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MEDICAL COUNCIL OF INDIA

COMPETENCY BASED UNDERGRADUATE CURRICULUM

Knows Knows how Shows Shows how Performs

Describe

Discuss

Counsel

Analyse

Differentiate

Activate

Deploy

Monitor

Predict

Integrate

Communicate

Interpret

Define

# Pandemic Management Module for UG

## Module 7

Clinician Communicator Team Leader Professional Lifelong Learner

Knowledge Skills Attitude Values Responsiveness Communication

Curriculum Implementation Support Program

# Module on Pandemic Management

## August 2020

## Medical Council of India
## Pocket-14, Sector- 8, Dwarka,
## New Delhi 110 077

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# Foreword

## Pandemic Management

The Medical Council of India has prepared revised Regulations on Graduate Medical Education and competency based Undergraduate curricula, accompanied by detailed guidance for its implementation. One of the desirable outcomes of the Competency derived education program is to enable the Indian Medical Graduate to be prepared for the unknown - to be able to understand, investigate, treat and prevent new and emerging diseases as a clinician, community leader and scholar. The emergence of COVID19 and its rapid spread across the globe has further underlined the need to develop these skills in our graduates.

This Pandemic Management module is designed to ensure that the MBBS student acquires competencies in handling not only the illness, but also the social, legal and other issues arising from such disease outbreaks. A pandemic or disease outbreak calls in to play all the five roles envisaged for the Indian Medical Graduate viz. clinician, communicator, leader and member of health care team, professional, life-long learner and committed to excellence, is ethical, responsive and accountable to patients. It is expected that this longitudinal module extending from Foundation Course to the final year undergraduate program will help in ensuring the creation of an IMG who will serve humanity as a doctor, leader and healer in bleak times such as the occurrence of a pandemic.

We are grateful to the members of the Expert Group and the Academic Cell for painstakingly putting this booklet together. We hope that teachers and institutions will benefit in creating a generation of Indian Medical Graduates who will be able to provide promotive, preventive and curative aspects of health care to the nation in times of extreme need like the outbreak of a pandemic.

V K Paul

Chairman, Board of Governors

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**MEDICAL COUNCIL OF INDIA**

BOARD OF GOVERNORS
IN SUPERSESSION OF MEDICAL COUNCIL OF INDIA

## Foreword

## Pandemic Management

The world community including India is facing an unprecedented crisis due to the rapidly spreading Covid-19 infection, across countries and continents. Recent reports indicate Covid-19 cases have crossed the 18 million mark globally. The impact of Covid-19 infection is being felt severely on the health sector. An acute necessity is being felt to maximise the health care facilities available in the country particularly the availability of trained health care workers to meet this unexpected health crisis.

The Competency based undergraduate curriculum was designed to enable the Indian Medical Graduate to be prepared to meet new challenges - to be able to recognise, diagnose, investigate, and treat newly emerging diseases as a clinician and community health leader; the Covid-19 pandemic outbreak has provided this opportunity. The longitudinal module on Pandemic Management extending from Foundation Course to the final year undergraduate program prepared by the Academic Cell and Expert Group is designed to provide year-wise detailed protocols in training the students to fulfil their role as a doctor, leader and healer during this difficult period of a rampaging pandemic. The Medical Council of India is appreciative of the efforts of the members of the Expert Group and the Academic Cell in preparing this module in a very short time.

Vats 19/8/20
(Dr. R.K. Vats)
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# How to use this document

This document has been prepared, considering the metamorphosis of a first year MBBS student to the Indian Medical Graduate (IMG) and the knowledge and competence that is expected from him/her in adapting to and managing a clinical condition that is predicted to happen, too often in the form of outbreaks, epidemics and pandemics, during his/her career.

The module is arranged in a Phase-based manner. It is expected that components of Self Directed Learning, Early Clinical Exposure, Integration and alignment as envisaged in the Competency documents (2018) would be incorporated in the execution of these modules in various phases, as applicable. It is also expected that the modules would be covered by an interdisciplinary team under supervision by the college level Curriculum Committee. The major coordinating departments involved in the execution of this document are identified in the table below.

**Longitudinal Module on Management of Pandemics for MBBS course**

| Period | Module | Broad areas | No. of hours | Major department(s) to coordinate |
|---|---|---|---|---|
| Foundation Course | F.1 | History of Outbreaks, Epidemics & Pandemics | 2 | Pre-Clinical |
| Phase I | 1.1 | Infection Control: Part - I<br>Infection Control Practices – Hand washing, Decontamination<br>Use of PPEs | 4 | Microbiology |
| Phase II | 2.1 | Infection Control: Part II<br>Air borne precautions<br>Contact Precautions<br>Infection Control Committee | 4 | Microbiology |
| | 2.2 | Emerging and Re-emerging infections, early identification and control of new infections | 6 | Community Medicine |
| | 2.3 | Sample Collection, Microbial diagnosis, Serologic tests and their performance parameters | 6 | Microbiology |
| | 2.4 | Vaccination strategies including vaccine development & Implementation | 6 | Community Medicine, Biochemistry |
| | 2.5 | Therapeutic strategies including new drug development | 6 | Pharmacology, General Medicine |
| Phase III Part 1 | 3.1 | Outbreak Management including Quarantine, Isolation, Contact Tracing | 5 | Community Medicine |
| | 3.2 | Interdisciplinary Collaboration, Principles of Public Health Administration, Health Economics, International Health | 5 | |
| | 3.3 | Operational Research, Field work, Surveillance | 8 | |
| Electives | | Epidemiology and research Components | | Community Medicine |
| Phase III Part 2 | 4.1 | Care of patients during Pandemics | 6 | Clinical departments (General Medicine, Pulmonary Medicine, Anaesthesiology as Integrated sessions) |
| | 4.2 | Emergency Procedures | 8 | |
| | 4.3 | Death related management | 2 | |
| | 4.4 | Communications and media management | 4 | |
| | 4.5 | Intensive Care Management during Pandemics | 4 | |
| | 4.6 | Palliative Care during Pandemics | 4 | |
| | | Total | 80 hours | |

**Skills suggested**

1. **Infection Control related**
    a. Hand washing
    b. PPE Donning & Doffing
    c. Disinfection

2. **Diagnostic**
    a. Sample collection
    b. Sample transportation & storage
    c. Choose the appropriate test based on performance parameters

3. **Disease Management**
    a. Pharmaco-vigilance measures
    b. Protocol based Management
    c. Therapeutic decision making
    d. Terminal care including CPR, ALS, PALS

4. **Epidemic Management**
    a. Outbreak investigation
    b. Contact tracing, Quarantine and Isolation
    c. Surveillance
    d. Documentation

5. **Research**
    a. Operational research
    b. Clinical trial protocol preparation including Vaccine trials
    c. Ethical considerations

6. **Communication**
    a. To the media
    b. Use of Telemedicine
    c. Patient & stakeholder communication

7. **Intensive Care**

8. **Palliative care during pandemics**

# Foundation Course

# Module F

# Module F.1
# History of Outbreaks, Epidemics & Pandemics

**Background**:

The occurrence of disease is a common phenomenon in communities. The frequency with which disease occurs in a population depends upon a number of epidemiological factors specific to the host, agent and environment including geographical location. Most of the diseases occur with a predictable frequency which is considered as normal for the population in that area. If there is increase in the frequency (more than expected), change in type of host population, clinical manifestations or involvement of newer geographical locations, then depending upon the extent of involvement, an outbreak, epidemic or pandemic has occurred.

A medical student must be aware of such events that have occurred in the past. This can help them learn from historical events, particularly causative or precipitating factors that might have resulted in such events, the most successful strategy that lead to its control and ways that can help in predicting and controlling future events of similar nature and / or magnitude.

**Competencies addressed:**

| **The student should demonstrate the ability to:** | **Level** |
|---|---|
| Define pandemic and differentiate it from outbreak/epidemic. | K |
| Identify the reasons and /or events that lead to pandemics in the past. | KH |
| Describe key strategies (by the State/Central Government, Non-Government Organization and society at large) that were adopted in prevention and control of these pandemics. | KH |
| Discuss the role which will be played by National and International bodies like WHO and ICMR, if these events take place | KH |

**Learning Experience**

**Year of study**: Foundation course Professional year 1

**Hours**: two (02)

i. Reading history of pandemics in small groups- 0.5 hours

ii. Identifying reasons/events that lead to these pandemics - 0.5 hours

iii. Sharing with large group & summarizing learning points - 1 hour

Students can also be given assignments where they can come prepared with the history of pandemics in the past through online/offline resources or hand outs can be made for them to discuss in class.

Some of the points for discussion in small group can be-

- Type of microbe involved in the pandemic and its properties that helped it spread e.g. route of entry and exit from host, mechanism of transmission involved, ability to survive on various external surfaces etc.
- How did the microbe evolve? Is this emerging or re-emerging in nature?
- Identify common factors in the community that helped the microbe to re/emerge and spread e.g. deforestation, change in trade practices, Host characteristics that supported the spread etc.
- Impact on health, economics and society,
- Steps taken to control the pandemic,
- Time taken to control,
- Current state of infection by that organism.

**Assessment**

1**. Formative**: Not required

2. **Summative:** Not required

## Introductory write-up:

A **pandemic** is derived from a Greek word (*pan*, ="all" and *demos*, ="people"). This is an epidemic that affects a significant number of people across a large geographic location, multiple continents or worldwide. Pandemics usually are caused by new microbes, particularly viruses. A large number of previously unexposed population is highly susceptible to these new microbes and if the disease is capable of human to human transmission, then the spread of these organisms is quite rapid leading to pandemics with major impact on society.

Thus, depending upon the pathogenic/ virulence properties of the new microbe, host susceptibilities and risk factors, pandemics can result in significant increase in morbidity and mortality in affected population in large geographic areas with huge impact on the economic growth, social life, and political parties.

Though most of the times it is difficult to pinpoint the factors that result in emergence or re-emergence of microbes capable of causing pandemics, some of the factors that are contributing significantly are global travel, industrial development, urbanization, global food production, wildlife trade, deforestation and overall misuse of nature. Socio-economic and anthropogenic environmental changes have resulted in emerging zoonosis, which can spread and cause pandemics as had happened in the spread of Black Death in the 14th century due to expansion of trade routes.

Further, the way the world is connected today, human beings have become extremely vulnerable to the rapid spread of new infections including zoonosis. A primarily animal pathogen can evolve into a human pathogen, and then with time, need for the original animal host is lost as microbes establish human-to-human transmission. Though this is a gradual process, but it has resulted in evolution of many predominantly human viral pathogens like smallpox, Human Immunodeficiency Virus(HIV), Nipah virus, Rabies, West Nile viruses, Ebola, Marburg, human monkey pox viruses, influenza A, dengue, SARS, Corona virus etc. resulting in widespread outbreaks, epidemics as well as pandemics.

As declared by the World Health Organization, the latest pandemic that we are facing globally is Covid-19 pandemic, a respiratory illness caused by the newly identified Coronavirus, which has originated in the live market of Wuhan in China. But this is not new as a large number of pandemics have happened in the past and few examples of devastating pandemics are given below:

**1) Antonine Plague (165 AD)**

Death Toll: 5 million
Cause: Unknown
Antonine Plague was an ancient pandemic that affected Asia Minor, Egypt, Greece and Italy and is thought to have been either Smallpox or Measles, though the true cause is still unknown.

**2) Plague of Justinian (541-542 AD)**

Death Toll: 25 million
Cause: Bubonic Plague
Generally regarded as the first recorded incident of the Bubonic Plague, killed up to a quarter of the population of the Eastern Mediterranean and devastated the city of Constantinople by killing an estimated 5,000 people per day and eventually resulting in the deaths of 40% of the city's population.

**3) The Black Death (1346-1353 AD)**

Death Toll: 75 – 200 million
Cause: Bubonic Plague
Bubonic Plague is thought to have originated in Asia. It spread most likely via the fleas living on the rats that commonly lived on merchant ships. Ports being major urban centres at the time, gave the perfect breeding ground for rats and fleas, and thus the insidious bacterium flourished, devastating three continents.

**4) Third Cholera Pandemic (1852–1860 AD)**

Death Toll: 1 million

Cause: Cholera

**Third Cholera Pandemic** was the deadliest of the seven cholera pandemics. This originated in India, spreading from the Ganges River Delta before spreading through Asia, Europe, North America and Africa. British physician John Snow succeeded in identifying contaminated water as the means of transmission for the disease.

**5) Flu Pandemic (1889-1890 AD)**

Death Toll: 1 million

Cause: Influenza virus

It was also known as "Asiatic Flu" or "Russian Flu". This was thought to be an outbreak due to the Influenza A virus. Rapid population growth of the 19th century, particularly in urban areas, helped in the spread of the flu, and the outbreak spread rapidly across the globe.

6) **Sixth Cholera Pandemi**c (**1899-1923**)

Death Toll: 800,000+

Cause: Cholera

Originated in India then spread to the Middle East, North Africa, Eastern Europe and Russia.

**7) Flu Pandemic (1918)**

Death Toll: 20 -50 million

Cause: Influenza virus

1918 flu pandemic was different from other influenza outbreaks. The host properties of Influenza virus were affecting the juveniles previously and the elderly or already immunologically weak individuals but, the new strain had infected and killed completely

healthy young adults, leaving children and those with weaker immune systems still alive.

### 8) Asian Flu (1956-1958)

Death Toll: 2 million

Cause: Influenza virus

Asian Flu was a pandemic outbreak of Influenza A of the H2N2 subtype, that originated in China in 1956 and lasted until 1958.

### 9) Flu Pandemic (1968)

Death Toll: 1 million

Cause: Influenza virus

"The Hong Kong Flu" was caused by the H3N2 strain of the Influenza A virus. Outbreak appeared in July 1968 in Hong Kong and by September 1968 virus had spread to Philippines, India, Australia, Europe, and the United States.

### 10) HIV/AIDS Pandemic (at its peak, 2005-2012)

Death Toll: 36 million

Cause: HIV/AIDS

It was first identified in the Democratic Republic of the Congo in 1976.Currently, there are nearly 35 million people living with HIV. As awareness has grown, new treatments have been developed that make HIV far more manageable, and many of those infected go on to lead productive lives.

### 11) Covid-19, the novel Coronavirus:

In December 2019, in the region of Wuhan, China, a new ("novel") Coronavirus began appearing in human beings. This new virus named as Covid-19, spreads incredibly quickly among people, due to its newness – no one had immunity to Covid-19, because no one had Covid-19 until 2019. Countries across the world declared mandatory stay-at-home measures, closing schools, businesses, and public places to curtail the spread of disease.

The outcome of the Covid-19 pandemic is difficult to predict, at least presently. But we can learn from the history of pandemics to determine our best course of action.

## Dealing with pandemics

Looking back in history, we can see respiratory viruses, particularly influenza viruses have been a major cause of repeated pandemics. This has justified the need for global influenza surveillance and monitoring systems, so as to keep an active surveillance of the strains of virus, their pathogenic potentials and host preferences. WHO has developed pandemic phases in 1999 with latest revisions in 2009 as planning tools that can loosely correspond to pandemic risk, identify sustained human to human transmission and give time for preparedness and response. These tools are not designed to predict. The six phases as given by WHO can be studied in three stages-

1. Inter-pandemic phase
2. Pandemic alert period
3. Pandemic phase

Thus, a basic understanding of these phases provides a framework to help countries to tackle the pandemic and prepare response planning.

Preparedness for impending pandemics is a necessary step to successful handling with minimal loss of life, economic and social disruptions. This requires involvement of government leadership, health sector, on-health sectors, individuals, families, and communities whole-heartedly. Activities that lead to capacity development, planning, coordination, and communication at various levels are critical for successful management.

The **WHO** plays an important role in rapid detection and verification of health emergencies like pandemics, as this is essential to save lives. WHO works with Member States across a range of activities, including coordination under the International Health Regulations (2005). Some of the important activities are:

Within 48 hours of an emergency, WHO

- Grades the severity of the event,
- Deploys field teams and activates global stockpiles of essential supplies, including personal protective equipment, medicines, and vaccines.
- Communicates the risk to the community and neighbouring countries through official International Health Regulations.
- Activates the Global Health Cluster, the Global Outbreak Alert and Response Network (GOARN), emergency medical teams and standby partners.
- WHO also develops new technologies to be able to detect and track new health events in the most difficult settings, such as the Early Warning, Alert and Response System (EWARS).
- Helps countries strengthen their public health surveillance system.
- Provides guidance on risk communications.
- Advises countries on establishing or accessing laboratory services.
- Enhances laboratory biosafety and biosecurity capacities.
- Increases domestic testing capacity in range and volume.

The WHO also supports Member States with the help of the World Bank, UNICEF, the World Food Programme and other partners to deliver universal health coverage and basic health services during these times. The WHO also deploys mobile medical teams and maintains stockpiles of essential supplies, life-saving medicines and personal protective equipment that can be dispatched quickly across the world. The WHO Emergency Medical Teams (EMT) Initiative also helps organizations and Member States build national capacities and stronger health systems so that countries have the ability to respond promptly when a disaster strikes or an outbreak flares.

Role of the **Indian Council of Medical Research (ICMR)**

The ICMR, New Delhi is one of the oldest medical research bodies in the world and apex body in India. This is the main national agency for the Planning, Formulation, Coordination, Implementation and Conduct or promotion of biomedical research in India.

For prevention and control of influenza outbreaks, ICMR Influenza Network was initiated in 2003. The influenza network collects clinical data, epidemiological data from patients with influenza-like illness (ILI) and severe acute respiratory infections (SARI) from several clinical virology setups in India. The surveillance database contains data on genetic characterization of the influenza viruses isolated. The network provides useful data for monitoring circulating influenza strains, detection of emerging/re-emerging viruses and defining seasonality in different geographical areas.

**Thus, ICMR plays a very active role in monitoring and helps in predicting impending pandemics.**

Indian Council of Medical Research is also coordinating “India COVID-19 Clinical Research Collaborative Network”. The goal of this network is to enhance the clinical understanding of Covid-19 in the country so as to develop specific clinical management protocols and further R&D for therapeutics. For this purpose, a central database of clinical and laboratory parameters of hospitalized Covid-19 cases is being created. All hospitals currently managing Covid-19 patients are invited to become partners in the network. ICMR also issues timely advisories required in testing and treatment of patients during pandemics.

**Resources:**


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# Phase I: Module 1

# Module 1.1
# Infection Control Practices- Part I

**Background:**

Exposure to infectious organisms is a common phenomenon but development of disease following such exposures can be easily prevented by following certain practices that have been labelled as “Standard Precautions”. It has been shown in studies that students who receive education about standard precautions have a higher level of knowledge and comply better. Various studies along with “Patient Safety Module” by WHO strongly recommends incorporation of infection control modules in the curriculum of medical schools as medical students, the future doctors need to understand these concepts at an early stage to be able to incorporate them in their practice. The student must be taught scientific bases of these practices that can protect against infections both in community as well as hospital settings. The student should be taught about the basics of Infection control practices with emphasis on ability to use Personal Protective Equipment (PPE) optimally.

This module is aimed at enabling the learner to practise standard infection control practices including proper and consistent hand washing, use of PPEs and to familiarise with various disinfection and antiseptic procedures.

**Competencies addressed**

| The student should be able to: | Level |
|---|---|
| Demonstrate proper hand washing | SH |
| Demonstrate Donning and Doffing of PPE | SH |

**Learning Experience**

**Year of study:** Professional year 1

**Hours:** 4 hours

I. Interactive discussion – 1 hour
    a. Basics of infection and chain of transmission,
    b. Significance and ways of infection prevention,
    c. Role of hand in spread of infections and importance of hand hygiene in prevention of spread of infections,
    d. Components of standard precautions and use of PPE,
    e. Cough etiquette.

II. DOAP session on hand washing, use of gloves, mask, donning and doffing of PPE -1 hour

III. Visit to the hospital and discussion with the staff about the infection control practices followed by them - 1 hour

IV. Debriefing and Feedback - 1hour

**Assessment**

1. **Formative:** Viva can be used. This could be done immediately after the module and/or later with internal assessment.

