



Ministry of Health and Family Welfare
Government of India

INTEGRATED DISEASE SURVEILLANCE PROGRAMME

**ToT TRAINING MANUALS
FOR STATE/DISTRICT SURVEILLANCE
OFFICERS, STATE RRTs
&
NODAL OFFICERS FROM MEDICAL COLLEGES**

Revised - 2020

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Abbreviations

AIDS	Acquired Immuno-Deficiency Syndrome
AFP	Acute Flaccid Paralysis
ANMs	Auxiliary Nurse Midwife
ANMOL	ANM Online
ASHA	Accredited Social Health Activist
AWWs	Angan Wadi Workers
AYUSH	Ayurveda, Yoga & Naturpathy, Unani, Siddha & Homeopathy
BMO	Block Medical Officer
BMW	Bio-Medical Waste Management
CCHF	Crimean Congo Haemorrhagic Fever
CDC	Centre for Disease Control and Prevention
CFR	Case Fatality Rate
CHC	Community Health Centre
CMO	Chief Medical officer
CSF	Cerebrospinal Fluid
CSU	Central Surveillance Unit
DRRT	District Rapid Response Team
DH	District Hospital
DHO	District Health Officer
DHS	Director of Health Services
DIO	District Immunization Officer
DME	Director of Medical Education
DMO	District Malaria Officer
DPHL	District Public Health Laboratory
DSO	District Surveillance Officer
DSU	District Surveillance Unit
DTO	District Tuberculosis Officer
EBS	Event-Based Surveillance
EI	Epidemic Intelligence
ELISA	Enzyme-linked Immunosorbent Assay
EWAR	Early Warning and Response
EWS	Early Warning Signal
HIV	Human Immunodeficiency Virus
HMIS	Health Information Management System
IAP	Indian Association of Paediatrics
IBS	Indicator-Based Surveillance
ICMR	Indian Council of Medical Research
ICT	Information, Communication and Technology
IDSP	Integrated Disease Surveillance Programme
IDH	Infectious Disease Hospital
IEC	Information Education Communication
IgG	Immunoglobulin G
IgM	Immunoglobulin M
IHIP	Integrated Health Information Platform
IIF	Indirect Immunofluorescence
IHR	International Health Regulations
ILI	Influenza Like Illnesses
IMA	Indian Medical Association

JE	Japanese Encephalitis
JMM	Joint Monitoring Mission
KFD	Kyasanur Forest Disease
MAT	Microscopic Agglutination Test
MHO	Medical & Health Officer
MMWR	Morbidity & Mortality Weekly Report
MO	Medical Officer
MoHFW	Ministry of Health & Family Welfare
MP	Malarial Parasite
MPHW	Multi-Purpose Health Workers
MPN	Minimum Probable Number
MS	Medical Superintendent
NACO	National AIDS Control Organization
NGO	Non-Governmental Organization
NCDC	National Centre for Disease Control
NFP	National Focal Point
NMEP	National Malaria Elimination Programme
NSPCD	National Surveillance Project for Communicable Diseases
NPO	National Programme Officer
OIE	World Organisation for Animal Health
ORS	Oral Rehydration Solution
OT	Ortho toluidine
PAHO	Pan-American Health Organisation
PCR	Polymerase Chain Reaction
PHC	Primary Health Centre
PHEIC	Public Health Emergency of International Concern
PIP	Programme Implementation Plan
PF	Plasmodium falciparum
RCH	Reproductive & Child Health
RRT	Rapid Response Team
RT	Radical Treatment
RU	Reporting Unit
SARI	Severe Acute Respiratory Illness
SDH	Sub District Hospital
SPPs	Sentinel Private Practitioners
SPSS	Statistical Package for the Social Sciences
SRL	State Referral Lab
SSU	State Surveillance Unit
TB	Tuberculosis
THO	Taluka Health Officer
UPHC	Urban Primary Health Centre
UHC	Urban Community Health Centre
VPD	Vaccine Preventable Disease
WFT	Weil-Felix Test
WHO	World Health Organisation

Commonly used definitions

Active Immunity

It is the immunity which an individual develops as a result of infection or by specific immunization and is usually associated with presence of antibodies or cells having a specific action on the microorganism concerned with a particular infectious disease or its toxin.

Anaphylaxis

It is a severe reaction of rapid onset characterized by circulating collapse.

