and the Department of Family Welfare from time to time. In the following section we will discuss the evolution and the components Reproductive and Child Health Programme.

#### 9.3.1 Evolution of the Reproductive and Child Health Programme

The Universal Immunization Programme was launched in 1986 and was highly successful. Under this programme a regular contact was established with the mothers and young children for the purpose of immunization. These immunization sessions formed a strong platform for the regular meeting of the health care delivery personnel and the mothers and the children. It was also observed that when the mothers went for the Tetanus Toxoid immunization they were also accompanied by their children, particularly the under five children. Therefore the immunization sessions were converted into mother - child protection sessions and other interventions for the child survival and safe motherhood were delivered through them as a single package.

During the Seventh Plan period, the Maternal and Child Health (MCH) programme was initiated. The activities aimed at improving the health of the mothers and children were a part of this programmes.

During the Eighth Plan period, in the year 1992, the MCH programme was renamed as Child Survival and Safe Motherhood (CSSM) programme and was supposed to be implemented in a phased manner over the next 5 year period.

However, in 1994, the International conference of Population and Development in Cairo recommended that the participant countries should implement unified programme for reproductive and child health. The concept of reproductive and child health is the evolution of a integrated approach for the programme aimed at improving the health status of the women and children by providing need- based, client oriented, high quality services to the beneficiaries.

Thus during the Ninth Plan, in the year 1997, the CSSM programme was reassessed and evolved as the Reproductive and Child Health (RCH) programme. The RCH programme incorporates the components under CSSM Programme. Besides these it also includes two additional components related to reproductive tract infection (RTI) and sexually transmitted infection (STI). The various components of RCH are explained below.

#### 9.3.2 Child Survival Component

Following are some of the special components related to child survival.

##### 1. Essential new born care :

A new born infant needs care for establishing and maintaining vital body functions such as respiration, temperature and nutrition in the first few days of life. Appropriate care immediately at birth is crucial for prevention of an unfavourable outcome and serious sequelae. The components under the essential newborn care are the following:

**i) Recording birth weight of all newborns and care of low birth weight babies:**

Low birth weight babies are specially prone to develop hypothermia or infection. Any baby weighing less than 2500 gms at birth is called low birth weight. A baby weighing 1800 to 2500 gms can be managed at home but requires special care. A baby weighing less than 1800 gms has to be referred to a hospital. To record birth weight the dais are being trained and provided with a colour coded spring balance in their delivery kits. A reading in the red area corresponding to low birth weight. The colour coded scales have an advantage as they can be used even by an illiterate person.

**ii) Resuscitation of asphyxiated babies:**

Normal babies cry spontaneously at birth. For babies who do not cry spontaneously at birth (birth asphyxia) resuscitation is a life saving intervention. All levels of health care personnel are being trained in resuscitation of a asphyxiated newborn. The steps consist of suction and airway clearance, tactile stimulation assisted ventilation through resuscitation bag and mask or through endotracheal tube, external cardiac massage, emergency medication and oxygen.

**iii) Prevention of hypothermia:**

The temperature regulation mechanism in a newborn is poorly developed. Therefore, the newborn is prone to hypothermia (rectal temperature less than 36°C) as well as hyperthermia (rectal temperature more than 39.5°). However, hypothermia is more common and can go undetected so it is more important. Hyperthermia is usually reported by the mother as fever but hypothermia may not be noticed by the mother. A low birth weight infant is particularly susceptible for hypothermia. Hypothermia in the newborn can be prevented by the following interventions.

- Newborn should be wiped dry immediately after birth and wrapped in a clean dry cloth (which can be pre-warmed in winter). In winter, a blanket may be necessary.
- The room where the baby is kept must be about 26 to 28°C or warm enough for an adult to feel just uncomfortable. The room should be free from draughts of air.
- "Rooming in". This is the practice of keeping the baby with the mother. The mother's body temperature warms up and maintains the baby's body temperature and also the baby can be breast-fed on demand.
- Newborns with birth weight less than 1800 gms should be placed under a source of radiant heat (radiant warmer or a lamp with a 200 watt bulb placed 45 cm above the baby).
- Do not bathe the new born soon after birth. Instead wipe the new born with a soft moist cloth to keep him/her clean.

The newborn's temperature can be judged by placing the dorsum of the hand on the baby's abdominal skin. If the skin feels cool, confirm if infant is hypothermic with a thermometer. In case of hypothermia rectal temperature (temperature of the rectum) measured by a rectal thermometer is more useful because temperature at the armpits may sometimes show a false high reading. However, rectal thermometer should be used only by a trained personnel otherwise it may lead to rectal perforation.