   The technique of hand washing and donning & doffing of gloves can be randomly observed during conduct of practical sessions in first MBBS particularly in dissection halls. Peer feedback can also be incorporated.

2. **Summative:** Not required

**Resources:**

https://www.cdc.gov/infectioncontrol/training/infection-control.html.

# Phase II: Module 2

# Module 2.1
# Infection Control Practices - Part II

**Background:**

The basics of infection and components of the standard precaution have been covered in the first phase. The second phase student is better equipped to understand the details of transmission-based precautions as they now learn about the microbes along with disinfection and antiseptic procedures in detail. This is also the right time to introduce a student to the roles and responsibilities of an Infection Control Team in a hospital.

This module is aimed at enabling the learner to identify the most probable route of spread of a particular microbe causing infection and based upon that, identify which transmission-based precaution need to be adhered to along with standard infection control practices.

**Competencies addressed**

| The student should be able to: | Level |
|---|---|
| Describe and discuss the implementation of airborne and contact precautions in a specific clinical situation | KH |
| Describe and discuss the functioning of institutional Infection Control Committee | KH |

**Learning Experience**

**Year of study:** Professional year 2

**Hours: 4** hours

I. Interactive discussion – 1 hour
   a. Revisit the various routes of spread of infections
   b. Need for isolation of patients in various circumstances
   c. Airborne and contact precautions including use of PPEs

d. Disinfection and antisepsis in patient care
e. Roles and responsibilities of infection control team

II. Small group case discussion followed by plenary– 1.5 hours

**Example of Case study**

Rajani, 34 years has returned home from Italy, at a time when that country is having an epidemic of a new virus infection. She has mild cough and sore throat. When she develops severe breathlessness, she is admitted in the general ward of the hospital. You have been asked to take a detailed history and examine the patient.

- What precautions are necessary in this case?
- What precautions are advised for the subordinate staff attending her?

III. Visit to the isolation ward in the hospital with discussion with the staff about the precautions they take - 1 hour

IV. Debriefing and Feedback - 0.5 hour

**Assessment**

1. **Formative:** OSCE, Viva, MCQ can be used.
2. **Summative:** OSCE, Viva, MCQ

**Resources:**

https://www.who.int/diseasecontrol_emergencies/training/m4_infection.pdf?ua=1

https://www.cdc.gov/infectioncontrol/training/infection-control.html.

# Module 2.2
# Emergence and Re-emergence of microbes

**Background:**

The serendipitous discovery of Penicillin by Alexander Fleming in 1928 made man dream about victory over microbes, but emerging and re-emerging infectious diseases have proven the futility of that dream and power of the microbes over man.

**Emerging Infectious Disease** (EID) are diseases that have been newly detected or were found only in restricted geographical locations with few cases. In contrast to this, **Re-Emerging Infectious Diseases** (REID) are diseases that were once major health problems and then their incidence declined to a great extent, but are again becoming health problems for a significant proportion of the population either globally or in a specific geographical location.

Incidence of these Emerging and Re-Emerging infectious diseases is increasing and there are a large number of factors that contribute to the origin or spread of these diseases which can increase the risk of Outbreaks or Pandemics dramatically. These factors can be related to the microbial properties, environmental, socio-economic, and demographic factors. Majority of the EID and REID are Zoonotic in origin and signifies the role of cohabitation in evolution of these organisms.

Keeping in mind the significance of understanding the factors that result in evolution of these infectious diseases and understanding mechanisms that can be adopted for prevention and control of these diseases a sound knowledge, skills and attitudes about Emergence and Re-emergence of microbes need to be developed in undergraduate medical students.

**Competencies addressed:**

| The student should be able to: | Level |
|---|---|
| Define emerging and re-emerging infections. Explain reasons or Identify factors responsible for emergence and re-emergence of these infectious diseases. | K |
| Discuss strategies for early identification, prevention and control of emerging and re-emerging infectious diseases. | K |
| Discuss the challenges faced in control/ prevention of these infections | KH |

**Learning Experience**

Year of study: Professional year 2

**Hours**: 6

i. Exploratory and interactive theory session- 1 hour

ii. Self study/ individual/ small group assignment about any one emerging or re-emerging infectious disease – 2 hours

iii. Discussion in small groups about reasons/ factors responsible for emerging or re-emerging infectious disease identified through case studies - 1 hour

iv. Plenary of findings in the case studies and closure - 2 hours

**Assessment**

1. **Formative:** Required, SAQ, MCQ, Viva Voce
2. **Summative**: Required

**Resources:**


1. Zumla A, Hui DS, (eds). Emerging and Re-Emerging Infectious Diseases, An Issue of Infectious Disease Clinics of North America E-Book. Elsevier Health Sciences; 2019 Nov 2.
2. Lessler J, Orenstein WA. The Many Faces of Emerging and Re-emerging Infectious Disease. Epidemiologic reviews. 2019 Nov 4.

# Module 2.3
# Diagnostic tools

**Background**:

Diagnostics are a fundamental component of successful outbreak containment or control strategies, being involved at every stage of an outbreak, from initial detection to eventual resolution. Each individual pathogen presents specific diagnostic challenges.

Pandemics are caused by either emergence or re-emergence of microbes. In case of re-emergence, availability of validated diagnostic protocols and tools make laboratory confirmation of the cases easy but this is not the case when we have newly evolved microbes causing pandemic. The laboratory diagnostic tests are either not available and if available, they need to be validated and their performance characteristics like sensitivity, specificity, positive predictive and negative predictive value studied before they can be used for diagnosis. The health care professionals are faced with various dilemmas at these times which can range from a very basic query like the best time and best sample that needs to be collected, to sensitivity and specificity of a chosen procedure that can be isolation of microbes, antigen or antibody detection or gene that needs to be detected in molecular diagnostics.

**Thus, the questions are innumerable and it becomes important to train a medical student to deal with such dilemmas in the diagnosis of an infection particularly during pandemics. They must be taught to choose and collect the most appropriate clinical sample in a suitable container with/without transport media, at the most appropriate time from a suspected case during pandemic and interpret the results of the test keeping in mind various performance characteristics and validation requirements.**

**Competencies addressed:**

| The student should be able to: | Level |
|---|---|
| Describe specimen selection, collection, transportation & storage requirement during a pandemic. | KH |
| Choose and collect the most appropriate clinical sample in a suitable container at the most appropriate time from a suspected case during pandemic (or in a simulated environment). | SH |
| Demonstrate appropriate safety measures in handling and processing of clinical specimens (use of PPE etc.) | SH |
| Discuss various diagnostic modalities available for an infectious disease. Explain sensitivity, specificity, positive predictive value & negative predictive value of each of the diagnostic test/modality. | KH |
| Chose the most appropriate diagnostic test keeping in mind sensitivity, specificity, positive & negative predictive value of the diagnostic test/modality available. | SH |

**Learning Experience**

Year of study: Professional year II

**Hours**: 6

i. Exploratory and interactive theory session- 1 hour

ii. Sample collection demo and hand on in skill lab- 1 hour

iii. Visit to laboratory with demonstration of diagnostic test-1hour

iv. Small group activity, where students can be asked to discuss different test reports of suspected cases with performance characteristic and asked to interpret followed by discussion on choosing a lab test– 2 hours

v. Discussion and closure - 1 hour

**Assessment**

1**. Formative:** Required by assignments, OSPE, viva

2. **Summative:** Required by OSPE, SAQ, MCQ

**Resources:**


1. Kelly-Cirino CD, Nkengasong J, Kettler H, et al**.** Importance of diagnostics in epidemic and pandemic preparedness**.** BMJ Global Health 2019;4: e001179.
2. J Michael Miller, Matthew J Binnicker, Sheldon Campbell, Karen C Carroll, Kimberle C Chapin, Peter H Gilligan et al. A Guide to Utilization of the Microbiology Laboratory for Diagnosis of Infectious Diseases: 2018. Update by the Infectious Diseases Society of America and the American Society for Microbiology, *Clinical Infectious Diseases*, Volume 67, Issue 6, 15 September 2018, Pages e1–e94.
3. Washington JA. Principles of Diagnosis. In: Baron S, editor. Medical Microbiology. 4th edition. Galveston (TX): University of Texas Medical Branch at Galveston; 1996. Chapter 10. Available from: https://www.ncbi.nlm.nih.gov/books/NBK8014/.

# Module 2.4

# Vaccination strategies including vaccine development & Implementation

**Background:**

Virulent agent, susceptible host and favourable environment forms the epidemiological triad for all infectious diseases in all settings. The disease can be controlled by addressing any of these components. If available, an effective vaccine can be very useful in breaking the chain of transmission quickly as host will no longer remain susceptible. Given the ease of logistics and quickness of action, vaccine has been looked upon as a potential saviour in situations of epidemics and pandemics especially in diseases caused by viruses. In fact, world owes it to vaccines, for the eradication of Smallpox and control of Polio and Measles. However, the development of vaccines is a long and tedious process, which takes several months to years. Also, equally important is to develop a rational strategy for use of vaccine for any illness. Usually there is undue pressure from communities and administrators for use of vaccines as ad-hoc measure. As a trained medical personnel, the Medical Officer should be able to guide them on this issue sensibly. Also, the Medical Officer should be vigilant to the generalized complacency that follows in the diseases known to have vaccine available. This module will focus on empowering the students to develop sound and rational knowledge about vaccines, vaccine development process and their role in small and large disease outbreaks.

**Competencies addressed:**

| The student should be able to: | Level |
|---|---|
| Describe the process of vaccine development. | KH |
| Describe the role of vaccines in disease control and eradication. | KH |
| Describe the steps to prepare a micro plan for vaccination activity at PHC level. | KH |
| Describe the importance of routine vaccination during pandemics. | KH |
| Describe the role of communities in vaccination programmes. | KH |
| Describe the cold chain for vaccine storage and delivery. | KH |

**Learning Experience**

Year of study: Professional year 2

**Hours**: 6

i. Exploratory and interactive theory session- 30 min.
ii. Small Group Discussion- 3 hrs.

**Suggested Topics for discussion:** Vaccines in Disease Control, Vaccine Development Process, Routine Vaccination during Pandemic & Pandemic Influenza Vaccines -WHO.

iii. Visit to PHC/ local hospital to show cold chain and sample micro-planning for Supplementary Polio Vaccination [Interaction with Medical Officer] -2 hrs.
iv. Discussion and closure – 30 min.

**Assessment**

**1. Formative:** Required- assignment, MCQ, SAQ

**2. Summative**: Short Answers, Short Notes

**Resources:**

1. Pandemic influenza vaccines: WHO. Available from: https://www.who.int/immunization/newsroom/vaccine_PI/en/
2. Vaccine Testing and the Approval Process- Centre for Disease Control, USA. Available from: https://www.cdc.gov/vaccines/basics/test-approve.html
3. Immunization Handbook for Medical Officers. National Health Mission. 2017. https://nhm.gov.in/New_Updates_2018/NHM_Components/Immunization/Guildelines_for_immunization/Immunization_Handbook_for_Medical_Officers%202017.pdf
4. Vaccination in Humanitarian Emergencies: Literature review and case studies. Available from: https://www.who.int/immunization/sage/meetings/2012/april/2_SAGE_WGVHE_SG1__Lit_Review_CaseStudies.pdf

# Module 2.5
# Therapeutic strategies
# including new drug development

**Background:**

In many pandemics, causative organisms may not be identified in the beginning. Even when identified, it is likely that a specific drug may not be available. However, persons with illnesses will have to be taken care of. This includes general care, supportive care, early recognition and management of complications. Many drugs which are already being used for existing indications may be used as 'off label'. The knowledge of biochemical features, enzymes, receptors, co-receptors, facilitating and inhibiting molecules may help one in postulating and verifying the use of some existing molecules. Considering the major role of immune mediators in disease pathogenesis and that of immunity in the elimination of the organism, various immune-modulators may also be considered in the management at various stages. Some of these molecules may also be used for prophylaxis in exposed persons or for primary prophylaxis in susceptible populations.

The development of a molecule, identifying its effects and detecting toxicities and side effects needs to be done systematically. Before release, any molecule has to undergo phase 1, 2 and 3 trials. Almost always this is done in animals and human volunteers. Post marketing trials also may lead to new observations. However, these steps which generally require long time lags may have to be shortened during a pandemic situation. Many drugs which show good effects may be discarded, as time passes. Experiences with one pandemic in one part of the globe may not be applicable to another. This module helps the learner to understand the pharmacologic approach to a pandemic situation.

**Competencies addressed:**

| The student should be able to: | Level |
|---|---|
| Describe and discuss the various phases of drug trials | KH |
| Prepare a plan for evaluation of off label use of a drug | SH |
| Organise pharmaco-vigilance activities | SH |
| Discuss ethical aspects of clinical trials in pandemics | SH |

**Learning Experience**

Year of study: Professional year 2

**Hours**: 6

i. Exploratory and interactive theory session- 1 hour
ii. Small Group Discussion- 2 hours

**Suggested Topics for discussion- New Drug Development – Challenges and Solutions – Urgency in procedures – Need for monitoring.**

iii. Visit to a pharmaceutical firm/ pharmacy lab to show various stages of drug development or an ADR monitoring exercise in clinical wards - 2 hours. (since it is not present in many cities - an appropriate video followed by discussion)
iv. Discussion and closure – 1 hour

**Case study**

1. During the beginning of the Covid-19 epidemic, various drugs were tried in different parts of the globe at various stages of the epidemic. Some of them are off label use of existing drugs, some are extrapolations based on molecular features of the virus. Discuss how you would reach a conclusion and explain to the authorities.
2. There is a pandemic caused by an unknown virus. Someone has come with a claim that a plant extract can be used to prevent and treat this infection.

Describe and discuss how you will proceed to identify any benefit from such an attempt.

3. A group of persons who have taken a tablet for prevention of infection during a pandemic develops a skin eruption. How will you establish any linkage between the drug and the new manifestation or conclude that this is a new manifestation that is just being recognised.

**Learning Points**

a. Various phases of clinical trials
b. Compliance with regulatory authorities
c. Exploration of off label uses and new molecules for therapy
d. Pharmaco-vigilance measures.

**Assessment**

1. **Formative:** SAQ, Viva
2. **Summative:** SAQ, Viva

# Phase III: Part 1

# Module 3

# Module 3.1
# Outbreak management
# including quarantine, isolation, contact tracing

**Background**

Outbreak management is one of the most important duties for all health care providers concerned with public health. To manage outbreaks, first we must investigate the outbreak to find out answers to what, where, when and who are affected and also as far as possible trace the source which may help us to suggest control measures so that we can contain the outbreak.

**Competency addressed**

| The student should be able to: | Level |
|---|---|
| Demonstrate the ability to conduct various epidemiological investigation related to pandemics - Level ( or in a simulated environment) | SH |

**Learning experience**

Year of study: professional Year 3

1. Introduction of case scenarios (4) -1 hour
2. Self-directed learning -1 hour
3. Interactive Lecture – 1 hour
4. Preparation of epidemic curve, spot map and calculating attack rate from a given data
5. Discussion and closure- 1 hour

**<u>Case scenario 1</u>**

Mr. X, Medical Officer of a primary health centre noticed increased number of cases with symptoms of fever, sore throat and cough during third week of March. While taking detailed history one patient had a history of international travel 2 weeks back from a place where some of his friends also had similar illness. In the next week, one of the tertiary care hospitals in the city reported increased number of severe acute respiratory illness among admitted patients and two of them died due to this.

As a Medical Officer or a member of a district health care team, how do you investigate this and manage the situation?

**Case scenario 2**

Dr. X was appointed as Medical Officer of the Primary Health Centre. One of his field staff reported three cases of watery diarrhoea and dehydration (two mild and one severe) in his field area and he referred them for admission to the hospital.

As a health professional what do you think about this episode and how do we proceed to investigate and control the situation.

**Case scenario 3:**

Dr. X was on casualty duty that day. Mr. Y, 49 years old, presented to Medicine casualty with high grade fever (3 days), retro-orbital pain, myalgia and rash. While eliciting detailed history from the patient, he revealed that there was history of fever and body ache for his brother and brother's wife one week back for which they took treatment in a private hospital. Mr. Y and his four brothers lived in nearby houses in the same compound (within 300 metres). He took paracetamol on the first two days of fever thinking that he was feverish as he walked in the rain the previous day.

As a health professional what do you think about this episode and how do we proceed to investigate and manage the situation.

**Case scenario 4:**

Mr. A,17 years old, was brought to Medicine casualty with history of headache, myalgia and vomiting in the past 2 days. He reached home only 4 days back after a tour along with 13 friends. The day after he came home, he had mild fever and body ache. He thought it might be due to tedious travel and took rest at home. But last night his friend phoned him and said that one of their friends was taken to hospital following fever, vomiting and loss of consciousness.

As a health professional what do you think about this episode and how do we proceed to investigate and manage the situation.

**Learning Points**

a. Define terms: outbreak, epidemic, pandemic.

b. How to detect / recognise an outbreak- warning signs of an impending outbreak - Steps of outbreak investigation
c. Describing the event in terms of time, place and person and importance of epidemic curve, spot map and attack rate.
d. Responses at different levels – general and specific measures include reservoir control, breaking the chain of transmission and protecting the at-risk group.
e. Differentiate between isolation and quarantine.
f. Role of contact tracing in outbreak control.
g. If it is a new disease, gaps will be there, so to fill the gap research activity is required.

**Assessment**

1. **Formative:** conducting clinic-social discussion based on a scenario, short answer questions, OSPE response station.
2. **Summative:** modified essay/ short question on steps of outbreak investigation, OSPE response in practical.

**Discussion**

**Definition of an outbreak/ epidemic:**

An **outbreak or epidemic** is defined as the occurrence in a community or region of cases of an illness clearly in excess of expected numbers. Usually an outbreak is limited to a small focal area, an epidemic covers large geographic area and has more than one focal point. **Pandemic** is defined as an epidemic occurring world-wide or over a very wide area crossing international boundaries and usually affects a large number of people.

**Warning signs of an impending outbreak**

- Clustering of cases or deaths in time and /or place,
- Unusual increase in cases or deaths,
- Even a single case of measles, AFP, Cholera, plague, dengue or JE,
- Acute febrile illness of unknown aetiology,
- Occurrence of two or more epidemiologically linked cases of meningitis,
- Shifting age distribution of cases,
- High or sudden increase in vector density,
- Natural disasters.

**Detecting an outbreak**

1. **Rumour register:** it has to be maintained in each public health facility for collecting information related to infectious diseases. There are key informants in the community like teachers, Anganwadi workers (AWW), ward members, Self-help Group (SHG), Youth club leaders, etc. They are the eyes and ears of health services in the community
2. Media – an important source of health information
3. Review of routine data
4. Through strict vigilance on warning signs of impending outbreak

**Steps of outbreak investigation:**

1. **Verification of the diagnosis**: The first and foremost step in outbreak investigation would be to verify the diagnosis. A clinical examination along with laboratory investigations of a sample of cases may be sufficient for this, but the epidemiological investigation should not be delayed until laboratory results are available.
2. **Confirmation of existence of an outbreak**: For this, Medical Officer should check
    - If there is an abnormal increase in the number of cases, or
    - See there is clustering of cases, or
    - If the cases are epidemiologically linked, or
    - If some trigger events have occurred, or
    - If many deaths have occurred.

    An arbitrary limit of two standard errors from the endemic occurrence is used to define epidemic threshold for common diseases like influenza. If there is evidence of an outbreak, and if the aetiology, source and route of transmission are known, specific control measures need to be initiated immediately. If anyone of the above is unknown, the outbreak must be investigated to identify the specific cause. The Rapid Response Team (RRT) which was formed during the phase of epidemic preparedness should be alerted and requested to further

investigate the outbreak. At the same time general control measures should be started.