Antiseptic

It is a substance which destroys or inhibits the growth of micro-organisms.

Bio-Medical Waste

Anything which has to be discarded is called waste. "Bio-medical waste" means any waste, which is generated during the diagnosis, treatment or vaccination of human beings or animals or research activities. This does not include general waste.

Biosafety

Biosafety defines the containment conditions under which infectious agents can be safely manipulated.

The application of knowledge, techniques and equipment to prevent personal, laboratory and environmental exposure to potentially infectious agents or biohazards.

Biosecurity

Institutional and personal security measures designed to prevent the loss, theft, misuse, diversion, or intentional release of pathogens and toxins. It is addressed through the coordination of administrative, regulatory and physical security procedures and practices implemented in a working environment that utilizes good biosafety practices, and where responsibilities and accountabilities are clearly defined.

Cases

A case is defined as a person in the population or study group identified as having the particular disease.

Carriers

A carrier is defined as an infected person or animal that harbors a specific infectious agent in the absence of discernible clinical disease and serves as a potential source of infection for others.

Incubatory carriers are those who shed the infectious agent during the incubation period of the disease.

Convalescent carriers are those who continue to shed the disease agent during the period of convalescence

Healthy carriers emerge from subclinical cases /infection who have developed carrier state without suffering from overt disease, but are nevertheless shedding the disease agent, e.g. poliomyelitis, cholera, diphtheria etc.

Case Definition

A case definition is a standard set of criteria for deciding whether an individual should be classified as having the health condition of interest.

Sub-clinical cases are those in which the disease agent may multiply in the host but does not manifest itself by signs and symptoms. They are variously referred to as inapparent, covert, missed or abortive cases and are equally important as sources of infection.

Communicable period

It is defined as the time during which an infectious agent may be transferred directly or indirectly from an infected person to another person, from an infected animal to man or from an infected person to an animal, including arthropods.

Community Health

Community health is defined as all the personal health and environmental services in any human community irrespective of whether such services were public or private ones.

Contamination

The presence of an Infectious agent on a body surface, also on or in clothes, beddings, toys, surgical instruments or dressings or other inanimate articles or substances including water, milk and food.

Contagious Disease

A disease that is transmitted through contact, e.g. scabies, STD, Leprosy, Trachoma.

Communicable Disease

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

Communicable period

It is defined as the time during which an infectious agent may be transferred directly or indirectly from an infected person to another person, from an infected animal to man, or from an infected person to an animal, including arthropods.

Diagnostic test

Use of clinical and/or laboratory procedures to confirm or refute the existence of disease or true abnormality in patients with signs and symptoms presumed to be caused by the disease.

Disaster

It can be defined as any occurrence that causes damage, ecological disruption, loss of human life or deterioration of health and health services on a scale sufficient to warrant an extraordinary response from outside the affected community or area.

Disease

It is defined as a condition in which body health is impaired, a departure from a state of health, an alteration of the human body interrupting the performance of vital functions.

Disease Control means, the disease agent is permitted to persist in the community at a level where it ceases to be a public health problem according to the tolerance of the local population.

Disinfectant

It is a substance which destroys harmful, microbes (not usually spores) with the object of preventing transmission of disease. Disinfectants are suitable for application only to inanimate objects.

Disinfection

It is the killing of the infectious agents outside the body by direct exposure to chemical or physical agents.

Elimination

It is used to describe interruption of transmission of disease.

Epidemic

(Epi=upon; demos = people) The “unusual” occurrence in a community or region of disease, specific health related behavior (e.g. Smoking) or other health related event (e.g. traffic accidents) clearly in excess of “expected occurrence”.

Epidemiology

The study of the distribution and determinants of health –related states or events in specified populations, and the application of this study to the control of health problems.

Endemic

(En=in; demos =people), It refers to the constant presence of a disease or infectious agent within a given geographic area or population group, without importation from outside; may also refer to the “usual” or expected frequency of the disease within such area or population group.

Eradication

Termination of all transmission of infection by extermination of the infectious agent through surveillance and containment. It implies that disease will no longer occur in a population. e.g. smallpox.

Evaluation

It is a process by which results are compared with the intended objectives, or more simply the assessment of how well a programme is performing. It should always be considered during the planning and implementation stages of a programme or activity.