In case of hypothermia the baby should be immediately referred to a hospital. Hypothermia is usually associated with hypoglycemia (low blood glucose level) and hypoxemia (low oxygen level in blood) therefore along with warming of the baby (by radiant heat) intravenous glucose infusion and oxygen may also be required.

**iv) Prevention of infections:**

Newborns are not only susceptible but also succumb quickly to infections. The risk of infection is higher in low birth weight infants. Infections in newborn can be prevented by the following :

- TT immunisation of the mother during antenatal period which prevents tetanus infection in the newborn.
- Observing clean delivery practices. It has been decided to train all traditional birth attendants in clean delivery practices. Clean delivery emphasises : "5 cleans".
  1. Clean hands (for the birth attendant)
  2. Clean surface (on which delivery is to be conducted)
  3. Clean blade (sterilised or new blade to cut the umbilical cord)
  4. Clean tie (sterile pieces of tie for the umbilical cord)
  5. Clean stump (nothing to be applied on the umbilical cord stump of the baby)

(It must be noted here that in the past cowdung was applied to the umbilical cord stump in the rural areas of many parts of the country. This had led to a high rate of infection in the newborn. Fortunately, this practice is not seen at present).

- After birth the baby should be handled only after washing hands. Too many people should not handle the baby and persons with respiratory infection, skin infection or diarrhea should not handle the baby.

**v) Exclusive breast feeding for the first four months:**

A common source of infection is the pre-lacteal feeds and water that is given to the child in many parts of the country. A normal baby breast feeding adequately does not need any kind of food or water for the first four months. During this period, the baby should be exclusively on breast milk. Water is required only in case of diarrhea. Here, it must be mentioned that normal breast fed babies pass stool frequently, especially between the 3rd to 10th day of life. These stool are generally golden yellow in colour and do not require any kind of treatment. As such a baby being exclusively breast fed is highly unlikely to have diarrhea. A frequent complaint of mothers is regurgitation of the feeds soon after breast feeding. This can be prevented by asking the mother to burp the baby against her shoulder and only then to put the baby to bed. It has been observed that in India women breast feed their children upto an average of two years of age. Although breast feeding should continue beyond 4 months it is not enough for the growth of the child. Therefore weaning (introduction to food other than breast milk) should start after 4 months of age. First of all top milk is introduced. The milk should be undiluted and fed by a spoon. Feeding bottles should not be used as they cannot be cleaned properly and might lead to diarrhea. Later, gradually other semi-solid food are introduced. This is followed by introduction of solids. By 1 year of age the child should be taking whatever is cooked in the house for others.

Under the "Baby Friendly Hospital Initiative" (BFHI) the government of India is promoting hospitals to encourage exclusive breast feeding. Guidelines for encouraging exclusive breast feeding have been laid down. Any hospital following these guidelines is given a "baby friendly hospital" status.

The "Infant Milk Substitute, Feeding Bottles and Infant Foods (Regulation of Production, Supply and Distribution) Act" was passed in 1992 with a view to the protection and promotion of breast feeding and ensuring the proper use of infant foods. The Act prohibits advertisement of infant milk substitutes and feeding bottles and also prescribes measures to ensure that in the marketing of infant milk substitutes no impression is given that the feeding of these products is equivalent to, or better than, breast feeding.

Breast milk is a wholesome and complete food for the infant during the first 4 months of life. It not only provides nutrition but also prevents infection in the baby. Breast feeding also decreases fertility by delaying the return of the menstrual cycle after delivery. Breast feeding should be started within 1 hour of birth and frequent suckings on demand should be ensured. It is important to give the first milk after delivery (colostrum) which is yellowish in colour and rich in substances called antibodies which prevent infections in the baby. The wrong practice of not giving colostrum to the baby has decreased considerably. But in many parts of the country this practice is still

continuing. Frequently one comes across complaints of failure to produce breast milk. However, true failure of lactation is very rare.

**vi) Referral of the sick child:**

The mother should be educated to look for the 'danger signs' and when they appear the baby should be immediately brought to the hospital.

These signs include :

- refusal of feeds
- increased drowsiness
- cold to touch
- difficult or rapid breathing
- abdominal distension
- convulsion or stiffness
- persistent vomiting
- deep jaundice

**2. Immunisation:**

Immunisation is a highly effective intervention against the six vaccine preventable killer diseases of childhood namely.