3. **Defining population at risk:** before starting investigation, it is necessary to have the attack rates.
4. **Rapid search area map and age gender distribution of entire population in the area.** This is essential for calculating for all cases and their characteristics: this is to identify all cases including those who have not sought medical care and those possibly exposed to the risk.

   For this, we can use a carefully designed epidemiological case sheet. The information collected should be relevant to the disease under study. Based on the information collected from the affected ones, search for more cases and their contacts should be continued. Laboratory investigations are done with the help of microbiologist. Microbiologist may advise on what samples are required, mode of collection and transport and also the laboratory to which these are to be sent. Entomological investigation should also be done if the outbreak warrants it.

5. **Data Analysis:** Data collected should be analysed to identify common event or experience using the epidemiological parameters like time, place and person.
   **Time**: Epidemic curve can be constructed based on chronological distribution of dates of onset and number of cases. It may suggest a time relationship with exposure to a suspected source, whether it is a common source or propagated epidemic, whether it is of a seasonal or cyclic pattern.
   **Place**: A spot map is prepared with cases in relation to possible source of infection. Clustering may suggest common source of infection.
   **Person**: Analyse the data by age, sex, occupation, and other risk factors. Find out attack rates/ case fatality rates for those exposed and not exposed. In food borne epidemic, food specific attack rates are calculated.

6. **Formulation of hypothesis:** on the basis of time, place and person analysis, hypothesis is formulated to explain the epidemic in terms of possible source, causative agent, possible modes of spread, people at risk and the environmental factors

7. **Testing the hypothesis:** If the hypothesis fits with the facts, response measures can be initiated; otherwise, further analytical investigation in terms of case control studies will need to be carried out. In the meantime, general control measures are carried out.
8. **Evaluation of ecologic factors:** This is to prevent further transmission of disease. Ecologic factors include sanitary status of eating establishments, water and milk supply, break down in water supply, population movements, atmospheric changes, population dynamics of insects and animal reservoirs.
9. **Further investigation of population at risk**: To obtain additional information, for e.g. serological study may reveal clinically in-apparent cases and throw light on the pathogenesis of the condition.
10. **Writing the report:** This can be an interim report which includes details of the investigation, the diagnosis and control measures initiated. Once the outbreak is coming under control, we should make follow up visits to see whether control measures are implemented adequately and also help to collect new information which was missed in the previous visits. The final report is given within 10 days of the outbreak being declared to be over. The outbreak is declared over when there are no new cases for a period of two incubation period since the onset of last case.

**Responses to an outbreak**

1. **General measures is** till the specific source and route of transmission is identified. For example, if one is suspecting a droplet infection outbreak, start a campaign requesting people to follow social distancing, use of mask and hand hygiene.
2. **Specific measures** depend on the causative agent. The broad steps are:
   - Identification and nullification of the source of outbreak like chlorinating wells,
   - Minimising transmission to prevent further exposure: vector control,
   - Protection of the host- immunization / chemoprophylaxis,
   - Controlling the reservoir include early diagnosis, notification, isolation, treatment, quarantine.

**Isolation**: Separation **of infected** persons or animals **for the period of communicability** from others in such places and conditions as to prevent or limit the direct or indirect transmission of infectious agent from those infected to those who are susceptible. Purpose is to protect the community by preventing transfer of infection from the reservoir to the possible susceptible host.

**Quarantine**: Limitation of freedom of movement **of healthy person** or domestic animals exposed to communicable disease for **a period not longer than the longest usual incubation period** of the disease to prevent contact with those not so exposed.

**Contact tracing**: The process of identifying, assessing and managing people who have been exposed to a disease to prevent onward transmission. When systematically applied, this will break the chain of transmission of an infectious disease and is an effective tool in public health. This has to be explained according to the scenario provided.

**Resources:**

1. Park's Textbook of Preventive and social medicine - 25th edition-published by Banarasidas Bhanot-2019.
2. Medical officer's manual on Integrated Disease Surveillance Project by National institute of Communicable Diseases, DGHS, GOI 2006.

# Module 3.2

# Interdisciplinary collaboration, Principles of Public Health Administration, Health Economics

**Background:**

When an outbreak is suspected as given in the case scenarios of previous module, interdisciplinary collaboration is essential. Inter-sectoral coordination is one among the four principles of primary health care. To ensure this, the outbreak control team or multidisciplinary team is convened to conduct the investigation in the field for confirming the outbreak and taking measures for preventing the spread of disease. The powerful public health administration which aims equity, use of appropriate technology, community participation and inter-sectoral coordination is our strength. While managing an outbreak we would understand that many of the determinants of health lie outside the domain of Health Department. Provision of safe drinking water, sanitation, nutrition, legal measures for imposing strict interventions, good house and shelter are some examples. This also points towards the importance of interdisciplinary collaboration. Members of the community should have all the rights to participate in their duties towards controlling an outbreak.

**Competency addressed**

| The student should be able to: | Level |
| --- | --- |
| Demonstrate the ability to conduct various epidemiological investigation related to pandemics (need clarity on simulated environment). | SH |

**Sub competency**

Demonstrate the ability to form interdisciplinary team for conducting outbreak investigation.

**Learning objectives**

The learners should be able to:

1. List the four principles of primary healthcare,

2. Describe the scope of inter-sectoral coordination in outbreak control,
3. List the members of inter-sectoral team for outbreak investigation,
4. Describe the activities of inter-sectoral team in each case scenario provided,
5. Demonstrate the formation and meeting of Rapid Response Team (RRT) as role play according to the case scenarios.

**Learning experience**

Year of study: professional Year 3

1. Introduction of topic based on previous case scenario -1 hour
2. Self -directed learning -1 hour
3. Interactive Lecture – 1 hour
4. Role play on forming RRT- 1 hour (based on one case scenario)
4. Discussion and closure- 1 hour

**Learning Points**

a. Inter-sectoral coordination as one among the four principles of primary health care,
b. The role of inter-sectoral coordination in outbreak management,
c. How this can be applied in all four case scenarios,
d. Who are included in the outbreak investigation team and what are their roles and responsibilities?
e. What is health economics? What is the impact of epidemic/pandemic on economic status of the family/ state/country?
f. Cost effectiveness of interventions/ actions to control epidemic.

**Assessment**

1. **Formative**: theory examination -as short questions /practical – group viva voce.
2. **Summative**: modified essay/ short question on role of inter-sectoral coordination in epidemic management, practical - viva voce.

**Discussion points**

**Inter-sectoral coordination**: It is a fact that health care cannot be provided by the health sector alone. While managing outbreak we realise that many of the determinants

of health are outside the domain of health care. Hence inter-sectoral coordination as one among the four principles of primary health care is worth mentioning. The other areas closely related to health are agriculture, animal husbandry, food, industry, education, housing, public works, communication etc. To ensure such coordination, administrative system should take the lead with suitable legislation and strong political will. Proper planning should be there to avoid duplication of activities.

In the event of a suspected outbreak, the Rapid Response Teams (RRT) which is a multidisciplinary team that looks into various aspects of an outbreak is alerted and meeting is convened. The team includes an epidemiologist, clinician, microbiologist and other specialities and sectors as per requirements (described earlier). The main role of RRT will be to investigate and confirm outbreak. The members of RRT are regularly doing their work but, in the event of an outbreak, come together to undertake a special function. They should work in coordination with the Government health staff. They will help and support health staff in management and control of outbreak but the responsibility of implementing control measures mainly rests with local health staff. RRT should be formed at all levels of administrative system (district, block, Panchayath). The name, address and mobile phone number of RRT members should be available at respective levels so that they can be alerted as soon as possible.

**Health economics**: Health economics as a branch of economics, is concerned with issues related to efficiency, effectiveness, values and behaviour in the production and consumption of health and health care. Pandemics may affect a large population across borders and nobody can predict when it ends, especially if it is a new disease without vaccine or treatment. So, we are forced to implement other measures like isolation, quarantine and complete lock-down to save the lives of the people. But, at the same time globally we have to face economic crisis due to reduction in gross domestic product (GDP) due to loss of life, workplace closures and quarantine measures.

Economic evaluation can be done as the comparative analysis of alternative course of action in terms of both their cost and consequences. Methods can be cost-benefit analysis (in monetary terms) and cost-effective analysis (in natural units).

**The Epidemic Diseases Act, 1897 (ANNEXURE I)**

One of the shortest legislations in India, The Epidemic Diseases Act has four sections. It is aimed at ‘providing for better prevention of the spread of Dangerous Epidemic Diseases’. The Act was first enacted in the British colonial era primarily to control the Bubonic Plague outbreak in the late 1800s. It has remained relevant ever since.

Section 2A of the Act allows the Centre to prescribe regulations to inspect any ship or vessel leaving or arriving in any port and to detain any person planning to leave or arrive into India.

The Government’s decisions on restricting international and domestic travel to and from India fall under the provisions of this Act.

The Act also empowers State Governments under Section 2(1) to prescribe Regulations with respect to any person or group of people to contain the spread of Covid-19.

**Penalty**

Section 3 of the Epidemic Diseases Act, 1897 gives the penalties for violating the Regulations. Section 188 of the Indian Penal Code states that it will be six months imprisonment or Rs. 1000 fine or both.

**The Disaster Management Act, 2005 (ANNEXURE II)**

The Disaster Management Act was enacted to tackle disasters at both Central and State Government levels.

Section (2) defines a disaster as a “catastrophe, mishap, calamity or grave occurrence in any area, arising from natural or man-made causes”. **On March 14, 2020 the Central Government termed Covid- 19 as a ‘notified disaster’ as a “critical medical condition or pandemic situation”.**

The Act enables the Centre and States to enforce a lock-down and restrict public movement. It allows the Government to get access to the National Disaster Response Fund, the State Disaster Response Fund and the District Disaster Response Fund. It also has provisions for allocation of resources for prevention, mitigation, capacity building etc.

**The Penalties**

Sections 51 to 60 of the Act prescribes the penalties for the violators.

The Law describes the offence as obstructing any officer or employee from performing their duty or refusing to comply with directions. Violators can be jailed for up to 1 year or fine, or both. In the case of dangerous behaviour, the jail term can be extended to two years.

**Resources:**


1. Park’s Textbook of Preventive and social medicine - 25th edition: published by Banarasidas Bhanot -2019.
2. Medical officer’s manual on Integrated Disease Surveillance Project by National Institute of Communicable Diseases, DGHS, GOI 2006.

# Module 3. 3:
# Operational research, field work, surveillance

**Background**

Operational research is the discipline that uses statistics, mathematics, computer modelling and similar science models for decision making. It is a potential tool for use in many areas that demands evidence-based or model-based decision making. One such area is the epidemic/ pandemic management but it is used less frequently. The reason for its limited use may be because of low awareness among the specialist community. In the era of frequent epidemics, it is the need of the hour to sensitize undergraduate medical students of today (health professionals of tomorrow) about operational research and its use in epidemic management.

Another important area is surveillance which is the backbone of public health programmes and provides information on public health events so that effective action can be taken in controlling and preventing disease outbreaks. The course of an epidemic depends on how early it is identified and how effectively specific control measures are applied.

**Competency addressed**

| **The student should be able to:** | **Level** |
|---|---|
| Demonstrate the ability to conduct various epidemiological investigation related to pandemics (or in simulated environment) | SH |

**Sub-competencies addressed**

1. Demonstrate the ability to appreciate the need of operational research in epidemic control.
2. Demonstrate the ability to identify syndromes and underlying diseases in the given scenario and suggest control measures.

**Learning experience**

Year of study: professional Year 3

1. Introduction of topics based on previous case scenario -1 hour
2. Self –directed learning -1 hour
3. Interactive Lecture – 2 hours (surveillance, operational research)
4. Discussion and closure- 1 hour
5. Visit to PHC/sub-centre and field area along with field staff of sub-centre -3 hours

**Points to be discussed**

a. What is operational research?
b. The role of operational research in outbreak management,
c. How this can be applied in all four case scenarios,
d. What is public health surveillance, its key elements and uses of surveillance in outbreak prevention,
e. Integrated Disease Surveillance Project (IDSP) – syndromes and core conditions in IDSP, types of surveillance, data collection methods,
f. How surveillance activity is carried out in peripheral institution (SC/PHC) as per IDSP
g. What are the field activities and how data is collected, compiled, analysed and reported?

**Assessment**

1. **Formative:** theory examination –as short questions /practical – viva voce
2. **Summative**– modified essay/ short question on role of operational research in epidemic management, Public Health Surveillance, practical – viva voce.

**Discussion points**

**Operational research (OR)**: is the discipline that uses statistics, mathematics, computer modelling and similar science methodology for decision making. This is helpful in many areas especially outbreak management activity that requires evidence-based or model-based decision making. Operational research can address important issues in epidemic management like how to allocate resources among options for a

better control of epidemic, what resources are needed to control an outbreak and which resources should be employed for the same.

Analytical computer-based models are used for plotting and forecasting epidemics. Advanced models with quantitative analysis are used for quantifying exposure and forecasting resources needed. Decision making techniques are used to help policy makers to set up policies. It is again a multi-disciplinary approach which requires team activity of OR/ statistics researchers, epidemiologist, managers, physicians, microbiologists etc. which help staff dealing with Statistics to better understand the nature of the epidemic and that is reflected in predictive accuracy of models. At the same time, epidemiologists will be more involved in OR and modelling which help them to better manage outbreaks.

**Public health surveillance**: Surveillance is defined as ongoing systematic collection, collation, analysis and interpretation of data and dissemination of information to those who need to know in order that action can be taken. In simple words, it is a data collection for action. We already have a system of decentralized state-based surveillance program in the country named as **Integrated Disease Surveillance Project (IDSP)**. This is the back bone of public health program as it provides information so that timely action can be taken in controlling and preventing diseases/ outbreaks.

**Key elements of surveillance system** are:

- Detection and notification of health event,
- Investigation and confirmation (epidemiological, clinical, laboratory),
- Collection of data,
- Analysis and interpretation of data,
- Feedback and dissemination of results,
- Response – a link to public health program as action for prevention and control

Uses of surveillance in outbreak control and prevention:

- Recognize cases or cluster of cases to trigger interventions to prevent transmission or reduce morbidity and mortality,

- Identify high risk groups or geographical areas to target interventions and guide analytic studies,
- Demonstrate the need for public health intervention programs and resource allocation during public health planning,
- Monitor effectiveness of prevention and control measures.

Core conditions under surveillance:

- Regular surveillance: vector borne diseases, water borne diseases, Respiratory diseases, vaccine preventable diseases, disease/s under eradication, other conditions (RTA), international commitments, Unusual clinical syndromes.
- Sentinel surveillance: Sexually transmitted disease/ blood borne, other conditions (water quality, outdoor air quality.
- Regular periodic surveillance: NCD risk factors, State specific diseases (Dengue, JE, Leptospirosis).

**Types of surveillance in IDSP**

**Syndromic:** Diagnosis made on the basis of symptoms/ clinical pattern by paramedical personnel and members of the community.

**Presumptive:** Diagnosis made on typical history and clinical examination by Medical Officer.

**Confirmed:** Clinical diagnosis confirmed by laboratory test.

**Major syndromes and (conditions) given under IDSP**

- Acute watery diarrhoea – (Cholera),
- Fever <7 days duration- only fever (malaria), fever with rash (Measles/Dengue), altered consciousness (Japanese encephalitis), fever with bleeding (Dengue), with convulsions,
- Fever > 7 days– (Typhoid),
- Jaundice- (Hepatitis),
- Cough >3 weeks,- (Pulmonary Tuberculosis),
- Acute flaccid paralysis - (Poliomyelitis),
- Unusual event?

**Data collection methods**

- Routine reporting – passive surveillance
- Sentinel surveillance
- Active surveillance
- Laboratory surveillance
- Outbreak investigation

PHC / sub-centre visit– interacting with Medical Officers of PHC and field staff about surveillance activities going on there as part of IDSP. Also getting acquainted with different registers and reporting formats for all three types of surveillance (syndromic, presumptive, Laboratory).

Field area visits with field staff to acquire skills of data collection methods, recording, analysing and reporting.

**Resources:**


1. Park's Textbook of Preventive and social medicine - 25th edition published by Banarasidas Bhanot-2019.
2. Medical Officer's Manual on Integrated Disease Surveillance Project by National Institute of Communicable Diseases, DGHS, GOI 2006.

# Phase III: Part 2

# Module 4

# Module 4.1
# Care of patients during Pandemics

**Description:**

During any pandemic, infected persons can be divided into three categories. Asymptomatic persons, mildly symptomatic, Advanced disease. Epidemiologically all symptomatics can also be classified as suspected, probable and confirmed. Most infected persons in most infections tend to be asymptomatic but infective to others. They are usually not picked up unless there is substantial active surveillance mechanisms in place. If all contacts are kept under observation or in quarantine and they are regularly screened, the asymptomatic persons can be picked up in large numbers.

The patients who come to the hospital are mostly symptomatic. Some of them may be serious enough to be hospitalised and some may need intensive care. They are usually graded as mild, moderate and severe, based on clinical finding and prognosis. The progression from mild to moderate and severe will depend on many factors.

The Institutional approach to a person reaching the health system includes proper triaging with the purpose of recognising and restricting the potential for transmission of infection to others, recognising bad prognostic signs and early institution of care depending on the presentation. All health care workers at the triage point should be aware of the specific information that needs to be elicited (e.g. travel history) and the bad prognostic indicators (symptoms and signs). In many illnesses, contact / airborne precautions must be initiated in the triage area itself and unnecessary movement of patients and close associates must be restricted too.

The clinical management of patients during pandemics must be based on specific protocols/ guidelines from immediate higher authority. This should be evidence-based and as per standard practices recognised. Extreme care should be taken to

document all history and other epidemiologic evidences, however subtle they may be. All activities should be properly documented and communicated to higher authorities as required. The treatment can be divided into non-pharmacologic interventions (like isolation, nutritional support), supportive care, specific management (if any), recognition and management of complications and prevention.

**Competencies addressed**

| **The student should be able to:** | **Level** |
|---|---|
| Describe and discuss the triage facilities required for persons during epidemics | KH |
| Demonstrate the role of IMG in triage and referral | SH |
| Demonstrate the ability to manage a suspected / confirmed case in the emergency room during a pandemic | SH |

**Case study**

There is some news about an unknown disease spreading in the town. An ambulance stops in front of your clinic. A group of 05 persons immediately jump out and rush to transport the patient to the emergency room. Mrs. Gracy, 65 years suffering from cough and breathlessness, is carried by four persons to the clinic. One among the group of doctors examines the patient and requests the nurse to arrange for a Chest X-ray and Blood Glucose estimation. Another doctor records the blood pressure. A third person tries to do a venesection. The patient is sent to the Radiology department. The patient develops breathlessness and syncope while returning to the emergency room.

- How should the emergency room prepare to receive a suspect case during an emergency?
- How can such a situation be handled better and safely during an outbreak?
- What precautions should be taken while patient is transported during an outbreak?

**Learning Points**

- Principles of Triage during epidemics,
- Precautions and care to be made while transporting a person with infections,
- Responsibility to other health care workers while a person with infection is cared.

**Learning Experience**

**Year of study:** Professional year Phase III Part 2

**Hours:** 6 hours

a) Interactive discussion – 2 hours
    i. Triage practices to be followed in a clinic / hospital
    ii. Primary care to be given to a patient on reaching the hospital
    iii. Steps to be taken to reduce transmission of infections in emergency area.

b) Role play to highlight the various roles to be played in emergency area - 1 hour
c) Visit to the hospital with discussion with staff about the practices followed - 2 hours
d) Debriefing and Feedback - 1hour

**Assessment**

1. **Formative:** DOPS, Viva can be used. This could be done immediately after the module and/or later with internal assessment.
2. **Summative:** not required

# Module 4.2
# Emergency Procedures during Pandemics

**Description:**

During outbreaks of illnesses, many patients can develop life-threatening complications. This is more common among persons of extreme age (children and elderly), depending on the pathogen. It is also likely to be more common among persons with co-morbidities as well. These co-morbidities may also make them vulnerable to dangerous events. Toxin or cytokine-mediated damage, metabolic causes, coagulation abnormalities, sepsis etc. can cause multi-organ dysfunction quickly. Persons may develop respiratory, cardiac, renal or neurological events. Proper and timely intervention can prevent further deterioration or even reverse the situation. The IMG should demonstrate required competencies to perform certain procedures. These may include endotracheal intubation, ventilation, cardiopulmonary resuscitation, tracheostomy, to name a few. All situations demand extreme care to be adopted to protect the health care worker involved in such procedures as well. Beyond the skills that are necessary to perform these psychomotor procedures, the IMG should also have the knowledge, attitude and communication skills to manage such a situation.

**Competencies addressed**

| **The student should be able to:** | **Level** |
|---|---|
| Demonstrate the ability to perform life-saving interventions during outbreaks, ensuring safety of HCWs | SH |

**Case study**

Mr. Joseph, 72 years old, has been admitted with a febrile illness, one week after a foreign trip at a time when a pandemic had been declared in the country he visited. He is being managed in an isolation room with all airborne precautions. The nurse notices that he has suddenly developed breathlessness and is tachypnoeic. The

oxygen saturation by pulse oximetry is only 70%. The duty doctor has found crackles all over the lung fields and mild cyanosis. The relatives are planning to take him home on their own. The doctor is called in by an emergency call.

- What are the steps that can be taken immediately to ensure a better survival for him?
- What are the factors influencing the decision to do any invasive procedure?
- How will you discuss the issues with the relatives?

**Learning points**

1. The type of emergency procedures required in various emergencies,
2. The logistics and infrastructure facilities and prioritisation to be considered,
3. The aspects related to communication with the relatives,
4. The immediate, short-term and long-term care of such persons in Intensive care.

**Learning Experience**

**Year of study:** Professional year Phase III Part 2

**Hours:** 8 hours

I. Interactive Discussion – 2 hours
    1. Indications for invasive procedures in Pandemics
    2. Points to be verified before emergency procedures
    3. Steps to be taken to reduce transmission of infections
    4. Attitude and Communication Issues related to complicated procedures

II. Skill development program – with mannequins e.g. intubation, CPR, ALS, PALS etc - 4 hours *(This may be linked with the routine Skill training component as well)*

III. Role Plays for communication skills and documentation - 1 hour

IV. Debriefing and Feedback -1hour

**Assessment**

1. **Formative:** OSCE, DOPS, Viva can be used. This could be done immediately after the module and/or later with internal assessment
2. **Summative:** OSCE, Viva, SAQ, MCQ

# Module 4.3
# Managing Death during Pandemics

**Description:**

During outbreaks of illnesses, many patients may expire, due to various causes. This is more common among persons of extreme ages (children and elderly) depending on the pathogen. It is also likely to be more common among persons with co-morbidities as well. These co-morbidities may also make them vulnerable to death as well. The inevitable consequence of death during pandemics must be handled with extreme caution. The management may start from the time the person becomes sick or is brought in a moribund condition. Death may be unexpected or even expected at times. Many procedures discussed in the previous module may not help in preventing death. Breaking the bad news regarding the condition of the patient well in time may ease the handling of death related issues. Documentation of death in as much clear terms as possible is absolutely essential. Handling of the dead body adhering to the infection control recommendations is also very important. Cooperation from relatives and administration has to be ensured, depending on the situation. The IMG is expected to be well aware of the medical and social consequences of death during a pandemic. Beyond the skills that are necessary to perform these procedures, the IMG should also have the knowledge, attitude and communication skills to manage such a situation.

**Competencies addressed**

| The student should be able to: | Level |
|---|---|
| Demonstrate the ability to handle death related events during outbreaks | SH |

**Case study**

Mr. Abdul, 50 years old, has been admitted with a febrile illness, which he developed after staying with his son who recently came from a metropolitan city where an unknown disease had been declared. He was intubated and was on ventilator for two

days. He was being managed in an isolation room with all airborne precautions. He was showing signs of improvement when he suddenly became unconscious and stopped breathing. Cardio-pulmonary resuscitation was attempted but failed. He died about 15 minutes after he developed the symptoms in the ICU. The doctor declared that he is no more.

- How is the event discussed with the relatives?
- What documents are to be prepared regarding the event?
- What care has to be exercised to prevent the transmission of infection after death?
- How will you discuss the issues with the relatives?

**Learning points**

- The emotional issues for the relatives and HCWs related to death of a person during epidemics.
- The principles of documentation and reporting and legal and ethical issues of death during epidemics.
- The aspects related to infection control practices like prophylaxis (if any), disinfection etc.

**Learning Experience**

**Year of study:** Professional year Phase III Part 2

**Hours:** 2 hours

i. Interactive discussion – 1 hour
   a. Confirmation and documentation of death
   b. Steps to be taken to reduce transmission of infections
   c. Attitude and Communication Issues related to handling of dead bodies
   d. Responding to media

ii. Role Play for communication skills and documentation with debriefing and feedback - 1 hour

**Assessment**

1. **Formative:** Viva can be used. This could be done immediately after the module and/or later with internal assessment.
2. **Summative:** Viva, SAQ, MCQ

# Module 4.4
# Information Management during Pandemics

**Description:**

During the spread of any infection, the community reacts in a certain fashion. Initially there will be fear of spread, maligning the affected people, stigma and discrimination and panic. The media also plays with this and try to sensationalise the whole issue. Any variations from normal pattern of response and functioning of HCWs will be criticised and negative messages will be generated. The media, when well informed, can help a lot in public awareness, health education and behaviour change. It depends to a large extent in sharing the proper information with them at the right time. The sanctity of the media and the right of society to criticise must also be respected.

The social media gets flooded with messages related to outbreaks very early. Most of these messages are based on inadequate information and improper interpretation of the unscientific ideas. Unfortunately, most of the knowledge that is shared in the social media is neither verified nor controlled by anyone. At the same time the online social media is an effective tool for spreading the right messages.

In many epidemics, contact precautions are to be adopted by HCWs and the general public. The visit to the hospital could contribute significantly to spread of infections. In many infections, home or institutional quarantine may be in place. These persons may develop many illnesses and other problems that do not require a face to face consultation. In such instances, the authorities have opened up the avenue of Telemedicine as a viable alternative. History taking and to some extent visual examination of the patient can be done using common virtual platforms. More exploratory options are available using sophisticated instruments like electronic stethoscope, portable ultrasound etc. Counselling is another activity that can use this platform. Online prescriptions in standardised format is also being accepted now. The IMG should be aware of the clinical, emotional, social and legal issues associated with this form of medical practice. Familiarity with electronic medical records, referral

patterns, virtual documentation etc. is also desirable. The virtual platform is also useful for health education and formal teaching and training for students and HCWs.

**Competencies addressed:**

| The student should be able to: | Level |
|---|---|
| Demonstrate the ability to prepare media reports, use online communication | SH |
| Demonstrate the ability to handle media communication and education | SH |
| Demonstrate the ability to recognise spam & fake messages | SH |

**Case study 1**

Mrs. Rachel, 30 years old, has been admitted with a febrile illness, 4 days after attending a funeral attended by many persons from outside the country. She became sick and was intubated in the emergency room. There was some delay in transferring the patient to intensive care unit. Within a few minutes, a few cameramen from visual media reached the campus and started reporting alleged deficiencies in care. Messages with similar content also started appearing in the social media. It was argued that the delay was because a very fatal infection was suspected in the patient and HCWs were refusing to see the patient. It was also suggested that this disease is spreading fast, is lethal and no cure is available.

- As the Medical Officer on duty on that particular day, you are asked to comment on what went wrong?
- You have been requested by your friends to start a messaging series countering the text messages appearing in the social media. What steps are recommended?
- How will you create a proper message for the visual media and social messaging platform?
- How can you develop a Tele-consultation system in your practice?

**Learning points**

- The chance of even small variations in the working of hospitals getting media attention
- The irresponsible behaviour from many corners of the society
- The need to prevent fake messages and to spread correct information.
- The proper use of Telemedicine for clinical and academic work.

**Learning Experience**

**Year of study:** Professional year Phase III Part 2

**Hours: 4** hours

i. Interactive discussion - 2 hours
   a. Responding to media
   b. Use and misuse of social media for health related messages.

ii. Visit to the media centre / Tele Medicine unit - 1 hour

iii. Role Plays for responding to media with Debriefing and Feedback - 1 hour

**Assessment**

1. **Formative:** Viva can be used. This could be done immediately after the module and/or later with internal assessment
2. **Summative:** Not needed

# Module 4.5
# Intensive Care Management during Pandemics

**Description:**

Pandemics become important, when there is a high degree of morbidity and associated mortality. This usually happens to persons at extremes of age. The elderly are highly vulnerable due to the aging process and compromised system functions and also because of many co-morbidities. Children and infants suffer mainly because of lack of immunity and higher chances of mingling and other issues like malnutrition. However, this pattern may get altered due to various reasons. The working population constituted by the young and middle aged can be affected in epidemics with direct links to the environment – ecological and employment related: e.g. Leptospirosis, Dengue, Chikungunya etc. Gender variations can also happen due to various predisposing factors among any gender groups. Serious involvement of organs systems like respiratory, cardiac, nervous or renal can lead to rapid deterioration in the patient's condition which may require extra care with lot of support and monitoring.

Intensive care is specialised care given in specialised settings with regular monitoring and corrective measures instituted without delay by a team of trained health care workers. The Intensive Care Unit (ICU) of today works with lots of gadgets and standard protocols. In addition to the technical details about diagnosis, prognostication and management, the team care concept and management of affective and communication issues related to ICU care also has to be imbibed by the learner. This form of care is usually very expensive and adds to the financial burden of the family as well. Maintenance of a good ICU demands the use of lots of technology, behaviour change, attitudinal modifications and team skills.

The routine intensive care that is offered for management of pandemic related cases also needs special training, as this involves high levels of integrity, dedication and commitment in terms of effort, compassion and a sense of urgency. This is also compounded by the fact that there are epidemiological issues as well.

This module intends to give the learner an insight into the intricacies of intensive care during the pandemics.

**Competencies addressed:**

| **The student should be able to:** | **Level** |
|---|---|
| Visit, enumerate and describe the functions of an Intensive Care Unit | KH |
| Enumerate and describe the criteria for admission and discharge of a patient to an ICU | KH |
| Observe and describe the management of an unconscious patient | KH |
| Observe and describe the basic setup process of a ventilator | KH |
| Observe and describe the principles of monitoring in an ICU | KH |

**Case study**

55 year old Krishnan, known case of systemic hypertension and type 2 diabetes mellitus presented with cough and breathing difficulty in the last 3 days. Patient was diagnosed with Covid-19 infection. Patient was referred to Covid isolation ICU in view of severe breathing difficulty, tachypnoea and desaturation. Patient was transported to ICU in oxygen trolley with $O_2$ via simple face mask considering all Covid-19 precautions.

Monitors were attached. On examination, patient conscious, oriented, tachypnoeic, Pulse Rate -120/min, BP-128/72mmHg, RR-32/min. ABG showed respiratory alkalosis with PaO2/FiO2 = 138(moderate ARDS). Initial CURB 60 score was 2. Patient was put on High Frequency Nasal Cannula (HFNC) with flow rate of 40L/min and FiO2 of 90%. Routine investigations were sent which includes CBC, ESR, RFT, LFT, serum electrolytes, coagulation profile, viral markers, blood grouping. Prognostic markers were done : CRP > 100 mg/L, LDH – 600 units/L, Trop I - <2.5 ng/L, D dimer – 1400 ng/ml, Serum ferritin – 565 ng/ml. Chest X-ray showed bilateral chest infiltrates. ECG showed normal sinus rhythm.

As the doctor on duty on that particular day, you are asked to plan future management.

**Learning points**

1. Initial assessment of patient in ICU
2. Early stabilisation of patient
3. Prognostication and management using standard protocols
4. Coordination with doctors and paramedical staff
5. Communication with the bystanders
6. Reporting to higher authorities

**Learning Experience**

**Year of study:** Professional year Phase III Part 2

**Hours: 4** hours

i. Interactive Discussion – 1 hour
   a. Interactive Lecture with videos
ii. Visit to the ICU – 1 hour
   a. Infection control
   b. Monitoring of vital signs
   c. Interpreting investigations
   d. Monitoring using equipment
iii. Role Play – 1 hour
iv. Debriefing session by intensivist - 1 hour

**Points for Discussion**

***INITIAL STABILISATION OF PATIENT IN ICU***

When a patient is received in ICU,

1. Make sure that the below said equipments are available:
   a. Oxygen source
   b. Airway cart
   c. Working suction
   d. Monitors

    e. Emergency drugs
    f. Defibrillator
2. Attach monitors
3. The primary survey should follow A-B-C-D-E

**A- Airway**

- If the patient can speak, the airway is patent
- Airway patency not maintained, triple manoeuvre-head tilt, chin lift and jaw thrust.
- If still not maintained, use oropharyngeal/nasal airways.

**B- Breathing**

- Check for oxygen saturation and respiratory rate
- If SpO2<90% and RR>30---give oxygen supplementation via
    a) Nasal prongs
    b) Simple face mask
    c) Venturie face mask

**C- Circulation**

- SBP<90—check distal pulses, confirm IV access and give fluid bolus
- Start on inotropic support

**D -** Determine GCS and assess pupils

**E-** Examine the patient

4. **Inform superior officer**

**Assessment**

1. **Formative:** Pre-test – Post Test; Viva can be used. This could be done immediately after the module and/or later with internal assessment.
2. **Summative:** Case based short note with plan of management, MCQ

# Module 4.6
# Palliative Care during Pandemics

**Description:**

During pandemics and other periods, many patients are likely to develop long lasting consequences after acute illness. After intensive care, a stage may be reached, when patients do not require to be in major institutions or need regular therapeutic procedures. Such persons require long-term care with social support systems. They may require only supportive, curative and rehabilitative interventions. The care is also aimed at making life comfortable and pleasant for them in the future. The patient may or may not recover, but giving hope for a better tomorrow may help them cope with the illness.

Palliative care is a broad speciality with plenty of activities. This module aims to familiarise the learner with the concept of palliative care.

This module may also be used to discuss about the issues related to isolation and solitude by the patients and also about the unhealthy stigma and discrimination experienced by patients, relatives and colleagues. Points may be raised about the issues faced by Health Care Workers, their emotional issues, burn out etc. as well. Social issues related to restriction of activities may be also be discussed along with this module.

**Competencies addressed:**

| **The student should be able to:** | **Level** |
|---|---|
| Demonstrate an understanding and needs and preferences of patients when choosing curative and palliative therapy. | KH |

**Case study**

James, 38 year old salesman, developed a febrile illness He was tested positive for a new viral infection. He developed shock while on treatment. He was started on inotropic supports, catheterised, was shifted with $O_2$ via simple face mask.

In CCU, on day 2 patient developed fever, GCS was E3VTM4, oliguria. Investigations revealed increased total count, increase in CRP, thrombocytopenia, altered RFT. ABG showed high anion gap metabolic acidosis. Patient developed sepsis with Acute Kidney Injury and Renal Replacement Therapy was initiated. Post dialysis patient was on double inotropic (noradrenaline and vasopressin) supports.

Post op day 4, GCS was E2VTM3, anisocoria present, investigations revealed haemoglobin - 9g/dl, total count – 20,000, platelet count – 60,000, urea/creatinine – 90/3, potassium – 5.2, altered LFT and coagulopathy. CT brain was taken which showed large right tempero-parietal bleed with IVH and midline shift. Since the patient was in septic shock with multi-organ dysfunction and DIC, it was decided for conservative line of management. Intensivist decided to discuss about palliative care with the family.

"I am Dr. , I am the treating physician of your son. I am here to explain the health condition of your son. As you know your son now has multi-organ failure. He has widespread blood stream infection which has affected his multiple organs. His vitals are unstable and is on multiple inotropic supports. He developed a condition called DIC and as a result there is large bleeding in his brain. In this situation, surgery would offer no benefit. It might further worsen his condition. Now, his vitals are only maintained with so much medications and ventilatory support. Any therapy aiming to improve his clinical condition will be futile. We are anticipating a gradual clinical deterioration which might end up in his death. So, we would suggest a palliative comfort care for this patient with your consent.

**Learning points**

1. Need to assess a patient well before palliative care is suggested
2. Importance of planning palliative care

3. Communicating to the patients and relatives about the need and utility of planned palliative care

**Learning Experience**

**Year of study:** Professional year Phase III Part 2

**Hours: 4** hours

i. Interactive discussion – 1 hour
   a. Interactive Lecture with videos

ii. Visit to the palliative care unit – 1 hour
   a. Pain & palliation
   b. Educational activities regarding continuation of care and warning signs
   c. Monitoring using basic observations and examinations
   d. Nutritional care
   e. Emotional care

iii. Role Play – 1 hours

iv. Debriefing session by intensivist - 1 hour

**Assessment**

1. **Formative:** Pre-test – Post Test; Viva can be used. This could be done immediately after the module and/or later with internal assessment
2. **Summative:** Case based short note on palliative care, MCQ

# Module 4.7
# Mental health issues during Pandemics

**Description:**

The pandemic, besides affecting the physical health, has a potential of immense mental health effects, both during and after its occurrence. The mental health repercussions are on an affected individual and in the general community. There is an apprehension of contracting the disease, the uncertainty of procuring medical help and the unpredictable nature of the disease, which causes fear and anxiety in the people. Social isolation or social distancing impacts wellbeing; work from home and home schooling are new and alien dimensions to life. There are worries about the real-world consequences of the pandemic, such as financial struggles.

The loneliness of quarantine, death and long-term consequences affecting oneself and the family are causes for perturbation in patients. Stigma and guilt for spreading the disease are two burdens carried by most patients. There is an increase in anxiety, depression, stress, post-traumatic stress disorder and the possibility of risk of suicide. Besides these direct and indirect psychosocial effects, the virus directly or through an immune reaction affects the brain and leads to mental health and neurological manifestations. In the aftermath of the disease, long term complications can precipitate mental illness.

Some groups of people are more prone to mental health impact. The vulnerable population are frontline workers, elders, children and adolescent, people suffering from mental illnesses and disabilities, women, migrant workers and individuals in conflict situations.

**Competencies addressed:**

| The student should be able to: | Level |
|---|---|
| Describe and discuss the mental health consequences of an epidemic on the general population, patients and health care workers | K |
| Demonstrate the ability to look after one's mental health during a stressful time of a pandemic | KH |
| Demonstrate the role of IMG in identification and referral of significant mental illness in response to the pandemic | SH |
| Demonstrate the ability to counsel patients with minor stress related symptoms in response to the pandemic | SH |

**Case study**

Mr. P. businessman aged 62 years, admitted in a single room of a Covid-19 hospital with mild respiratory symptoms. He could not sleep for two nights. During ward rounds, he expresses worry about the future of his business in case something happens to him. His wife and son were admitted to another isolation hospital, and he was unable to communicate with them and suffers from palpitations and tremors when he thinks about them. You are approached by relatives, who request you to assess him for suicidal ideas.

How will you manage the situation?

**Learning points**

The student should be able to recognize:

1. The psychological impact of a novel disease and about which there is little known, and many uncertainties exist.

2. Issues related to quarantine or lockdown such as social distancing, isolation, stigma, loss of contacts.
3. Patient's concerns about availability and cost of treatment, economic issues, probable death and its impact.
4. Signs and symptoms of anxiety, panic and depression and its management.
5. Signs of suicidal ideation and the need for referral of patients if needed.
6. The ability to counsel patients for minor stress related symptoms.