- diphtheria
- pertussis (whooping cough)
- tetanus
- polio
- measles
- childhood tuberculosis



Prior to 1985 immunisation activities were implemented as the Expanded Programme of Immunisation (EPI) but the coverage levels achieved till 1985 were only about 20-40% because the implementation of the programme lacked the thrust and support required to achieve high coverage levels within a limited time frame. In 1986 the Universal Immunisation Programme (UIP) was started and it was considered as one of the technology missions of the government of India. At the inception of this programme, in 1985-86, vaccine coverage levels ranged between 29% (for BCG) and 41% (for DPT) but by 1997-98 the coverage levels have been 96% and 90% respectively.

The Universal Immunisation coverage of 27 million pregnant women and 25 million infants, annually, is one of the most important interventions under the Child Survival and Safe Motherhood Programme. The immunisation schedule is as follows:

<b>Immunisation Schedule</b>	
<b>For pregnant women</b>	
*	Early in pregnancy : TT 1st dose
*	One month later : TT 2nd dose
[Note : In case two doses of TT were given during previous pregnancy within past 3 years then only one dose (booster) is required.]	

**For Infants**

* At 6 Weeks	:	BCG	)
	:	DPT 1st dose	)
	:	OPV 1st dose	)
			between 6 wks to 9 months
* At 10 weeks	:	DPT 2nd dose	)
	:	OPV 2nd dose	)
* At 14 weeks	:	DPT 3rd dose	)
	:	OPV 3rd dose	)
* At 9 months	:	Measles	
* At 16-24 months	:	DPT & OPV boosters	
* At 5-6 year	:	DT	

[Note : for institutional deliveries BCG is to be given at birth and dose of OPV (known as 0 dose) is also to be given at birth]

The vaccines

- TT - Tetanus toxoid. In pregnancy it is given to prevent neonatal tetanus in the baby
- DPT - Diphtheria, Pertusis and Tetanus.
- DT - Diphtheria and Tetanus.
- BCG - Protects against the severe forms of childhood tuberculosis.

OPV is the only oral vaccine in the UIP, the rest are injectables.

These vaccines are given by the health workers male and female either by domicilliary visits or at a fixed site on a fixed day basis. The fixed site fixed day approach is preferred. The date of vaccination is entered into the mother and child immunisation card which is given to the mother. DPT vaccination is commonly followed by fever for 1 or 2 days which subsides on its own. The worker is expected to explain this to the mother and also to give paracetamol tablets for reducing emperature. The mother is also told not to apply anything to the BCG vaccination site. Vials of vaccine opened for an immunisation session is not re-used for subsequent session.

**Cold chain:** The cold chain is a system of transporting and storing vaccines at recommended temperatures from the manufacturer to the point of use. It is essential to maintain the potency of vaccines. OPV is the most heat sensitive vaccine and loses its potency rapidly on exposure to high temperatures. The cold chain consists of Walk-in-coolers, Deep Freezers, Ice-lined Refrigerators (ILR), Cold Boxes and Vaccine Carriers, Each Primary Health Centre should have one deep freezer and one ice-lined refrigerator. OPV and Measles are stored in the deep freezer under sub-zero temperatures whereas DTP, DT, TT and BCG are stored in the ILR between 2-8° C. The health workers carry the vaccines to the immunisation site using vaccine carriers which are lined by ice packs.

Among the childhood vaccine preventable diseases polio has been targeted for eradication, neonatal tetanus has been targeted for elimination.

**Polio eradication**

For eradication of polio by 2000 A.D. the following strategy is being followed :

- Strengthening routine immunisation
- Conducting National Immunisation Days (NID) which is otherwise known as PULSE POLIO
- Conducting special rounds of vaccination known as 'MOP UP ROUNDS' before the transmission session in areas where cases have occurred in the past year.

- Increased surveillance for polio cases followed by investigation of each case and CONTAINMENT IMMUNISATION.

### Neonatal tetanus elimination:

Neonatal tetanus had been targeted for elimination by 1995. By elimination it was meant that the incidence should come down to less than 1/10,000 live births. Although data is not yet available there are indications that this target has been achieved in many areas of the country. The strategy for neonatal tetanus elimination is mainly based on:

- TT immunisation during pregnancy
- Conduction of clean deliveries by trained attendants
- Increased surveillance for each case of neonatal tetanus

### 3. Appropriate management of diarrhea

The diarrheal disease control programme was started in 1978. Since 1985-86, with the inception of the National Oral Rehydration Therapy (ORT) Programme, the focus of activities has been on strengthening case management of diarrhea for children under the age of five years and improving maternal knowledge related to use of Home Available Fluid (HAF), use of ORS and continued feeding. From 1992, the programme has become a part of the CSSM Programme.