**Learning Experience**

**Year of study:** Professional year Phase III Part 2

Hours: 04

v. Interactive Lecture with videos – 1 hour
vi. Group discussion with frontline staff and telephonic conversations with recovered patients and their family members (live or recorded) - 1 hour
vii. Role plays – 1 hour
viii. Debriefing session by a physician, psychiatrist and nurse - 1 hour

**Discussion points**

Different issues are faced by people belonging to the following categories:

a. Older people who are dependent on others for daily activities and who are technologically handicapped,
b. People with co-morbidities that worsen with any co-existing illness, e.g. Chronic Kidney Disease, Chronic Lung, Liver and heart diseases,
c. Worsening of disorders in persons with pre-existing mental health problems,
d. People with disabilities,
e. Persons who do not stay with their relatives, e.g. at nursing homes, homeless people,
f. Ethnic minorities, persons staying in far off places,
g. Illiterate persons, persons who cannot use electronic media,
h. Healthy persons who are caring for the above types of patients at home.

There are other relevant issues like:

i. **Knowing when a psychiatry referral is required.** Being aware of where the nearest help is available,
ii. **Knowledge and skills required for supportive counselling.** Counselling involves forming an empathetic, warm and genuine relationship, demonstrating non-judgmental, active listening and giving positive feedback and reassurance. It involves encouraging the person to find simple solutions to their problems,
iii. **Burden and mental health of caretakers.** Health care workers are at risk for mental health issues which can be prevented and treated. Self-care and the need for professional advice as and when required is important. Periodic relaxation with duty breaks may be helpful.

The emotional issues may take the form of anxiety as expressed by persistent and excessive worry, irritability and sleep problems. Panic attacks may present as sudden onset of anxiety with trembling, paresthesia, palpitations, shortness of breath, choking sensation, chest pain, nausea, vomiting, dizziness, sweating and a sense of impending doom.

It is necessary to observe for signs of depression. These include sadness of mood, helplessness, hopelessness, loss of worth, decreased interactions, loss of appetite, loss of sleep, and recurrent thoughts about death or suicide. There may be references to bereaved persons, guilt, self-hatred, and self-harm. Unless taken care of promptly, these may lead to suicidal ideation/ attempts.

Stress may have varying presentations and may include:

- **physical symptoms:** headaches, sleeping and eating difficulties,
- **behavioural symptoms:** low motivation to work, starting or increasing use of alcohol or drugs, decreased interaction,
- **emotional symptoms:** fear, anxiety, sadness and anger.

A psychiatry referral is required if symptoms are pervasive, distressing and cause impairment. The presence of persistent suicidal ideas is another important reason for a consult. Patients who do not improve with brief counselling interventions would benefit from interventions by a psychiatrist.

**Interventions suggested are:**

a. Be informed and do not fall prey to rumours and social media infodemic.
b. Have a routine regarding sleep and meals. Allocate time for work, rest and exercise. Set up priorities and follow a daily pattern of activities. Revive hobbies.
c. Be in contact with your social circle. Regular conversations and communications at a personal level with the use of phones or digital media (video conferencing) is important.
d. Restriction of screen time is suggested.
e. Engage oneself in stimulating and motivational activities.
f. Connect with nature, life, people around and with those who have recovered.
g. Look after oneself through nutritious food, exercises, motivating and positive thoughts and practice spirituality.
h. Use relaxation and breathing exercises to help in anxiety and sleep.
i. Seek help from phone counselling and self-help groups.
j. Refer to psychiatrist, if required for telemedicine consults.

**Assessment**

1. **Formative:** DOPS, Viva can be used. This could be done immediately after the module and/or later with internal assessment.

2. **Summative:** not required.

**Further reading:**

WHO. Mental health and psychosocial considerations during the COVID-19 outbreak-Interim guidance WHO/2019-nCoV/MentalHealth/2020.1 available at https://www.who.int/publications/i/item/WHO-2019-nCoV-MentalHealth-2020.1

**The copy of THE EPIDEMIC DISEASES ACT, 1897 & THE DISASTER MANAGEMENT ACT, 2005 which have been attached as Annexure I and Annexure II respectively, have been obtained from India Code Depository of All Central and States Acts Website.**

**Link:- https://www.indiacode.nic.in/**

# Annexure I

# THE EPIDEMIC DISEASES ACT, 1897

# &

# Annexure II

# THE DISASTER MANAGEMENT ACT, 2005

THE EPIDEMIC DISEASES ACT, 1897

ARRANGEMENT OF SECTIONS

SECTIONS

1. Short title and extent.

2. Power to take special measures and prescribe regulations as to dangerous epidemic disease.

2A. Powers of Central Government.

3. Penalty.

4. Protection to persons acting under Act.

# THE EPIDEMIC DISEASES ACT, 1897

## ACT NO. 3 OF 1897[1]

[*4th February*, 1897.]

An Act to provide for the better prevention of the spread of Dangerous Epidemic Diseases.

WHEREAS it is expedient to provide for the better prevention of the spread of dangerous epidemic disease; It is hereby enacted as follows :—

**1. Short title and extent.**—(*1*) This Act may be called the Epidemic Diseases Act, 1897.

[2][(*2*) It extends to the whole of India except [3][the territories which, immediately before the 1st November, 1956, were comprised in Part B States]] [4]* * *

[5]* * * * *

[6]**2. Power to take special measures and prescribe regulations as to dangerous epidemic disease.**—(*1*) When at any time the [7][State Government] is satisfied that [7][the State] or any part thereof is visited by, or threatened with, an outbreak of any dangerous epidemic disease, the [8][State Government], if [9][it] thinks that the ordinary provisions of the law for the time being in force are insufficient for the purpose, may take, or require or empower any person to take, such measures and, by public notice, prescribe such temporary regulations to be observed by the public or by any person or class of persons as [9][it] shall deem necessary to prevent the outbreak of such disease or the spread thereof, and may determine in what manner and by whom any expenses incurred (including compensation if any) shall be defrayed.

(*2*) In particular and without prejudice to the generality of the foregoing provisions, the [7][State Government] may take measures and prescribe regulations for—

[10]* * * * *

(*b*) the inspection of persons travelling by railway or otherwise, and the segregation, in hospital, temporary accommodation or otherwise, of persons suspected by the inspecting officer of being infected with any such disease.

[11]* * * * *

1. This Act has been amended in its application to—
   (*1*) the Punjab by the Epidemic Diseases (Punjab Amendment) Act, 1944 (Punjab Act 3 of 1944); in East Punjab by East Punjab Act 1 of 1947:
   (*2*) the C. P. and Berar by the C. P. and Berar Epidemic Diseases (Amendment) Act, 1945 (C. P. and Berar Act 4 of 1945).
   The Act has been extended to—
   (*1*) the whole of Madhya Pradesh by M.P. Act 23 of 1958 (when notified).
   (*2*) the transferred territories of Punjab by Punjab Act 8 of 1961.
   (*3*) in Dadra and Nagar Haveli (w.e.f. 1-7-1965) by Reg. 6 of 1963, s. 2 and Sch.
   (*4*) to Lakshadweep (w.e.f. 1-10-1967) : *vide* Reg. 8 of 1965, s. 3 and Sch.
   (*5*) Union territory of Pondicherry by Act 26 of 1968, s. 3 and Sch.
   The Act has been repealed in its application to Bellary District by Mysore Act 14 of 1955.
2. Subs. by the A.0. 1950.
3. Subs. by the Adaptation of Laws (No. 2) Order, 1956 for "Part B States".
4. The word "and" rep. by Act 10 of 1914, s. 3 and the Second Schedule.
5. Sub-section (*3*) rep. by s. 3 and the Second Schedule, *ibid*.
6. For Notifications issued under this section, *see* different local Rules and Orders.
7. Subs. by the A.O. 1937, for "G.G. in C."
8. Subs., *ibid.,* for "India".
9. Subs., *ibid.,* for "he".
10. Paragraph (*a*) omitted, *ibid.*
11. Sub-section (*3*) omitted by Act 38 of 1920, s. 2 and the First Schedule.

[1][2A. **Powers of Central Government.**—When the Central Government is satisfied that India or any part thereof is visited by, or threatened with, an outbreak of any dangerous epidemic disease and that the ordinary provisions of the law for the time being in force are insufficient to prevent the outbreak of such disease or the spread thereof, the Central Government may take measures and prescribe regulations for the inspection of any ship or vessel leaving or arriving at any port in [2][the territories to which this Act extends] and for such detention thereof, or of any person intending to sail therein, or arriving thereby, as may be necessary.]

**3. Penalty.**—Any person disobeying any regulation or order made under this Act shall be deemed to have committed an offence punishable under section 188 of the Indian Penal Code (45 of 1860).

**4. Protection to persons acting under Act.**—No suit or other legal proceeding shall lie against any person for anything done or in good faith intended to be done under this Act.

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1. Ins. by Act 38 of 1920, s. 2 and the First Schedule. Earlier substituted by the A.O.1937.
2. Subs. by the Adaptation of Laws (No.2) Order, 1956, for "a Part A State or a Part C State".

THE DISASTER MANAGEMENT ACT, 2005

ARRAGEMENT OF SECTIONS

CHAPTER I

PRELIMINARY

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1. Short title, extent and commencement.
2. Definitions.

CHAPTER II

THE NATIONAL DISASTER MANAGEMENT AUTHORITY

3. Establishment of National Disaster Management Authority.
4. Meetings of National Authority.
5. Appointment of officers and other employees of the National Authority.
6. Powers and functions of National Authority.
7. Constitution of advisory committee by National Authority.
8. Constitution of National Executive Committee.
9. Constitution of sub-committees.
10. Powers and functions of National Executive Committee.
11. National plan.
12. Guidelines for minimum standards of relief.
13. Relief in loan repayment, etc.

CHAPTER III

STATE DISASTER MANAGEMENT AUTHORITY

14. Establishment of State Disaster Management Authority.
15. Meetings of the State Authority.
16. Appointment of officers and other employees of State Authority.
17. Constitution of advisory committee by the State Authority.
18. Powers and functions of State Authority.
19. Guidelines for minimum standard of relief by State Authority.
20. Constitution of State Executive Committee.
21. Constitution of sub-committees by State Executive Committee.
22. Functions of the State Executive Committee.
23. State Plan.
24. Powers and functions of State Executive Committee in the event of threatening disaster situation.

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DISTRICT DISASTER MANAGEMENT AUTHORITY

25. Constitution of District Disaster Management Authority.
26. Powers of Chairperson of District Authority.

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27. Meetings.
28. Constitution of advisory committees and other committees.
29. Appointment of officers and other employees of District Authority.
30. Powers and functions of District Authority.
31. District Plan.
32. Plans by different authorities at district level and their implementation.
33. Requisition by the District Authority.
34. Powers and functions of District Authority in the event of any threatening disaster situation or disaster.

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36. Responsibilities of Ministries or Departments of Government of India.
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39. Responsibilities of departments of the State Government.
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44. National Disaster Response Force.
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56. Failure of officer in duty or his connivance at the contravention of the provisions of this Act.
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67. Direction to media for communication of warnings, etc.
68. Authentication of orders of decisions.
69. Delegation of powers.
70. Annual report.
71. Bar of jurisdiction of court.
72. Act to have overriding effect.
73. Action taken in good faith.
74. Immunity from legal process.
75. Power of Central Government to make rules.
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77. Rules and regulations to be laid before Parliament.
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79. Power to remove difficulties.

# THE DISASTER MANAGEMENT ACT, 2005

## ACT NO. 53 OF 2005

[23*rd December*, 2005.]

An Act to provide for the effective management of disasters and for matters connected therewith or incidental thereto.

BE it enacted by Parliament in the Fifty-sixth Year of the Republic of India as follows:—

## CHAPTER I

## PRELIMINARY

**1. Short title, extent and commencement.**—(*1*) This Act may be called the Disaster Management Act, 2005.

(*2*) It extends to the whole of India.

(*3*) It shall come into force on such date[1] as the Central Government may, by notification in the Official Gazette appoint; and different dates* may be appointed for different provisions of this Act and for different States, and any reference to commencement in any provision of this Act in relation to any State shall be construed as a reference to the commencement of that provision in that State.

**2. Definitions**.—In this Act, unless the context otherwise requires,—

(*a*) "affected area" means an area or part of the country affected by a disaster;

(*b*) "capacity-building" includes—

(*i*) identification of existing resources and resources to be acquired or created;

(*ii*) acquiring or creating resources identified under sub-clause (*i*);

(*iii*) organisation and training of personnel and coordination of such training for effective management of disasters;

(*c*) "Central Government" means the Ministry or Department of the Government of India having administrative control of disaster management;

(*d*) "disaster" means a catastrophe, mishap, calamity or grave occurrence in any area, arising from natural or man made causes, or by accident or negligence which results in substantial loss of life or human suffering or damage to, and destruction of, property, or damage to, or degradation of, environment, and is of such a nature or magnitude as to be beyond the coping capacity of the community of the affected area;

(*e*) "disaster management" means a continuous and integrated process of planning, organising, coordinating and implementing measures which are necessary or expedient for—

(*i*) prevention of danger or threat of any disaster;

(*ii*) mitigation or reduction of risk of any disaster or its severity or consequences;

(*iii*) capacity-building;

(*iv*) preparedness to deal with any disaster;

(*v*) prompt response to any threatening disaster situation or disaster;

(*vi*) assessing the severity or magnitude of effects of any disaster;

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1. 28th July, 2006 (ss. 2, 3, 4, 5, 6, 8, 10, 75, 77, 79), *vide* notification No. S.O. 1216(E), dated 28th July, 2006;

*1st August, 2007 [ss. 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 38, 39, 40, 41, 48, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, sub-sec. (2) of s. 70, 71, 72, 73, 74, 78, 79], *vide* notification No. S.O. 722(E), dated 7th May, 2007;

*17th March, 2008 (ss. 44, 45), *vide* notification No. 517(E), dated 17th March, 2008;

*18th October, 2011 (s. 46), *vide* notification No. S.O. 2397(E), dated 18th October, 2011, *see* Gazette of India, Extraordinary, Part II, sec. 3(*ii*).

(*vii*) evacuation, rescue and relief;

(*viii*) rehabilitation and reconstruction;

(*f*) "District Authority" means the District Disaster Management Authority constituted under sub-section (*1*) of section 25;

(*g*) "District Plan" means the plan for disaster management for the district prepared under section 31;

(*h*) "local authority" includes panchayati raj institutions, municipalities, a district board, cantonment board, town planning authority or Zila Parishad or any other body or authority, by whatever name called, for the time being invested by law, for rendering essential services or, with the control and management of civic services, within a specified local area;

(*i*) "mitigation" means measures aimed at reducing the risk, impact or effects of a disaster or threatening disaster situation;

(*j*) "National Authority" means the National Disaster Management Authority established under sub-section (*1*) of section 3;

(*k*) "National Executive Committee" means the Executive Committee of the National Authority constituted under sub-section (*1*) of section 8;

(*l*) "National Plan" means the plan for disaster management for the whole of the country prepared under section 11;

(*m*) "preparedness" means the state of readiness to deal with a threatening disaster situation or disaster and the effects thereof;

(*n*) "prescribed" means prescribed by rules made under this Act;

(*o*) "reconstruction" means construction or restoration of any property after a disaster;

(*p*) "resources" includes manpower, services, materials and provisions;

(*q*) "State Authority" means the State Disaster Management Authority established under sub-section (*1*) of section 14 and includes the Disaster Management Authority for the Union territory constituted under that section;

(*r*) "State Executive Committee" means the Executive Committee of a State Authority constituted under sub-section (*1*) of section 20;

(*s*) "State Government" means the Department of Government of the State having administrative control of disaster management and includes Administrator of the Union territory appointed by the President under article 239 of the Constitution;

(*t*) "State Plan" means the plan for disaster management for the whole of the State prepared under section 23.

## CHAPTER II

### THE NATIONAL DISASTER MANAGEMENT AUTHORITY

**3. Establishment of National Disaster Management Authority.**—(*1*) With effect from such date as the Central Government may, by notification in the Official Gazette appoint in this behalf, there shall be established for the purposes of this Act, an authority to be known as the National Disaster Management Authority.

(*2*) The National Authority shall consist of the Chairperson and such number of other members, not exceeding nine, as may be prescribed by the Central Government and, unless the rules otherwise provide, the National Authority shall consist of the following:—

(*a*) the Prime Minister of India, who shall be the Chairperson of the National Authority, *ex officio;*

(*b*) other members, not exceeding nine, to be nominated by the Chairperson of the National Authority.

(*3*) The Chairperson of the National Authority may designate one of the members nominated under clause (*b*) of sub-section (*2*) to be the Vice-Chairperson of the National Authority.

(*4*) The term of office and conditions of service of members of the National Authority shall be such as may be prescribed.

**4. Meetings of National Authority**.—(*1*) The National Authority shall meet as and when necessary and at such time and place as the Chairperson of the National Authority may think fit.

(*2*) The Chairperson of the National Authority shall preside over the meetings of the National Authority.

(*3*) If for any reason the Chairperson of the National Authority is unable to attend any meeting of the National Authority, the Vice-Chairperson of the National Authority shall preside over the meeting.

**5. Appointment of officers and other employees of the National Authority**.—The Central Government shall provide the National Authority with such officers, consultants and employees, as it considers necessary for carrying out the functions of the National Authority.

**6. Powers and functions of National Authority.**—(*1*) Subject to the provisions of this Act, the National Authority shall have the responsibility for laying down the policies, plans and guidelines for disaster management for ensuring timely and effective response to disaster.

(*2*) Without prejudice to generality of the provisions contained in sub-section (*1*), the National Authority may —

(*a*) lay down policies on disaster management;

(*b*) approve the National Plan;

(*c*) approve plans prepared by the Ministries or Departments of the Government of India in accordance with the National Plan;

(*d*) lay down guidelines to be followed by the State Authorities in drawing up the State Plan;

(*e*) lay down guidelines to be followed by the different Ministries or Departments of the Government of India for the purpose of integrating the measures for prevention of disaster or the mitigation of its effects in their development plans and projects;

(*f*) coordinate the enforcement and implementation of the policy and plan for disaster management;

(*g*) recommend provision of funds for the purpose of mitigation;

(*h*) provide such support to other countries affected by major disasters as may be determined by the Central Government;

(*i*) take such other measures for the prevention of disaster, or the mitigation, or preparedness and capacity building for dealing with the threatening disaster situation or disaster as it may consider necessary;

(*j*) lay down broad policies and guidelines for the functioning of the National Institute of Disaster Management.

(*3*) The Chairperson of the National Authority shall, in the case of emergency, have power to exercise all or any of the powers of the National Authority but exercise of such powers shall be subject to *ex post facto* ratification by the National Authority.

**7. Constitution of advisory committee by National Authority.**—(*1*) The National Authority may constitute an advisory committee consisting of experts in the field of disaster management and having practical experience of disaster management at the national, State or district level to make recommendations on different aspects of disaster management.

(*2*) The members of the advisory committee shall be paid such allowances as may be prescribed by the Central Government in consultation with the National Authority.

**8. Constitution of National Executive Committee.**—(*1*) The Central Government shall, immediately after issue of notification under sub-section (*1*) of section 3, constitute a National Executive Committee to assist the National Authority in the performance of its functions under this Act.

(*2*) The National Executive Committee shall consist of the following members, namely:—

(*a*) the Secretary to the Government of India in charge of the Ministry or Department of the Central Government having administrative control of the disaster management, who shall be Chairperson, *ex officio;*

(*b*) the Secretaries to the Government of India in the Ministries or Departments having administrative control of the agriculture, atomic energy, defence, drinking water supply, environment and forests, finance (expenditure), health, power, rural development, science and technology, space, telecommunication, urban development, water resources and the Chief of the Integrated Defence Staff of the Chiefs of Staff Committee, *ex officio*.

(*3*) The Chairperson of the National Executive Committee may invite any other officer of the Central Government or a State Government for taking part in any meeting of the National Executive Committee and shall exercise such powers and perform such functions as may be prescribed by the Central Government in consultation with the National Authority.

(*4*) The procedure to be followed by the National Executive Committee in exercise of its powers and discharge of its functions shall be such as may be prescribed by the Central Government.