**Oral Rehydration Therapy (ORT):** The deaths due to diarrhea occur because of dehydration. Only diarrhea with blood or mucous requires antibiotic treatment. But all other diarrheal episodes need increased fluid and electrolyte intake to match the loss of these substance in stool. This can be done by the mother at home by giving the child home available fluids like sugar salt solution, soup, dal water, rice water etc. The most simple and effective HAF is the sugar salt solution which can be made by adding one tea-spoon sugar and one pinch of salt to one glass of water. The child should be given from this each time the child passes stool, the idea being to replace approximately a little more than the volume lost in stool. Oral Rehydration Salt (ORS) is available free of cost from all primary health centres and subcentres. According to the programme each villages (specially the one that do not have subcentres) should have an "DRS depot" with a volunteer from the village. Besides the free supply of ORS they are also marketed under the special marketing scheme at subsidised rates. The standard ORS packet is meant for one litre of water and is to be used within twenty four hours once reconstituted. It is also important to maintain nutrition and if the child is on breast milk it should be continued. If ORT is started early in diarrhea hospitalisation is not required. Only about less than 10% of diarrhea may develop severe dehydration needing hospitalisation and intra-venous fluids. Signs of sever dehydration are:

- drowsiness or unconsciousness
- no urination
- rapid feeble and sometimes impalpable pulse

The mother should be educated about these signs so that they can rush in the child to the hospital as soon as the signs develop.

### 4. Appropriate management of Acute Respiratory Infections

Acute respiratory infections along with diarrhea are responsible for about a 1/2 to 2/3 of all under-five deaths. Majority of the deaths due to ARI can be prevented if early medical intervention is done. Under the CSSM programme, the health workers are being trained in the diagnosis and treatment of pneumonia. The diagnosis of pneumonia is based on counting of respiratory rate. A resting respiratory rate greater than 60/min, 50/min and 40/min in the respective age groups of 2 months, 2 months to 1 year and 1 year to 5 years is diagnosed as pneumonia. Further if chest indrawing (movement of the lower chest inwards during inspiration instead of moving outwards as in a normal child) is there then the disease is labelled as severe pneumonia. Along with it if there is inability to feed, cyanosis (blue colouration of the body) convulsion, or strider then a diagnosis of very severe disease is made. All cases of sever pneumonia and very severe disases as well as any pneumonia in a child less than 2 months need admission in a hospital but a case of plain pneumonia can be treated at home. For this the health

worker (female) are being trained to administer antibiotics (Septran tablets). The mothers should also be educated to count respiratory rate and to recognize other signs of severity of the disease so that immediate medical help can be sought.

### 5. Vitamin A prophylaxis:

Vitamin A deficiency leads to night blindness, bitot spots (chalky white foamy lesions on the conjunctiva of eye), drying of the cornea of eye and corneal ulceration leading to blindness. There is also evidence suggesting that vitamin A prevents infections specially respiratory infections. Vitamin A is found in green leafy vegetables, fruits like papaya and mango. For non-vegetarian fish is a good source of vitamin A.

An estimated 1 to 5 percent of children under 3 years of age have signs of vitamin A deficiency. Under the CSSM programme prophylactic doses of concentrated vitamin A is given orally to children under 3 years of age. The recommended doses and timings are as follows :

- 1st dose of 1 ml of Vitamin A (i.e. 1 lakh units) at 9 months with measles vaccination.
- Thereafter 2ml of vitamin A (e.i. 2 lakh units) every 6 months upto 3 years of age.

Any child with complains of night blindness or signs of Vitamin A deficiency should be given 2 doses of Vitamin A (each dose consisting of 2 ml) one month apart.

### Check your Progress - 2

Notes: a) Space is given below for your answer.

b) Check your answers work the ones given at the end of this unit.

1. Mention any two strategies for child survival and safe motherhood.

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2. Define hypothermia

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3. What is "rooming in"?

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4. What are the 'danger signs' for referring the sick child to the hospital?

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### 9.3.3 Safe Motherhood Component

Under the current RCH programme the major interventions include.

a) essential objective care, b) emergency objectives care, c) 24 hrs delivery services at PHC/CHC, d) referral transportation to deserving families through Panchayat, e) facilities for medical termination of pregnancies, f) prevention of reproductive tract infection and g) birth spacing and limiting family size.

#### A) Essential objective care

##### 1. Antenatal Care:

Appropriate care during pregnancy goes a long way in ensuring not only safe motherhood but also a healthy baby. Under the RCH programme the following services are provided during pregnancy :

- **Early registration** of pregnancy by the female health worker preferably between 12 to 16 weeks of gestation. The pregnancy should be registered as a 'High risk pregnancy' if there is any factor which could adversely affect the pregnancy. These factors include four or more pregnancies in the past, pregnancy wastage in earlier conceptions, any associated systemic or gynecological disease, any complications during the present pregnancy, teenage pregnancies, pregnancy occurring after 35 years of age, previous child less than 2 years of age, height less than 145 cm, underweight mother, severe degree of anemia etc. such pregnancies require special care and institutional deliveries.
- At least 3 **antenatal checkups** preferably timed so that the first checkup is before 20 weeks, the second is at 32 weeks and the third at 36 weeks. The lady should be encouraged to visit the nearest health setup more frequently, especially during the third trimester of pregnancy.
- Appropriate doses of **TT immunisation**
- Administration of at least 100 tablets of folifer (containing iron and folic acid) during the pregnancy. The folifer tablets are supplied free of cost by the government. As prophylactic therapy the tablets should ideally be started at registration of pregnancy and consumed throughout the pregnancy and lactation at the rate of one tablet a day. Those having anemia usually require two tablets a day.
- Promotion of safe delivery at home or at an institution, Disposable Delivery Kits (DDKs) for home delivery are to be made available. These kits contain a blade, two pieces of tie, two pieces of gauge, and a piece of soap pre-sterilised and packed in a polythene packet. The DDKs are given to the mothers during the last trimester of pregnancy. This packet is to be used by the birth attendant in case of a home delivery.
- Deworming with mebendazole tablets in areas where prevalence rates of hook worm infestation are high. (hook worm can lead to anemia).
- **Early detection of complication and referral**
- Education of mothers regarding increased food intake during pregnancy, preparation for exclusive breast feeding, motivation for family planning, self identification of complications and clean delivery practices.

##### 2. Natal care:

This component of RCH programme is more relevant for the states of Assam, Bihar, Uttar Pradesh, Orissa, Madhya Pradesh and Rajasthan where most of the deliveries are

still conducted at home in unclean environment. Thus causing high motherhood morbidity & mortality (Annual report of MHFW 98-99).

This refers to the care provided during delivery. It consists of conduction of all deliveries under 'clean' conditions by trained personnel, promotion of institutional deliveries specially for the high risk pregnancies and prompt management of obstetrical emergencies.

Since home deliveries account for more than 70 percent of the deliveries it has been decided in policy to train all traditional birth attendants so that **all deliveries are attended by trained personnel**. An intermediate goal is to have at least one trained dai in each village. The training is usually done at community health centre but it can also be done in a PHC if adequate number of deliveries are being conducted in it. After training the dais are provided with a delivery kit.

Nearly 16% if all pregnancies are high risk pregnancies. They require special care during delivery. All such high risk pregnancies should be encouraged to deliver in a hospital. Under the programme an effort is also being made to **promote institutional deliveries** as far as possible.

It was also realised that lack of accessible specialised health care facilities contributed to a large extent to the high rates of maternal mortality. It was observed that most of the complicated deliveries are referred late by the dais. The PHCs do not have operation theatres, gynecologists or blood transfusion facilities. It is also difficult to get a fast means of transportation from a remote village to the nearest town for specialised health care, especially at night. It must be pointed out here that in case of post-partum hemorrhage the patient may even die within an hour. A timely blood transfusion is life saving in such situations. Similarly an obstructed labour needs an operation theatre. Therefore, it has been decided to establish subdistrict level health care facilities known as **First Referral Units (FRUs)** for providing **emergency obstetric care**. The FRUs will be established per district. The idea is to provide specialised health care facilities which are more accessible to the people. The existing health facilities with operation theatre and sanctioned posts of gynaecologists are being taken up on priority so that the FRUs could be made functional in a relatively short period of time by filling up vacancies, training personnel, supply of basic and essential equipment and minor renovations and repairs where required. Assistance in setting up FRUs is being given on a priority basis to the so called BIMAROU states where the MMR is 2 times higher than the national average. There are however two areas of concern - firstly, in remote rural areas where FRUs are most needed, living conditions may not be conducive for filling up of vacancies of sanctioned personnel, especially female medical officers; secondly, it may not be feasible to provide blood banks to these FRUs because the government may not be able to provide HIV testing kits to all FRUs and whether untested blood can be transfused to save patient's life will remain an ethical question.