**9. Constitution of sub-committees.**—(*1*) The National Executive Committee may, as and when it considers necessary, constitute one or more sub-committees, for the efficient discharge of its functions.

(*2*) The National Executive Committee shall, from amongst its members, appoint the Chairperson of the sub-committee referred to in sub-section (*1*).

(*3*) Any person associated as an expert with any sub-committee may be paid such allowances as may be prescribed by the Central Government.

**10. Powers and functions of National Executive Committee**.—(*1*) The National Executive Committee shall assist the National Authority in the discharge of its functions and have the responsibility for implementing the policies and plans of the National Authority and ensure the compliance of directions issued by the Central Government for the purpose of disaster management in the country.

(*2*) Without prejudice to the generality of the provisions contained in sub-section (*1*), the National Executive Committee may—

(*a*) act as the coordinating and monitoring body for disaster management;

(*b*) prepare the National Plan to be approved by the National Authority;

(*c*) coordinate and monitor the implementation of the National Policy;

(*d*) lay down guidelines for preparing disaster management plans by different Ministries or Departments of the Government of India and the State Authorities;

(*e*) provide necessary technical assistance to the State Governments and the State Authorities for preparing their disaster management plans in accordance with the guidelines laid down by the National Authority;

(*f*) monitor the implementation of the National Plan and the plans prepared by the Ministries or Departments of the Government of India;

(*g*) monitor the implementation of the guidelines laid down by the National Authority for integrating of measures for prevention of disasters and mitigation by the Ministries or Departments in their development plans and projects;

(*h*) monitor, coordinate and give directions regarding the mitigation and preparedness measures to be taken by different Ministries or Departments and agencies of the Government;

(*i*) evaluate the preparedness at all governmental levels for the purpose of responding to any threatening disaster situation or disaster and give directions, where necessary, for enhancing such preparedness;

(*j*) plan and coordinate specialised training programme for disaster management for different levels of officers, employees and voluntary rescue workers;

(*k*) coordinate response in the event of any threatening disaster situation or disaster;

(*l*) lay down guidelines for, or give directions to, the concerned Ministries or Departments of the Government of India, the State Governments and the State Authorities regarding measures to be taken by them in response to any threatening disaster situation or disaster;

(*m*) require any department or agency of the Government to make available to the National Authority or State Authorities such men or material resources as are available with it for the purposes of emergency response, rescue and relief;

(*n*) advise, assist and coordinate the activities of the Ministries or Departments of the Government of India, State Authorities, statutory bodies, other governmental or non-governmental organisations and others engaged in disaster management;

(*o*) provide necessary technical assistance or give advice to the State Authorities and District Authorities for carrying out their functions under this Act;

(*p*) promote general education and awareness in relation to disaster management; and

(*q*) perform such other functions as the National Authority may require it to perform.

**11. National Plan.**—(*1*) There shall be drawn up a plan for disaster management for the whole of the country to be called the National Plan.

(*2*) The National Plan shall be prepared by the National Executive Committee having regard to the National Policy and in consultation with the State Governments and expert bodies or organisations in the field of disaster management to be approved by the National Authority.

(*3*) The National Plan shall include—

(*a*) measures to be taken for the prevention of disasters, or the mitigation of their effects;

(*b*) measures to be taken for the integration of mitigation measures in the development plans;

(*c*) measures to be taken for preparedness and capacity building to effectively respond to any threatening disaster situations or disaster;

(*d*) roles and responsibilities of different Ministries or Departments of the Government of India in respect of measures specified in clauses (*a*), (*b*) and (*c*).

(*4*) The National Plan shall be reviewed and updated annually.

(*5*) Appropriate provisions shall be made by the Central Government for financing the measures to be carried out under the National Plan.

(*6*) Copies of the National Plan referred to in sub-sections (*2*) and (*4*) shall be made available to the Ministries or Departments of the Government of India and such Ministries or Departments shall draw up their own plans in accordance with the National Plan.

**12. Guidelines for minimum standards of relief**.—The National Authority shall recommend guidelines for the minimum standards of relief to be provided to persons affected by disaster, which shall include,—

(*i*) the minimum requirements to be provided in the relief camps in relation to shelter, food, drinking water, medical cover and sanitation;

(*ii*) the special provisions to be made for widows and orphans;

(*iii*) *ex gratia* assistance on account of loss of life as also assistance on account of damage to houses and for restoration of means of livelihood;

(*iv*) such other relief as may be necessary.

**13. Relief in loan repayment, etc.**—The National Authority may, in cases of disasters of severe magnitude, recommend relief in repayment of loans or for grant of fresh loans to the persons affected by disaster on such concessional terms as may be appropriate.

## CHAPTER III

## STATE DISASTER MANAGEMENT AUTHORITIES

**14. Establishment of State Disaster Management Authority.**—(*1*) Every State Government shall, as soon as may be after the issue of the notification under sub-section (*1*) of section 3, by notification in the Official Gazette, establish a State Disaster Management Authority for the State with such name as may be specified in the notification of the State Government.

(*2*) A State Authority shall consist of the Chairperson and such number of other members, not exceeding nine, as may be prescribed by the State Government and, unless the rules otherwise provide, the State Authority shall consist of the following members, namely:—

(*a*) the Chief Minister of the State, who shall be Chairperson, *ex officio*;

(*b*) other members, not exceeding eight, to be nominated by the Chairperson of the State Authority;

(*c*) the Chairperson of the State Executive Committee, *ex officio*.

(*3*) The Chairperson of the State Authority may designate one of the members nominated under clause (*b*) of sub-section (*2*) to be the Vice-Chairperson of the State Authority.

(*4*) The Chairperson of the State Executive Committee shall be the Chief Executive Officer of the State Authority, *ex officio*:

Provided that in the case of a Union territory having Legislative Assembly, except the Union territory of Delhi, the Chief Minister shall be the Chairperson of the Authority established under this section and in case of other Union territories, the Lieutenant Governor or the Administrator shall be the Chairperson of that Authority:

Provided further that the Lieutenant Governor of the Union territory of Delhi shall be the Chairperson and the Chief Minister thereof shall be the Vice-Chairperson of the State Authority.

(*5*) The term of office and conditions of service of members of the State Authority shall be such as may be prescribed.

**15. Meetings of the State Authority**.—(*1*) The State Authority shall meet as and when necessary and at such time and place as the Chairperson of the State Authority may think fit.

(*2*) The Chairperson of the State Authority shall preside over the meetings of the State Authority.

(*3*) If for any reason, the Chairperson of the State Authority is unable to attend the meeting of the State Authority, the Vice-Chairperson of the State Authority shall preside at the meeting.

**16. Appointment of officers and other employees of State Authority.**—The State Government shall provide the State Authority with such officers, consultants and employees, as it considers necessary, for carrying out the functions of the State Authority.

**17. Constitution of advisory committee by the State Authority.**—(*1*) A State Authority may, as and when it considers necessary, constitute an advisory committee, consisting of experts in the field of disaster management and having practical experience of disaster management to make recommendations on different aspects of disaster management.

(*2*) The members of the advisory committee shall be paid such allowances as may be prescribed by the State Government.

**18. Powers and functions of State Authority.**—(*1*) Subject to the provisions of this Act, a State Authority shall have the responsibility for laying down policies and plans for disaster management in the State.

(*2*) Without prejudice to the generality of provisions contained in sub-section (*1*), the State Authority may—

(*a*) lay down the State disaster management policy;

(*b*) approve the State Plan in accordance with the guidelines laid down by the National Authority;

(*c*) approve the disaster management plans prepared by the departments of the Government of the State;

(*d*) lay down guidelines to be followed by the departments of the Government of the State for the purposes of integration of measures for prevention of disasters and mitigation in their development plans and projects and provide necessary technical assistance therefor;

(*e*) coordinate the implementation of the State Plan;

(*f*) recommend provision of funds for mitigation and preparedness measures;

(*g*) review the development plans of the different departments of the State and ensure that prevention and mitigation measures are integrated therein;

(*h*) review the measures being taken for mitigation, capacity building and preparedness by the departments of the Government of the State and issue such guidelines as may be necessary.

(*3*) The Chairperson of the State Authority shall, in the case of emergency, have power to exercise all or any of the powers of the State Authority but the exercise of such powers shall be subject to *ex post facto* ratification of the State Authority.

**19. Guidelines for minimum standard of relief by State Authority**.—The State Authority shall lay down detailed guidelines for providing standards of relief to persons affected by disaster in the State:

Provided that such standards shall in no case be less than the minimum standards in the guidelines laid down by the National Authority in this regard.

**20. Constitution of State Executive Committee.**—(*1*) The State Government shall, immediately after issue of notification under sub-section (*1*) of section 14, constitute a State Executive Committee to assist the State Authority in the performance of its functions and to coordinate action in accordance with the guidelines laid down by the State Authority and ensure the compliance of directions issued by the State Government under this Act.

(*2*) The State Executive Committee shall consist of the following members, namely:—

(*a*) the Chief Secretary to the State Government, who shall be Chairperson, *ex officio*;

(*b*) four Secretaries to the Government of the State of such departments as the State Government may think fit, *ex officio*.

(*3*) The Chairperson of the State Executive Committee shall exercise such powers and perform such functions as may be prescribed by the State Government and such other powers and functions as may be delegated to him by the State Authority.

(*4*) The procedure to be followed by the State Executive Committee in exercise of its powers and discharge of its functions shall be such as may be prescribed by the State Government.

**21. Constitution of sub-committees by State Executive Committee.**—(*1*) The State Executive Committee may, as and when it considers necessary, constitute one or more sub-committees, for efficient discharge of its functions.

(*2*) The State Executive Committee shall, from amongst its members, appoint the Chairperson of the sub-committee referred to in sub-section (*1*).

(*3*) Any person associated as an expert with any sub-committee may be paid such allowances as may be prescribed by the State Government.

**22. Functions of the State Executive Committee**.—(*1*) The State Executive Committee shall have the responsibility for implementing the National Plan and State Plan and act as the coordinating and monitoring body for management of disaster in the State.

(*2*) Without prejudice to the generality of the provisions of sub-section (*1*), the State Executive Committee may—

(*a*) coordinate and monitor the implementation of the National Policy, the National Plan and the State Plan;

(*b*) examine the vulnerability of different parts of the State to different forms of disasters and specify measures to be taken for their prevention or mitigation;

(*c*) lay down guidelines for preparation of disaster management plans by the departments of the Government of the State and the District Authorities;

(*d*) monitor the implementation of disaster management plans prepared by the departments of the Government of the State and District Authorities;

(*e*) monitor the implementation of the guidelines laid down by the State Authority for integrating of measures for prevention of disasters and mitigation by the departments in their development plans and projects;

(*f*) evaluate preparedness at all governmental or non-governmental levels to respond to any threatening disaster situation or disaster and give directions, where necessary, for enhancing such preparedness;

(*g*) coordinate response in the event of any threatening disaster situation or disaster;

(*h*) give directions to any Department of the Government of the State or any other authority or body in the State regarding actions to be taken in response to any threatening disaster situation or disaster;

(*i*) promote general education, awareness and community training in regard to the forms of disasters to which different parts of the State are vulnerable and the measures that may be taken by such community to prevent the disaster, mitigate and respond to such disaster;

(*j*) advise, assist and coordinate the activities of the Departments of the Government of the State, District Authorities, statutory bodies and other governmental and non-governmental organisations engaged in disaster management;

(*k*) provide necessary technical assistance or give advice to District Authorities and local authorities for carrying out their functions effectively;

(*l*) advise the State Government regarding all financial matters in relation to disaster management;

(*m*) examine the construction, in any local area in the State and, if it is of the opinion that the standards laid for such construction for the prevention of disaster is not being or has not been followed, may direct the District Authority or the local authority, as the case may be, to take such action as may be necessary to secure compliance of such standards;

(*n*) provide information to the National Authority relating to different aspects of disaster management;

(*o*) lay down, review and update State level response plans and guidelines and ensure that the district level plans are prepared, reviewed and updated;

(*p*) ensure that communication systems are in order and the disaster management drills are carried out periodically;

(*q*) perform such other functions as may be assigned to it by the State Authority or as it may consider necessary.

**23. State Plan.**—(*1*) There shall be a plan for disaster management for every State to be called the State Disaster Management Plan.

(*2*) The State Plan shall be prepared by the State Executive Committee having regard to the guidelines laid down by the National Authority and after such consultation with local authorities, district authorities and the people's representatives as the State Executive Committee may deem fit.

(*3*) The State Plan prepared by the State Executive Committee under sub-section (*2*) shall be approved by the State Authority.

(*4*) The State Plan shall include,—

(*a*) the vulnerability of different parts of the State to different forms of disasters;

(*b*) the measures to be adopted for prevention and mitigation of disasters;

(*c*) the manner in which the mitigation measures shall be integrated with the development plans and projects;

(*d*) the capacity-building and preparedness measures to be taken;

(*e*) the roles and responsibilities of each Department of the Government of the State in relation to the measures specified in clauses (*b*), (*c*) and (*d*) above;

(*f*) the roles and responsibilities of different Departments of the Government of the State in responding to any threatening disaster situation or disaster.

(*5*) The State Plan shall be reviewed and updated annually.

(*6*) Appropriate provisions shall be made by the State Government for financing for the measures to be carried out under the State Plan.

(*7*) Copies of the State Plan referred to in sub-sections (*2*) and (*5*) shall be made available to the Departments of the Government of the State and such Departments shall draw up their own plans in accordance with the State Plan.

**24. Powers and functions of State Executive Committee in the event of threatening disaster situation.**—For the purpose of, assisting and protecting the community affected by disaster or providing relief to such community or, preventing or combating disruption or dealing with the effects of any threatening disaster situation, the State Executive Committee may—

(*a*) control and restrict, vehicular traffic to, from or within, the vulnerable or affected area;

(*b*) control and restrict the entry of any person into, his movement within and departure from, a vulnerable or affected area;

(*c*) remove debris, conduct search and carry out rescue operations;

(*d*) provide shelter, food, drinking water, essential provisions, healthcare and services in accordance with the standards laid down by the National Authority and State Authority;

(*e*) give direction to the concerned Department of the Government of the State, any District Authority or other authority, within the local limits of the State to take such measure or steps for rescue, evacuation or providing immediate relief saving lives or property, as may be necessary in its opinion;

(*f*) require any department of the Government of the State or any other body or authority or person in charge of any relevant resources to make available the resources for the purposes of emergency response, rescue and relief;

(*g*) require experts and consultants in the field of disasters to provide advice and assistance for rescue and relief;

(*h*) procure exclusive or preferential use of amenities from any authority or person as and when required;

(*i*) construct temporary bridges or other necessary structures and demolish unsafe structures which may be hazardous to public;

(*j*) ensure that non-governmental organisations carry out their activities in an equitable and non-discriminatory manner;

(*k*) disseminate information to public to deal with any threatening disaster situation or disaster;

(*l*) take such steps as the Central Government or the State Government may direct in this regard or take such other steps as are required or warranted by the form of any threatening disaster situation or disaster.

## CHAPTER IV

### DISTRICT DISASTER MANAGEMENT AUTHORITY

**25. Constitution of District Disaster Management Authority**.—(*1*) Every State Government shall, as soon as may be after issue of notification under sub-section (*1*) of section 14, by notification in the Official Gazette, establish a District Disaster Management Authority for every district in the State with such name as may be specified in that notification.

(*2*) The District Authority shall consist of the Chairperson and such number of other members, not exceeding seven, as may be prescribed by the State Government, and unless the rules otherwise provide, it shall consist of the following, namely:—

(*a*) the Collector or District Magistrate or Deputy Commissioner, as the case may be, of the district who shall be Chairperson, *ex officio*;

(*b*) the elected representative of the local authority who shall be the co-Chairperson, *ex officio*:

Provided that in the Tribal Areas, as referred to in the Sixth Schedule to the Constitution, the Chief Executive Member of the district council of autonomous district, shall be the co-Chairperson, *ex officio*;

(*c*) the Chief Executive Officer of the District Authority, *ex officio*;

(*d*) the Superintendent of Police, *ex officio*;

(*e*) the Chief Medical Officer of the district, *ex officio*;

(*f*) not exceeding two other district level officers, to be appointed by the State Government.

(*3*) In any district where zila parishad exists, the Chairperson thereof shall be the co-Chairperson of the District Authority.

(*4*) The State Government shall appoint an officer not below the rank of Additional Collector or Additional District Magistrate or Additional Deputy Commissioner, as the case may be, of the district to be the Chief Executive Officer of the District Authority to exercise such powers and perform such functions as may be prescribed by the State Government and such other powers and functions as may be delegated to him by the District Authority.

**26. Powers of Chairperson of District Authority.**—(*1*) The Chairperson of the District Authority shall, in addition to presiding over the meetings of the District Authority, exercise and discharge such powers and functions of the District Authority as the District Authority may delegate to him.

(*2*) The Chairperson of the District Authority shall, in the case of an emergency, have power to exercise all or any of the powers of the District Authority but the exercise of such powers shall be subject to *ex post facto* ratification of the District Authority.

(*3*) The District Authority or the Chairperson of the District Authority may, by general or special order, in writing, delegate such of its or his powers and functions, under sub-section (*1*) or (*2*), as the case may be, to the Chief Executive Officer of the District Authority, subject to such conditions and limitations, if any, as it or he deems fit.

**27. Meetings**.—The District Authority shall meet as and when necessary and at such time and place as the Chairperson may think fit.

**28. Constitution of advisory committees and other committees.**—(*1*) The District Authority may, as and when it considers necessary, constitute one or more advisory committees and other committees for the efficient discharge of its functions.

(*2*) The District Authority shall, from amongst its members, appoint the Chairperson of the Committee referred to in sub-section (*1*).

(*3*) Any person associated as an expert with any committee or sub-committee constituted under sub-section (*1*) may be paid such allowances as may be prescribed by the State Government.

**29. Appointment of officers and other employees of District Authority**.—The State Government shall provide the District Authority with such officers, consultants and other employees as it considers necessary for carrying out the functions of District Authority.

**30. Powers and functions of District Authority.**—(*1*) The District Authority shall act as the district planning, coordinating and implementing body for disaster management and take all measures for the purposes of disaster management in the district in accordance with the guidelines laid down by the National Authority and the State Authority.