3. **Post natal care:** Provision of 3 post natal care to monitor the post natal recovery of the women and to detect complications which would need appropriate referral.
- B. **Emergency Obstetrics care:** This is an important intervention as complications of pregnancy are not always predictable. Under the RCH programme the FRUs will be strengthened through supply of drugs in the form of Emergency Obstetrics Drugs Kits, equipment kits and skilled manpower on contractual/hired basis.
- C. **24 hours delivery services at PHC/CHC:** To promote institutional deliveries provision has been made to give additional honorarium staff to ensure round the clock delivery facilities at health centres. This is to ensure that at least one nurse/medical officer is available at the health centre at any time during the day/night.
- D. **Referral Transportation to deserving families through Panchayat:** In order to deal with obsteric emergencies, where death of the mother often occurs due to lack of delay in the referral facilities, provision has been made to assist referral of indigent families in 25% of sub-centres in selected states. The selected States are Madhya Pradesh, Uttar Pradesh, Bihar, Orissa, Assam, Rajasthan and Nagaland. The responsibility for this at the grass root level lies with the Panchayat. A

lumpsum corpus fund is made available to the Panchayat through District Family Welfare Officers to coordinate the referral activities.

- E. **Facilities for Medical Termination of Pregnancies (MTP):** Medical Termination of Pregnancy (MTP) is a reproductive health measure which enables women to opt out of an unwanted pregnancy and thus prevents maternal deaths associated with sepsis following illegal abortions.

Under the RCH programme the assistance from the Government of India will be in the form of training, supply of MTP equipment and provision of engaging doctors trained in MTP to visit PHCs to perform MTPs on a fixed day once a week / once a fortnight. Assistant will also be provided to competent medical clinics in the non-governmental sector as most of the people seeking MTP services access the private practitioners.

- F. **Prevention of Reproductive Tract Infection (RTI)/ Sexually Transmitted Infection (STI):** A major component of RCH is the prevention of RTI/ STI. RTI/STI do not cause high mortality but are responsible for significant morbidity among both women and men. This ranges from the pain and discomfort of the acute illness to impairment of reproductive functions and chronic reproductive tract diseases. Besides that it has been found that a person suffering from RTI/STI is ten times more prone to contracting HIV infection.

Under the RCH programme the component of RTI/STI is linked to HIV/AIDS. Therefore it has been planned and implemented in close collaboration with National AIDS Control Organisation (NACO). Under this programme NACO provides assistance for setting up RTI/STI clinics at the district level. The Department of Family Welfare will assist in setting up FRUs in a phased manner.

- G. **Birth Spacing and Limiting Family Size :** Closely spaced births and unlimited conceptions pose a threat to both the mother and baby's life. Birth spacing and limiting family size is an important intervention in the Safe Motherhood programme. Therefore aspects are dealt in the National Family Welfare Programme.

**National Family Welfare Programme :** India was the first country in the world to launch a National Family Planning Programme in 1952. Initially there were only a few family planning clinics involved in distributing educational materials, and doing training and research. During the third five year plan (1961-66), family planning was declared as the very centre of planned development. The emphasis was shifted from a pure clinic approach to a community approach using extensive education, small family norm became the slogan. In 1966 a special family planning department was formed in the ministry of health. During 1966-69, the programme took firmer root and was introduced all the health centre. In the fourth plan (1969-74), the programme got top priority and included all the MCH activities. In 1970 All India Post Partum programme and in 1972 Medical Termination of Pregnancy Act was introduced. In 1976 the country framed its first 'National Population Policy'. The disastrous forcible sterilisation campaign of 1976 led to the defeat of Congress in 1977 election. The new Janta Dal government which came into power in 1977 formulated a new population policy. The most important content of this policy was to rule out any kind of compulsion and coercion from the programme. The department in the ministry was renamed as the department of Family Welfare. Family welfare thus included voluntarily adopted activities not only to avoid unwanted births but also to bring about wanted births, to regulate the intervals between pregnancies, to control the time at which births occur in relation to the ages of the parent, and to determine the number of children in the family. In 1977-78 local communities were involved in the decision making. Village Health Guides and diAs were introduced in family welfare schemes. By 1978 India became a signatory to the Alma Ata declaration, 'Health for all by 2000 A.D.'. This led to National Health Policy in 1982-83. It advocated a 2 child family norm and declared the goals to be achieved by 2000 A.D. The sixth and seventh plans were set accordingly to achieve these goals. The government of India in 1986 framed a more detailed and comprehensive National Population Policy.

A major chunk of the ministry's budget goes into family welfare. In the first plan, family planning was allotted Rs. 1 crore but by the seventh plan it became Rs. 3,266 crores. In the eighth and ninth plans it has been further increased. This

demonstrates India's commitment to the cause of family welfare and population control.

The enormous cost of the programme has also found some criticism. This is because statistics shows that birth rate started declining from 1901 and the decline was maintained till 1951 without spending any money. From 1952 onwards after spending a huge amount of money we have only managed to marginally increase the decline of the birth rate. Had the same rate of decline as that between 1901-51 continued till date we would have had a birth rate of about 31. Presently the birth rate is 29 per thousand population. So the programme has achieved only a 2 point decrease in the birth rate which is poor cost effectiveness.

From time to time various studies have tried to identify the limitations of the family welfare programme. These are :

- gender bias (son preference), specially in northern India
- female illiteracy
- increased fertility period for women because of early marriage and delayed acceptance of family planning method
- more emphasis on terminal (permanent) method of contraception and less on spacing method
- increased child mortality
- women not empowered to make decisions about contraception on their own (husbands or mother-in-law make the decisions)
- limited choice of contraceptives available for acceptors.

Based on these findings it has been advocated to promote gender equality, female literacy, empowerment of women, more emphasis on spacing methods, delayed marriage and introduction of newer contraceptive methods to give the acceptors a 'cafeteria choice'. The introduction of incentives and disincentives is still being debated.

Under the RCH programme the methods available for spacing and limiting family size are the following :

**Spacing methods (temporary methods):**

1. Condoms
2. Oral Contraceptive Pills (OCP)
3. Copper T (Intra-uterine device [IUD])

**Terminal method (permanent methods):**

1. Male sterilisation (vasectomy)
2. Female sterilisation (tubectomy)

All methods are available free of cost. In addition condoms and OCP are socially marketed. All the spacing methods are available in the primary health centres and the subcentres. A stock of OCP and condoms are also maintained with voluntary depot holders within the village. For the permanent methods the health workers accompany the acceptor to the nearest facility where it is being done, usually the community health centre of the district/subdistrict hospital. Permanent methods are also done in family planning camps.

OCP is prescribed for newly married couples or young couple with or without a child whereas Copper T is for couples who already have one or two children. When desired family size is complete terminal methods should be adopted. Condoms can be used by any couple but the failure rate is high especially if incorrectly used.

H. **Sex Education:** Provision of sex education for adolescent boys and girls in order to prepare them as responsible adults in future. However this area needs the co-operation and involvement of the community members, educational institutions and the health team.

**Check Your Progress - 3**

- Notes: a) Space is given below for your answers  
 b) Check your answers with the ones given at the end of this unit.

1. What are spacing methods?

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2. Mention four limitations of the family welfare programme.

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## 9.4 POLICIES AND SCHEMES TO SUPPORT MATERNAL AND CHILD HEALTH

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Realising the importance of maternal and child health the government of India has been framing policies and special schemes to support maternal and child health. Some of the important ones are outlined here. We shall discuss them briefly under two broad categories viz. I) policies and ii) schemes.

### 9.4.1 Policies

The two important policies related to CSSM are the National Health Policy and National Population Policy.

#### 1. National Health Policy:

The National Health Policy was formulated in 1982 and was approved by Parliament in 1983. It lays stress on the provision of preventive, promotive and rehabilitative health services to the people - representing a shift from medical care to health care, and from urban to rural population. The policy sets out specific goals and targets to be achieved by 2000 A.D. The emphasis was on achieving health for all by 2000 A.D. through primary health care approach. Some of the goals to be achieved by 2000 A.D. were.

- Infant mortality rate - 60/1000 live births
- Crude birth rate - 21/1000 population
- Crude death rate - 9/1000 population
- Couple protection rate - 60%
- Net Reproductive Rate  $NRR = 1$  (now to be achieved in 2006 A.D.)

#### 2. National Population Policy:

In 1976 the country framed its first population policy which was modified in 1977. In 1986, the government of India evolved a more detailed and comprehensive National

Population Policy has given family planning the broadest possible dimensions. This include child survival, women's status and employment, literacy and education, socio-economic development and anti-poverty programmes. Some salient features of the policy are :

- Advancing the age of marriage of girls to 20
- Promoting the two-child norm
- Increasing female literacy rate
- Increasing demand for contraception to achieve a couple protection rate of over 56% by the end of 8th plan
- Promotion of spacing methods
- Enhancing child survival
- Revamping the infrastructure and improving programme management at all level
- Linkage with anti-poverty schemes
- Maximum involvement of NGOs

#### 9.4.2 Schemes

The three other schemes related to RCH are I) village health guide scheme ii) ICDS and iii) post partum programme.