(*2*) Without prejudice to the generality of the provisions of sub-section (*1*), the District Authority may—

(*i*) prepare a disaster management plan including district response plan for the district;

(*ii*) coordinate and monitor the implementation of the National Policy, State Policy, National Plan, State Plan and District Plan;

(*iii*) ensure that the areas in the district vulnerable to disasters are identified and measures for the prevention of disasters and the mitigation of its effects are undertaken by the departments of the Government at the district level as well as by the local authorities;

(*iv*) ensure that the guidelines for prevention of disasters, mitigation of its effects, preparedness and response measures as laid down by the National Authority and the State Authority are followed by all departments of the Government at the district level and the local authorities in the district;

(*v*) give directions to different authorities at the district level and local authorities to take such other measures for the prevention or mitigation of disasters as may be necessary;

(*vi*) lay down guidelines for prevention of disaster management plans by the department of the Government at the districts level and local authorities in the district;

(*vii*) monitor the implementation of disaster management plans prepared by the Departments of the Government at the district level;

(*viii*) lay down guidelines to be followed by the Departments of the Government at the district level for purposes of integration of measures for prevention of disasters and mitigation in their development plans and projects and provide necessary technical assistance therefor;

(*ix*) monitor the implementation of measures referred to in clause (*viii*);

(*x*) review the state of capabilities for responding to any disaster or threatening disaster situation in the district and give directions to the relevant departments or authorities at the district level for their up gradation as may be necessary;

(*xi*) review the preparedness measures and give directions to the concerned departments at the district level or other concerned authorities where necessary for bringing the preparedness measures to the levels required for responding effectively to any disaster or threatening disaster situation;

(*xii*) organise and coordinate specialised training programmes for different levels of officers, employees and voluntary rescue workers in the district;

(*xiii*) facilitate community training and awareness programmes for prevention of disaster or mitigation with the support of local authorities, governmental and non-governmental organisations;

(*xiv*) set up, maintain, review and upgrade the mechanism for early warnings and dissemination of proper information to public;

(*xv*) prepare, review and update district level response plan and guidelines;

(*xvi*) coordinate response to any threatening disaster situation or disaster;

(*xvii*) ensure that the Departments of the Government at the district level and the local authorities prepare their response plans in accordance with the district response plan;

(*xviii*) lay down guidelines for, or give direction to, the concerned Department of the Government at the district level or any other authorities within the local limits of the district to take measures to respond effectively to any threatening disaster situation or disaster;

(*xix*) advise, assist and coordinate the activities of the Departments of the Government at the district level, statutory bodies and other governmental and non-governmental organisations in the district engaged in the disaster management;

(*xx*) coordinate with, and give guidelines to, local authorities in the district to ensure that measures for the prevention or mitigation of threatening disaster situation or disaster in the district are carried out promptly and effectively;

(*xxi*) provide necessary technical assistance or give advise to the local authorities in the district for carrying out their functions;

(*xxii*) review development plans prepared by the Departments of the Government at the district level, statutory authorities or local authorities with a view to make necessary provisions therein for prevention of disaster or mitigation;

(*xxiii*) examine the construction in any area in the district and, if it is of the opinion that the standards for the prevention of disaster or mitigation laid down for such construction is not being or has not been followed, may direct the concerned authority to take such action as may be necessary to secure compliance of such standards;

(*xxiv*) identify buildings and places which could, in the event of any threatening disaster situation or disaster, be used as relief centers or camps and make arrangements for water supply and sanitation in such buildings or places;

(*xxv*) establish stockpiles of relief and rescue materials or ensure preparedness to make such materials available at a short notice;

(*xxvi*) provide information to the State Authority relating to different aspects of disaster management;

(*xxvii*) encourage the involvement of non-governmental organisations and voluntary social-welfare institutions working at the grassroots level in the district for disaster management;

(*xxviii*) ensure communication systems are in order, and disaster management drills are carried out periodically;

(*xxix*) perform such other functions as the State Government or State Authority may assign to it or as it deems necessary for disaster management in the District.

**31. District Plan**.—(*1*) There shall be a plan for disaster management for every district of the State.

(*2*) The District Plan shall be prepared by the District Authority, after consultation with the local authorities and having regard to the National Plan and the State Plan, to be approved by the State Authority.

(*3*) The District Plan shall include—

(*a*) the areas in the district vulnerable to different forms of disasters;

(*b*) the measures to be taken, for prevention and mitigation of disaster, by the Departments of the Government at the district level and local authorities in the district;

(*c*) the capacity-building and preparedness measures required to be taken by the Departments of the Government at the district level and the local authorities in the district to respond to any threatening disaster situation or disaster;

(*d*) the response plans and procedures, in the event of a disaster, providing for—

(*i*) allocation of responsibilities to the Departments of the Government at the district level and the local authorities in the district;

(*ii*) prompt response to disaster and relief thereof;

(*iii*) procurement of essential resources;

(*iv*) establishment of communication links; and

(*v*) the dissemination of information to the public;

(*e*) such other matters as may be required by the State Authority.

(*4*) The District Plan shall be reviewed and updated annually.

(*5*) The copies of the District Plan referred to in sub-sections (*2*) and (*4*) shall be made available to the Departments of the Government in the district.

(*6*) The District Authority shall send a copy of the District Plan to the State Authority which shall forward it to the State Government.

(*7*) The District Authority shall, review from time to time, the implementation of the Plan and issue such instructions to different departments of the Government in the district as it may deem necessary for the implementation thereof.

**32. Plans by different authorities at district level and their implementation.**—Every office of the Government of India and of the State Government at the district level and the local authorities shall, subject to the supervision of the District Authority,—

(*a*) prepare a disaster management plan setting out the following, namely:—

(*i*) provisions for prevention and mitigation measures as provided for in the District Plan and as is assigned to the department or agency concerned;

(*ii*) provisions for taking measures relating to capacity-building and preparedness as laid down in the District Plan;

(*iii*) the response plans and procedures, in the event of, any threatening disaster situation or disaster;

(*b*) coordinate the preparation and the implementation of its plan with those of the other organisations at the district level including local authority, communities and other stakeholders;

(*c*) regularly review and update the plan; and

(*d*) submit a copy of its disaster management plan, and of any amendment thereto, to the District Authority.

**33. Requisition by the District Authority**.—The District Authority may by order require any officer or any Department at the district level or any local authority to take such measures for the prevention or mitigation of disaster, or to effectively respond to it, as may be necessary, and such officer or department shall be bound to carry out such order.

**34. Powers and functions of District Authority in the event of any threatening disaster situation or disaster.**—For the purpose of assisting, protecting or providing relief to the community, in response to any threatening disaster situation or disaster, the District Authority may—

(*a*) give directions for the release and use of resources available with any Department of the Government and the local authority in the district;

(*b*) control and restrict vehicular traffic to, from and within, the vulnerable or affected area;

(*c*) control and restrict the entry of any person into, his movement within and departure from, a vulnerable or affected area;

(*d*) remove debris, conduct search and carry out rescue operations;

(*e*) provide shelter, food, drinking water and essential provisions, healthcare and services;

(*f*) establish emergency communication systems in the affected area;

(*g*) make arrangements for the disposal of the unclaimed dead bodies;

(*h*) recommend to any Department of the Government of the State or any authority or body under that Government at the district level to take such measures as are necessary in its opinion;

(*i*) require experts and consultants in the relevant fields to advise and assist as it may deem necessary;

(*j*) procure exclusive or preferential use of amenities from any authority or person;

(*k*) construct temporary bridges or other necessary structures and demolish structures which may be hazardous to public or aggravate the effects of the disaster;

(*l*) ensure that the non-governmental organisations carry out their activities in an equitable and non-discriminatory manner;

(*m*) take such other steps as may be required or warranted to be taken in such a situation.

## CHAPTER V

### MEASURES BY THE GOVERNMENT FOR DISASTER MANAGEMENT

**35. Central Government to take measures.**—(*1)* Subject to the provisions of this Act, the Central Government shall take all such measures as it deems necessary or expedient for the purpose of disaster management.

(*2*) In particular and without prejudice to the generality of the provisions of sub-section (*1*), the measures which the Central Government may take under that sub-section include measures with respect to all or any of the following matters, namely:—

(*a*) coordination of actions of the Ministries or Departments of the Government of India, State Governments, National Authority, State Authorities, governmental and non-governmental organisations in relation to disaster management;

(*b*) ensure the integration of measures for prevention of disasters and mitigation by Ministries or Departments of the Government of India into their development plans and projects;

(*c*) ensure appropriate allocation of funds for prevention of disaster, mitigation, capacity-building and preparedness by the Ministries or Departments of the Government of India;

(*d*) ensure that the Ministries or Departments of the Government of India take necessary measures for preparedness to promptly and effectively respond to any threatening disaster situation or disaster;

(*e*) cooperation and assistance to State Governments, as requested by them or otherwise deemed appropriate by it;

(*f*) deployment of naval, military and air forces, other armed forces of the Union or any other civilian personnel as may be required for the purposes of this Act;

(*g*) coordination with the United Nations agencies, international organisations and governments of foreign countries for the purposes of this Act;

(*h*) establish institutions for research, training, and developmental programmes in the field of disaster management;

(*i*) such other matters as it deems necessary or expedient for the purpose of securing effective implementation of the provisions of this Act.

(*3*) The Central Government may extend such support to other countries affected by major disaster as it may deem appropriate.

**36. Responsibilities of Ministries or Departments of Government of India.**—It shall be the responsibility of every Ministry or Department of the Government of India to—

(*a*) take measures necessary for prevention of disasters, mitigation, preparedness and capacity-building in accordance with the guidelines laid down by the National Authority;

(*b*) integrate into its development plans and projects, the measures for prevention or mitigation of disasters in accordance with the guidelines laid down by the National Authority;

(*c*) respond effectively and promptly to any threatening disaster situation or disaster in accordance with the guidelines of the National Authority or the directions of the National Executive Committee in this behalf;

(*d*) review the enactments administered by it, its policies, rules and regulations, with a view to incorporate therein the provisions necessary for prevention of disasters, mitigation or preparedness;

(*e*) allocate funds for measures for prevention of disaster, mitigation, capacity-building and preparedness;

(*f*) provide assistance to the National Authority and State Governments for—

(*i*) drawing up mitigation, preparedness and response plans, capacity-building, data collection and identification and training of personnel in relation to disaster management;

(*ii*) carrying out rescue and relief operations in the affected area;

(*iii*) assessing the damage from any disaster;

(*iv*) carrying out rehabilitation and reconstruction;

(*g*) make available its resources to the National Executive Committee or a State Executive Committee for the purposes of responding promptly and effectively to any threatening disaster situation or disaster, including measures for—

(*i*) providing emergency communication in a vulnerable or affected area;

(*ii*) transporting personnel and relief goods to and from the affected area;

(*iii*) providing evacuation, rescue, temporary shelter or other immediate relief;

(*iv*) setting up temporary bridges, jetties and landing places;

(*v*) providing, drinking water, essential provisions, healthcare, and services in an affected area;

(*h*) take such other actions as it may consider necessary for disaster management.

**37. Disaster management plans of Ministries or Departments of Government of India.**—(*1*) Every Ministry or Department of the Government of India shall—

(*a)* prepare a disaster management plan specifying the following particulars, namely:—

(*i*) the measures to be taken by it for prevention and mitigation of disasters in accordance with the National Plan;

(*ii*) the specifications regarding integration of mitigation measures in its development plans in accordance with the guidelines of the National Authority and the National Executive Committee;

(*iii*) its roles and responsibilities in relation to preparedness and capacity-building to deal with any threatening disaster situation or disaster;

(*iv*) its roles and responsibilities in regard to promptly and effectively responding to any threatening disaster situation or disaster;

(*v*) the present status of its preparedness to perform the roles and responsibilities specified in sub-clauses (*iii*) and (*iv*);

(*vi*) the measures required to be taken in order to enable it to perform its responsibilities specified in sub-clauses (*iii*) and (*iv*);

(*b*) review and update annually the plan referred to in clause (*a*);

(*c*) forward a copy of the plan referred to in clause (*a*) or clause (*b*), as the case may be, to the Central Government which Government shall forward a copy thereof to the National Authority for its approval.

(*2*) Every Ministry or Department of the Government of India shall––

(*a*) make, while preparing disaster management plan under clause (*a*) of sub-section (*1*), provisions for financing the activities specified therein;

(*b*) furnish a status report regarding the implementation of the plan referred to in clause (*a*) of sub-section (*1*) to the National Authority, as and when required by it.

**38. State Government to take measures**.––(*1*) Subject to the provisions of this Act, each State Government shall take all measures specified in the guidelines laid down by the National Authority and such further measures as it deems necessary or expedient, for the purpose of disaster management.

(*2*) The measures which the State Government may take under sub-section (*1*) include measures with respect to all or any of the following matters, namely:––

(*a*) coordination of actions of different departments of the Government of the State, the State Authority, District Authorities, local authority and other non-governmental organisations;

(*b*) cooperation and assistance in the disaster management to the National Authority and National Executive Committee, the State Authority and the State Executive Committee, and the District Authorities;

(*c*) cooperation with, and assistance to, the Ministries or Departments of the Government of India in disaster management, as requested by them or otherwise deemed appropriate by it;

(*d*) allocation of funds for measures for prevention of disaster, mitigation, capacity-building and preparedness by the departments of the Government of the State in accordance with the provisions of the State Plan and the District Plans;

(*e*) ensure that the integration of measures for prevention of disaster or mitigation by the departments of the Government of the State in their development plans and projects;

(*f*) integrate in the State development plan, measures to reduce or mitigate the vulnerability of different parts of the State to different disasters;

(*g*) ensure the preparation of disaster management plans by different departments of the State in accordance with the guidelines laid down by the National Authority and the State Authority;

(*h*) establishment of adequate warning systems up to the level of vulnerable communities;

(*i*) ensure that different departments of the Government of the State and the District Authorities take appropriate preparedness measures;

(*j*) ensure that in a threatening disaster situation or disaster, the resources of different departments of the Government of the State are made available to the National Executive Committee or the State Executive Committee or the District Authorities, as the case may be, for the purposes of effective response, rescue and relief in any threatening disaster situation or disaster;

(*k*) provide rehabilitation and reconstruction assistance to the victims of any disaster; and

(*l*) such other matters as it deems necessary or expedient for the purpose of securing effective implementation of provisions of this Act.

**39. Responsibilities of departments of the State Government**.—It shall be the responsibility of every department of the Government of a State to—

(*a*) take measures necessary for prevention of disasters, mitigation, preparedness and capacity-building in accordance with the guidelines laid down by the National Authority and the State Authority;

(*b*) integrate into its development plans and projects, the measures for prevention of disaster and mitigation;

(*c*) allocate funds for prevention of disaster, mitigation, capacity-building and preparedness;

(*d*) respond effectively and promptly to any threatening disaster situation or disaster in accordance with the State Plan, and in accordance with the guidelines or directions of the National Executive Committee and the State Executive Committee;

(*e*) review the enactments administered by it, its policies, rules and regulations with a view to incorporate therein the provisions necessary for prevention of disasters, mitigation or preparedness;

(*f*) provide assistance, as required, by the National Executive Committee, the State Executive Committee and District Authorities, for—

(*i*) drawing up mitigation, preparedness and response plans, capacity-building, data collection and identification and training of personnel in relation to disaster management;

(*ii*) assessing the damage from any disaster;

(*iii*) carrying out rehabilitation and reconstruction;

(*g*) make provision for resources in consultation with the State Authority for the implementation of the District Plan by its authorities at the district level;

(*h*) make available its resources to the National Executive Committee or the State Executive Committee or the District Authorities for the purposes of responding promptly and effectively to any disaster in the State, including measures for—

(*i*) providing emergency communication with a vulnerable or affected area;

(*ii*) transporting personnel and relief goods to and from the affected area;

(*iii*) providing evacuation, rescue, temporary shelter or other immediate relief;

(*iv*) carrying out evacuation of persons or live-stock from an area of any threatening disaster situation or disaster;

(*v*) setting up temporary bridges, jetties and landing places;

(*vi*)providing drinking water, essential provisions, healthcare and services in an affected area;

(*i*) such other actions as may be necessary for disaster management.

**40. Disaster management plan of departments of State**.—(*1*) Every department of the State Government, in conformity with the guidelines laid down by the State Authority, shall—

(*a*) prepare a disaster management plan which shall lay down the following :—

(*i*) the types of disasters to which different parts of the State are vulnerable;

(*ii*) integration of strategies for the prevention of disaster or the mitigation of its effects or both with the development plans and programmes by the department;

(*iii*) the roles and responsibilities of the department of the State in the event of any threatening disaster situation or disaster and emergency support function it is required to perform;

(*iv*) present status of its preparedness to perform such roles or responsibilities or emergency support function under sub-clause (*iii*);

(*v*) the capacity-building and preparedness measures proposed to be put into effect in order to enable the Ministries or Departments of the Government of India to discharge their responsibilities under section 37;

(*b*) annually review and update the plan referred to in clause (*a*); and

(*c*) furnish a copy of the plan referred to in clause (*a*) or clause (*b*), as the case may be, to the State Authority.

(*2*) Every department of the State Government, while preparing the plan under sub-section (*1*), shall make provisions for financing the activities specified therein.

(*3*) Every department of the State Government shall furnish an implementation status report to the State Executive Committee regarding the implementation of the disaster management plan referred to in sub-section (*1*).

## CHAPTER VI

### LOCAL AUTHORITIES

**41. Functions of the local authority.**—(*1*) Subject to the directions of the District Authority, a local authority shall—

(*a*) ensure that its officers and employees are trained for disaster management;

(*b*) ensure that resources relating to disaster management are so maintained as to be readily available for use in the event of any threatening disaster situation or disaster;

(*c*) ensure all construction projects under it or within its jurisdiction conform to the standards and specifications laid down for prevention of disasters and mitigation by the National Authority, State Authority and the District Authority;

(*d*) carry out relief, rehabilitation and reconstruction activities in the affected area in accordance with the State Plan and the District Plan.

(*2*) The local authority may take such other measures as may be necessary for the disaster management.

## CHAPTER VII

### NATIONAL INSTITUTEOF DISASTER MANAGEMENT

**42. National Institute of Disaster Management.**—(*1*) With effect from such date as the Central Government may, by notification in the Official Gazette appoint in this behalf, there shall be constituted an institute to be called the National Institute of Disaster Management.

(*2*) The National Institute of Disaster Management shall consist of such number of members as may be prescribed by the Central Government.

(*3*) The term of office of, and vacancies among, members of the National Institute of Disaster Management and manner of filling such vacancies shall be such as may be prescribed.

(*4*) There shall be a governing body of the National Institute of Disaster Management which shall be constituted by the Central Government from amongst the members of the National Institute of Disaster Management in such manner as may be prescribed.

(*5*) The governing body of the National Institute of Disaster Management shall exercise such powers and discharge such functions as may be prescribed by regulations.

(*6*) The procedure to be followed in exercise of its powers and discharge of its functions by the governing body, and the term of office of, and the manner of filling vacancies among the members of the governing body, shall be such as may be prescribed by regulations.

(*7*) Until the regulations are made under this section, the Central Government may make such regulations; and any regulation so made may be altered or rescinded by the National Institute of Disaster Management in exercise of its powers.

(*8*) Subject to the provisions of this Act, the National Institute of Disaster Management shall function within the broad policies and guidelines laid down by the National Authority and be responsible for planning and promoting training and research in the area of disaster management, documentation and development of national level information base relating to disaster management policies, prevention mechanisms and mitigation measures.

(*9*) Without prejudice to the generality of the provisions contained in sub-section (*8*), the National Institute, for the discharge of its functions, may—

(*a*) develop training modules, undertake research and documentation in disaster management and organise training programmes;

(*b*) formulate and implement a comprehensive human resource development plan covering all aspects of disaster management;

(*c*) provide assistance in national level policy formulation;

(*d*) provide required assistance to the training and research institutes for development of training and research programmes for stakeholders including Government functionaries and undertake training of faculty members of the State level training institutes;

(*e*) provide assistance to the State Governments and State training institutes in the formulation of State level policies, strategies, disaster management framework and any other assistance as may be required by the State Governments or State training institutes for capacity-building of stakeholders, Government including its functionaries, civil society members, corporate sector and people's elected representatives;

(*f*) develop educational materials for disaster management including academic and professional courses;

(*g*) promote awareness among stakeholders including college or school teachers and students, technical personnel and others associated with multi-hazard mitigation, preparedness and response measures;

(*h*) undertake, Organise and facilitate study courses, conferences, lectures, seminars within and outside the country to promote the aforesaid objects;

(*i*) undertake and provide for publication of journals, research papers and books and establish and maintain libraries in furtherance of the aforesaid objects;

(*j*) do all such other lawful things as are conducive or incidental to the attainment of the above objects; and

(*k*) undertake any other function as may be assigned to it by the Central Government.

**43. Officers and other employees of the National Institute**.—The Central Government shall provide the National Institute of Disaster Management with such officers, consultants and other employees, as it considers necessary, for carrying out its functions.

## CHAPTER VIII

### NATIONAL DISASTER RESPONSE FORCE

**44. National Disaster Response Force**.—(*1*) There shall be constituted a National Disaster Response Force for the purpose of specialist response to a threatening disaster situation or disaster.

(*2*) Subject to the provisions of this Act, the Force shall be constituted in such manner and, the conditions of service of the members of the Force, including disciplinary provisions therefore, be such as may be prescribed.

**45. Control, direction, etc**.—The general superintendence, direction and control of the Force shall be vested and exercised by the National Authority and the command and supervision of the Force shall vest in an officer to be appointed by the Central Government as the Director General of the National Disaster Response Force.