##### 1. Village Health Guide Scheme (VHG):

In 1977 the Village Health Guide (VHG) or community health volunteer scheme was introduced by the government. The VHG are usually men or women from the villages who have an attitude for social service. They are not government staff but get a stipend. They form a link between the community and the health system. The national target is to have one VHG to serve 1000 population. The VHG are selected by the village and after an initial training of 3 months, are given a simple medicine kit with common drugs. Their main work is home visiting, health education, sanitation, treating minor ailments, promoting the health of mother and child and family planning.

##### 2. Integrated Child Development Services (ICDS) scheme:

The government of India in 1975 initiated a national scheme known as ICDS scheme through the social welfare sector of the five year plan. The scheme is under the Human Resource Development ministry. The principal worker in the ICDS projects is the 'Anganwadi worker'. Each anganwadi worker is responsible for one anganwadi which caters to 1000 population. The activities undertaken at the anganwadi are: supplementary nutrition, immunisation, health checkup, referral, health education and non-formal education. The beneficiaries are mothers and children below 6 years of age. At the anganwadi each child is regularly weighed to monitor growth and a record in the form of a growth chart is kept. The anganwadi worker also act as the link between the community and the health personnel. The anganwadi workers are supervised by Mukhya sevikas. The over all supervision of an ICDS project lies hand of the Child Development Project Officer (CDPO).

##### 3. Post Partum Programme (PPP)

It is essentially a hospital based, maternity centred approach to family planning which began in 1969. the objective was to improve the health of the mother and child through MCH programme and thereby encourage mothers to adopt small family norm. the programme includes antenatal, neonatal and postnatal services.

This programme is found to be an effective way of promoting family planning as women at the time of delivery and during the lying-in-period are generally more receptive to family planning advice and health education.

- The PPP now covers 554 medical institutions including 128 medical colleges. It has also been extended to sub-divisional and sub-district hospitals.

The above mentioned policies and schemes reflect the political commitment of the government. The government has also formulated a "Plan of Action for Children" in 1992 in accordance with the agreement reached at the World Summit for Children in 1990.

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## 9.5 LET US SUM UP

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In this unit, we first dealt with the maternal and child health status of the country. We saw how the mortality and fertility rates have decreased over time. We also noted the disparity between urban and rural, the between states. Next we learnt about the RCH Programme. We noted that the child survival components are essential newborn care, immunisation, appropriate management of diarrhea and pneumonia and Vitamin A prophylaxis. Similarly we noted that safe motherhood programme consists of antenatal care, early identification of complication, deliveries specially for high risk pregnancies, management of obstetric emergencies and birth spacing. Thereafter we critically reviewed the family welfare programme. Then we also noted the policies and schemes of the government to promote maternal and child health.

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## 9.6 KEY WORDS

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Antenatal	:	Before delivery
Natal	:	During delivery
Post natal	:	After delivery.

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## 9.7 SUGGESTED READINGS

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## 9.8 MODEL ANSWERS

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### Check Your Progress - 1

1. The women and children constitute 62 percent of the total population.
2. About 1,25,000 women die every year due to causes related to pregnancy and child birth monthly one in every 200-250 reported women dies due to causes related to pregnancy and child birth.

3. Child survival leads to decline in birth rate as exclusive breast feeding acts as a natural contraceptive.

### Check Your Progress - 2

1. Two strategies for child survival.
  - i) Control/eliminate/eradicate vaccine preventable disease.
  - ii) Control pneumonia among under-five children
- Two strategies for safe motherhood.
  - i) Control of anemia among pregnant women
  - ii) Essential obstetric services for all pregnant women.
2. Hypothermia is the low body temperature-less than  $36^{\circ}\text{C}$ .
3. "Rooming in" is the practice of keeping the baby with the mother so that the baby's body temperature is warmed up by the mother's body temperature. This is necessary when the baby is having hypothermia.
4. The danger signs include : refusal of feeds. Increased drowsiness, cold to touch, convulsions or stiffness, persistent vomiting and deep jaundice.

### Check Your Progress - 3

1. Spacing methods are the temporary methods of family planning. They include use of i) condoms, ii) oral contraceptive pills and iii) Copper T.
2. Following are the four limitations of the family welfare programme.
  - i) preference for sons
  - ii) female illiteracy
  - iii) increased risk of exposure of women to pregnancy because of early marriage
  - iv) increased child mortality.



NOTE



अन्नाद् भवन्ति भूतानि पर्जन्यादन्नसंभव ।  
यज्ञाद् भवति पर्जन्यो यज्ञः कर्मसमुद्भवः ॥ १४ ॥

From food creatures become; from rain is the  
production of food; rain proceedeth from  
sacrifice; sacrifice ariseth out of action 14

— Bhagvad Gita, Third Discourse

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