## CHAPTER IX

### FINANCE, ACCOUNTS AND AUDIT

**46. National Disaster Response Fund**.—(*1*) The Central Government may, by notification in the Official Gazette, constitute a fund to be called the National Disaster Response Fund for meeting any threatening disaster situation or disaster and there shall be credited thereto—

(*a*) an amount which the Central Government may, after due appropriation made by Parliament by law in this behalf provide;

(*b*) any grants that may be made by any person or institution for the purpose of disaster management.

(*2*) The National Disaster Response Fund shall be made available to the National Executive Committee to be applied towards meeting the expenses for emergency response, relief and rehabilitation in accordance with the guidelines laid down by the Central Government in consultation with the National Authority.

**47. National Disaster Mitigation Fund**.—(*1*) The Central Government may, by notification in the Official Gazette, constitute a Fund to be called the National Disaster Mitigation Fund for projects exclusively for the purpose of mitigation and there shall be credited thereto such amount which the Central Government may, after due appropriation made by Parliament by law in this behalf, provide.

(*2*) The National Disaster Mitigation Fund shall be applied by the National Authority.

**48. Establishment of funds by State Government**.—(*1*) The State Government shall, immediately after notifications issued for constituting the State Authority and the District Authorities, establish for the purposes of this Act the following funds, namely:—

(*a*) the fund to be called the State Disaster Response Fund;

(*b*) the fund to be called the District Disaster Response Fund;

(*c*) the fund to be called the State Disaster Mitigation Fund;

(*d*) the fund to be called the District Disaster Mitigation Fund.

(*2*) The State Government shall ensure that the funds established—

(*i*) under clause (*a*) of sub-section *(1)* is available to the State Executive Committee;

(*ii*) under sub-clause (*c*) of sub-section (*1*) is available to the State Authority;

(*iii*) under clauses (*b*) and (*d*) of sub-section (*1*) are available to the District Authority.

**49. Allocation of funds by Ministries and Departments.**—(*1*) Every Ministry or Department of the Government of India shall make provisions, in its annual budget, for funds for the purposes of carrying out the activities and programmes set out in its disaster management plan.

(*2*) The provisions of sub-section (*1*) shall, *mutatis mutandis*, apply to departments of the Government of the State.

**50. Emergency procurement and accounting.**—Where by reason of any threatening disaster situation or disaster, the National Authority or the State Authority or the District Authority is satisfied that immediate procurement of provisions or materials or the immediate application of resources are necessary for rescue or relief,—

(*a*) it may authorise the concerned department or authority to make the emergency procurement and in such case, the standard procedure requiring inviting of tenders shall be deemed to be waived;

(*b*) a certificate about utilisation of provisions or materials by the controlling officer authorised by the National Authority, State Authority or District Authority, as the case may be, shall be deemed to be a valid document or voucher for the purpose of accounting of emergency, procurement of such provisions or materials.

## CHAPTER X

### OFFENCES AND PENALTIES

**51. Punishment for obstruction, etc.**—Whoever, without reasonable cause—

(*a*) obstructs any officer or employee of the Central Government or the State Government, or a person authorised by the National Authority or State Authority or District Authority in the discharge of his functions under this Act; or

(*b*) refuses to comply with any direction given by or on behalf of the Central Government or the State Government or the National Executive Committee or the State Executive Committee or the District Authority under this Act,

shall on conviction be punishable with imprisonment for a term which may extend to one year or with fine, or with both, and if such obstruction or refusal to comply with directions results in loss of lives or imminent danger thereof, shall on conviction be punishable with imprisonment for a term which may extend to two years.

**52. Punishment for false claim**.—Whoever knowingly makes a claim which he knows or has reason to believe to be false for obtaining any relief, assistance, repair, reconstruction or other benefits consequent to disaster from any officer of the Central Government, the State Government, the National Authority, the State Authority or the District Authority, shall, on conviction be punishable with imprisonment for a term which may extend to two years, and also with fine.

**53. Punishment for misappropriation of money or materials, etc**.—Whoever, being entrusted with any money or materials, or otherwise being, in custody of, or dominion over, any money or goods, meant for providing relief in any threatening disaster situation or disaster, misappropriates or appropriates for his own use or disposes of such money or materials or any part thereof or wilfully compels any other person so to do, shall on conviction be punishable with imprisonment for a term which may extend to two years, and also with fine.

**54. Punishment for false warning**.—Whoever makes or circulates a false alarm or warning as to disaster or its severity or magnitude, leading to panic, shall on conviction, be punishable with imprisonment which may extend to one year or with fine.

**55. Offences by Departments of the Government.**—(*1*) Where an offence under this Act has been committed by any Department of the Government, the head of the Department shall be deemed to be guilty of the offence and shall be liable to be proceeded against and punished accordingly unless he proves that the offence was committed without his knowledge or that he exercised all due diligence to prevent the commission of such offence.

(*2*) Notwithstanding anything contained in sub-section (*1*), where an offence under this Act has been committed by a Department of the Government and it is proved that the offence has been committed with the consent or connivance of, or is attributable to any neglect on the part of, any officer, other than the head of the Department, such officer shall be deemed to be guilty of that offence and shall be liable to be proceeded against and punished accordingly.

**56. Failure of officer in duty or his connivance at the contravention of the provisions of this Act.**—Any officer, on whom any duty has been imposed by or under this Act and who ceases or refuses to perform or withdraws himself from the duties of his office shall, unless he has obtained the express written permission of his official superior or has other lawful excuse for so doing, be punishable with imprisonment for a term which may extend to one year or with fine.

**57. Penalty for contravention of any order regarding requisitioning**.—If any person contravenes any order made under section 65, he shall be punishable with imprisonment for a term which may extend to one year or with fine or with both.

**58. Offence by companies.**—(*1*) Where an offence under this Act has been committed by a company or body corporate, every person who at the time the offence was committed, was in charge of, and was responsible to, the company, for the conduct of the business of the company, as well as the company,

shall be deemed to be guilty of the contravention and shall be liable to be proceeded against and punished accordingly:

Provided that nothing in this sub-section shall render any such person liable to any punishment provided in this Act, if he proves that the offence was committed without his knowledge or that he exercised due diligence to prevent the commission of such offence.

(*2*) Notwithstanding anything contained in sub-section (*1*), where an offence under this Act has been committed by a company, and it is proved that the offence was committed with the consent or connivance of or is attributable to any neglect on the part of any director, manager, secretary or other officer of the company, such director, manager, secretary or other officer shall also, be deemed to be guilty of that offence and shall be liable to be proceeded against and punished accordingly.

*Explanation.*—For the purpose of this section—

(*a*) "company" means any body corporate and includes a firm or other association of individuals; and

(*b*) "director", in relation to a firm, means a partner in the firm.

**59. Previous sanction for prosecution**.—No prosecution for offences punishable under sections 55 and 56 shall be instituted except with the previous sanction of the Central Government or the State Government, as the case may be, or of any officer authorised in this behalf, by general or special order, by such Government.

**60. Cognizance of offences**.—No court shall take cognizance of an offence under this Act except on a complaint made by—

(*a*) the National Authority, the State Authority, the Central Government, the State Government, the District Authority or any other authority or officer authorised in this behalf by that Authority or Government, as the case may be; or

(*b*) any person who has given notice of not less than thirty days in the manner prescribed, of the alleged offence and his intention to make a complaint to the National Authority, the State Authority, the Central Government, the State Government, the District Authority or any other authority or officer authorised as aforesaid.

## CHAPTER XI

### MISCELLANEOUS

**61. Prohibition against discrimination**.—While providing compensation and relief to the victims of disaster, there shall be no discrimination on the ground of sex, caste, community, descent or religion.

**62. Power to issue direction by Central Government.**—Notwithstanding anything contained in any other law for the time being in force, it shall be lawful for the Central Government to issue direction in writing to the Ministries or Departments of the Government of India, or the National Executive Committee or the State Government, State Authority, State Executive Committee, statutory bodies or any of its officers or employees, as the case may be, to facilitate or assist in the disaster management and such Ministry or Department or Government or Authority, Executive Committee, statutory body, officer or employee shall be bound to comply with such direction.

**63. Powers to be made available for rescue operations**.—Any officer or authority of the Union or a State, when requested by the National Executive Committee, any State Executive Committee or District Authority or any person authorised by such Committee or Authority in this behalf, shall make available to that Committee or authority or person, such officers and employees as requested for, to perform any of the functions in connection with the prevention of disaster or mitigation or rescue or relief work.

**64. Making or amending rules, etc., in certain circumstances.**—Subject to the provisions of this Act, if it appears to the National Executive Committee, State Executive Committee or the District Authority, as the case may be, that provisions of any rule, regulation, notification, guideline, instruction, order, scheme or bye-laws, as the case may be, are required to be made or amended for the purposes of prevention of disasters or the mitigation thereof, it may require the amendment of such rules, regulation,

notification, guidelines, instruction, order, scheme or bye-laws, as the case may be, for that purpose, and the appropriate department or authority shall take necessary action to comply with the requirements.

**65. Power of requisition of resources, provisions, vehicles, etc., for rescue operations, etc.**—(*1*) If it appears to the National Executive Committee, State Executive Committee or District Authority or any officer as may be authorised by it in this behalf that—

(*a*) any resources with any authority or person are needed for the purpose of prompt response;

(*b*) any premises are needed or likely to be needed for the purpose of rescue operations; or

(*c*) any vehicle is needed or is likely to be needed for the purposes of transport of' resources from disaster affected areas or transport of resources to the affected area or transport in connection with rescue, rehabilitation or reconstruction,

such authority may, by order in writing, requisition such resources or premises or such vehicle, as the case may be, and may make such further orders as may appear to it to be necessary or expedient in connection with the requisitioning.

(*2*) Whenever any resource, premises or vehicle is requisitioned under sub-section (*1*), the period of such requisition shall not extend beyond the period for which such resource, premises or vehicle is required for any of the purposes mentioned in that sub-section.

(*3*) In this section,—

(*a*) "resources" includes men and material resources;

(*b*) "services" includes facilities;

(*c*) "premises" means any land, building or part of a building and includes a hut, shed or other structure or any part thereof;

(*d*) "vehicle" means any vehicle used or capable of being used for the purpose of transport, whether propelled by mechanical power or otherwise.

**66. Payment of compensation.**— (*1*) Whenever any Committee, Authority or officer referred to in sub-section (*1*) of section 65, in pursuance of that section requisitions any premises, there shall be paid to the persons interested compensation the amount of which shall be determined by taking into consideration the following, namely:—

(*i*) the rent payable in respect of the premises, or if no rent is so payable, the rent payable for similar premises in the locality;

(*ii*) if as consequence of the requisition of the premises the person interested is compelled to change his residence or place of business, the reasonable expenses (if any) incidental to such change:

Provided that where any person interested being aggrieved by the amount of compensation so determined makes an application within the thirty days to the Central Government or the State Government, as the case may be, for referring the matter to an arbitrator, the amount of compensation to be paid shall be such as the arbitrator appointed in this behalf by the Central Government or the State Government, as the case may be, may determine:

Provided further that where there is any dispute as to the title to receive the compensation or as to the apportionment of the amount of compensation, it shall be referred by the Central Government or the State Government, as the case may be, to an arbitrator appointed in this behalf by the Central Government or the State Government, as the case may be, for determination, and shall be determined in accordance with the decision of such arbitrator.

*Explanatio*n.—In this sub-section, the expression "person interested" means the person who was in actual possession of the premises requisitioned under section 65 immediately before the requisition, or where no person was in such actual possession, the owner of such premises.

(*2*) Whenever any Committee, Authority or officer, referred to in sub-section (*1*) of section 65 in pursuance of that section requisitions any vehicle, there shall be paid to the owner thereof compensation the mount of which shall be determined by the Central Government or the State Government, as the case may be, on the basis of the fares or rates prevailing in the locality for the hire of such vehicle:

Provided that where the owner of such vehicle being aggrieved by the amount of compensation so determined makes an application within the prescribed time to the Central Government or the State Government, as the case may be, for referring the matter to an arbitrator, the amount of compensation to be paid shall be such as the arbitrator appointed in this behalf by the Central Government or the State Government, as the case may be, may determine:

Provided further that where immediately before the requisitioning the vehicle or vessel was by virtue of a hire purchase agreement in the possession of a person other than the owner, the amount determined under this sub-section as the total compensation payable in respect of the requisition shall be apportioned between that person and the owner in such manner as they may agree upon, and in default of agreement, in such manner as an arbitrator appointed by the Central Government or the State Government, as the case may be, in this behalf may decide.

**67. Direction to media for communication of warnings, etc.**—The National Authority, the State Authority, or a District Authority may recommend to the Government to give direction to any authority or person in control of any audio or audio-visual media or such other means of communication as may be available to carry any warning or advisories regarding any threatening disaster situation or disaster, and the said means of communication and media as designated shall comply with such direction.

**68. Authentication of orders or decisions**.—Every order or decision of the National Authority or the National Executive Committee, the State Authority, or the State Executive Committee or the District Authority, shall be authenticated by such officers of the National Authority or the National Executive Committee or, the State Executive Committee, or the District Authority, as may be authorised by it in this behalf.

**69. Delegation of powers**.—The National Executive Committee, State Executive Committee, as the case may be, by general or special order in writing, may delegate to the Chairperson or any other member or to any officer, subject to such conditions and limitations, if any, as may be specified in the order, such of its powers and functions under this Act as it may deem necessary.

**70. Annual report.**—(*1*) The National Authority shall prepare once every year, in such form and at such time as may be prescribed, an annual report giving a true and full account of its activities during the previous year and copies thereof shall be forwarded to the Central Government and that Government shall cause the same to be laid before both Houses of Parliament within one month of its receipt.

(*2*) The State Authority shall prepare once in every year, in such form and at such time as may be prescribed, an annual report giving a true and full account of its activities during the previous year and copies thereof shall be forwarded to the State Government and that Government shall cause the same to be laid before each House of the State Legislature where it consists of two Houses, or where such Legislature consists of one House, before that House.

**71. Bar of jurisdiction of court**.—No court (except the Supreme Court or a High Court) shall have jurisdiction to entertain any suit or proceeding in respect of anything done, action taken, orders made, direction, instruction or guidelines issued by the Central Government, National Authority, State Government, State Authority or District Authority in pursuance of any power conferred by, or in relation to its functions, by this Act.

**72. Act to have overriding effect**.—The provisions of this Act, shall have effect, notwithstanding anything inconsistent therewith contained in any other law for the time being in force or in any instrument having effect by virtue of any law other than this Act.

**73. Action taken in good faith.**—No suit or prosecution or other proceeding shall lie in any court against the Central Government or the National Authority or the State Government or the State Authority or the District Authority or local authority or any officer or employee of the Central Government or the National Authority or the State Government or the State Authority or the District Authority or local authority or any person working for on behalf of such Government or authority in respect of any work done or purported to have been done or intended to be done in good faith by such authority or Government or such officer or employee or such person under the provisions of this Act or the rules or regulations made thereunder.

**74. Immunity from legal process**.—Officers and employees of the Central Government, National Authority, National Executive Committee, State Government, State Authority, State Executive Committee or District Authority shall be immune from legal process in regard to any warning in respect of any impending disaster communicated or disseminated by them in their official capacity or any action taken or direction issued by them in pursuance of such communication or dissemination.

**75. Power of Central Government to make rules.**—(*1*) The Central Government may, by notification in the Official Gazette, make rules for carrying out the purposes of this Act.

(*2*) In particular, and without prejudice to the generality of the foregoing power, such rules may provide for all or any of the following matters, namely:—

(*a*) the composition and number of the members of the National Authority under sub-section (*2*), and the term of office and conditions of service of members of the National Authority under sub-section (*4*), of section 3;

(*b*) the allowances to be paid to the members of the advisory committee under sub-section (*2*) of section 7;

(*c*) the powers and functions of the Chairperson of the National Executive Committee under sub-section (*3*) of section 8 and the procedure to be followed by the National Executive Committee in exercise of its powers and discharge of its functions under sub-section (*4*) of section 8;

(*d*) allowances to be paid to the persons associated with the sub-committee constituted by the National Executive Committee under sub-section (*3*) of section 9;

(*e*) the number of members of the National Institute of Disaster Management under sub-section (*2*), the term of the office and vacancies among members and the manner of filling such vacancies under sub-section (*3*) and the manner of constituting the Governing Body of the National Institute of Disaster Management under sub-section (*4*) of section 42;

(*f*) the manner of constitution of the Force, the conditions of service of the members of the Force, including disciplinary provisions under sub-section (*2*) of section 44;

(*g*) the manner in which notice of the offence and of the intention to make a complaint to the National Authority, the State Authority, the Central Government, the State Government or the other authority or officer under clause (*b*) of section 60;

(*h*) the form in which and the time within which annual report is to be prepared under section 70;

(*i*) any other matter which is to be, or may be, prescribed, or in respect of which provision is to be made by rules.

**76. Power to make regulations**.—(*1*) The National Institute of Disaster Management, with the previous approval of the Central Government may, by notification in the Official Gazette, make regulations consistent with this Act and the rules made thereunder to carry out the purposes of this Act.

(*2*) In particular, and without prejudice to the generality of the foregoing power, such regulations may provide for all or any of the following matters, namely:—

(*a*) powers and functions to be exercised and discharged by the governing body;

(*b*) procedure to be followed by the governing body in exercise of the powers and discharge of its functions;

(*c*) any other matter for which under this Act provision may be made by the regulations.

**77. Rules and regulations to be laid before Parliament.**—Every rule made by the Central Government and every regulation made by the National Institute of Disaster Management under this Act shall be laid, as soon as may be after it is made, before each House of Parliament, while it is in session, for a total period of thirty days which may be comprised of one session or in two or more successive sessions, and if, before the expiry of the session immediately following the session or the successive sessions aforesaid, both Houses agree in making any modification in the rule or regulation or both Houses agree that the rule or regulation should not be made, the rule or regulation shall thereafter have effect only

in such modified form or be of no effect, as the case may be; so, however, that any such modification or annulment shall be without prejudice to the validity of anything previously done under that rule or regulation.

**78. Power of State Government to make rules.**—(*1*) The State Government may, by notification in the Official Gazette, make rules to carry out the provisions of this Act.

(*2*) In particular, and without prejudice to the generality of the foregoing power, such rules may provide for all or any of the following matters, namely:—

(*a*) the composition and number of the members of the State Authority under sub-section (*2*), and the term of office and conditions of service of the members of the State Authority under sub-section (*5*), of section 14;

(*b*) the allowances to be paid to the members of the advisory committee under sub-section (*2*) of section 17;

(*c*) the powers and functions of the Chairperson of the State Executive Committee under sub-section (*3*), and the procedure to be followed by the State Executive Committee in exercise of its powers and discharge of its functions under sub-section (*4*) of section 20;

(*d*) allowances to be paid to the persons associated with the sub-committee constituted by the State Executive Committee under sub-section (*3*) of section 21;

(*e*) the composition and the number of members of the District Authority under sub-section (*2*), and the powers and functions to be exercised and discharged by the Chief Executive Officer of the District Authority under sub-section (*3*) of section 25;

(*f*) allowances payable to the persons associated with any committee constituted by the District Authority as experts under sub-section (*3*) of section 28;

(*g*) any other matter which is to be, or may be, prescribed, or in respect of which provision is to be made by rules.

(*3*) Every rule made by the State Government under this Act shall be laid, as soon as may be after it is made, before each House of the State Legislature where it consists of two Houses, or where such Legislature consists of one House before that House.

**79. Power to remove difficulties.**—(*1*) If any difficulty arises in giving effect to the provisions of this Act, the Central Government or the State Government, as the case may be, by notification in the Official Gazette, make order not inconsistent with the provisions of this Act as may appear to it to be necessary or expedient for the removal of the difficulty:

Provided that no such order shall be made after the expiration of two years from the commencement of this Act.

(*2*) Every order made under this section shall be laid, as soon as may be after it is made, before each House of Parliament or the Legislature, as the case may be.