Exotic

Disease which are imported into a country in which they do not otherwise occur e.g. rabies in UK.

Generation time

It is defined as the interval of time between receipt of infection by a host and maximal infectivity of that host. It refers to transmissions of infection, whether clinical or subclinical.

Hazard

It can be defined as any phenomenon that has the potential to cause disruption or damage to people and their environment.

Herd immunity

It is the level of resistance of a community or group of people to a particular disease. Herd immunity provides an immunological barrier to the spread of disease in the human herd.

Host

A person or other animal, including birds and arthropods, that affords subsistence or lodgement to an infectious agent under natural (as opposed to experimental) conditions.

Obligate host means the only host e.g. man in measles & typhoid.

Definitive or primary host means host in which the parasite attains maturity or passes its sexual stage.

Intermediate or secondary host are those in which the parasite is in a larval or asexual state.

Transport host is a carrier host in which the organism remains alive but does not undergo any development.

Iatrogenic Disease

Any untoward or adverse consequence of a preventive, diagnostic or therapeutic regimen or procedure, that causes impairment, handicap, disability or death.

Incidence

It is defined as the number of new cases occurring in a defined population during a specified period of time.

Index case

Refers to the first case to come to the attention of the investigator; it is not always the primary case.

Infection

The entry and development or multiplication of an infectious agent in the body of man or animals.

Latent infection is when the host does not shed the infectious agent which lies dormant within the host without symptoms (and often without any demonstrable presence in blood, tissues or bodily secretions of the host.)

Infectious Disease

A clinically manifest disease of man or animals resulting from an infection.

Infestation

For persons or animals, the lodgment, development and reproduction of arthropods on the surface of the body or in the clothing, e.g. lice, itchmite.

Incubation period

It is defined as the time interval between invasion by an infectious agent and appearance of the first sign and symptom of the disease in question.

International Health Regulations (IHR)

The International Health Regulations (IHR) are a set of international legal instrument that work towards maximizing public health security by binding countries to prevent and respond to acute public health risks that have the potential to cross borders and threaten people worldwide.

Isolation

It is defined as separation for the period of communicability of infected persons or animals from others in such places and under such conditions, as to prevent or limit the direct or indirect

transmission of the infectious agent from those infected to those who are susceptible, or who may spread the agent to others.

Latent period

It is defined as the period of disease initiation to disease detection.

Monitoring

It is the continuous oversight of activities to ensure that they are proceeding according to plan. It keeps track of achievements, staff movements and utilization, supplies and equipment, and the money spent in relation to the resources available so that if anything goes wrong, immediate corrective measures can be taken.

Nosocomial Infection

Nosocomial (hospital acquired) infection is an infection originating in a patient while in a hospital or other health care facility.

Notification

Certain diseases are statutorily notifiable. The diseases are notified to the local health authority whose responsibility is to put into operation control measures including the provision of medical care to patients, perhaps in a hospital.

Opportunistic Infection

This is infection by an organism that takes the opportunity provided by a defect in host defense to infect the host and hence cause disease.

Outbreak

A disease outbreak is the occurrence of cases of disease in excess of what would normally be expected in a defined community, geographical area or season. An outbreak may occur in a restricted geographical area, or may extend over several countries. It may last for a few days or weeks, or for several years.

Pandemic

An epidemic usually affecting a large proportion of the population, occurring over a wide geographic area such as a section of a nation, the entire nation, a continent or the world e.g. influenza pandemics in 1918 and 1957, cholera El Tor in 1962.

Passive Immunity

When antibodies produced in one body (human or animal) are transferred to another to induce protection against disease, it is known as passive immunity.

Prevalence

It refers to all the current cases (old& new) existing at a given point in time, or over a period of time in a given population.

Primary case

It refers to first case of communicable disease introduced into the population unit being studied.

Public health

It is defined as the science and art of preventing disease, prolonging life, and promoting health and efficiency through organized community efforts for the sanitation of the environment, the control of communicable infections, the education of the individual in personal hygiene, the organization of medical and nursing services for early diagnosis and preventive treatment of disease, and the development of social machinery to ensure for every individual a standard of living adequate for the maintenance of health, so organizing these benefits as to enable every citizen to realize his birthright of health and longevity.

Quarantine

It is defined as the limitation of freedom of movement of such well persons or domestic animals exposed to communicable disease for a period of time and longer than the longest usual incubation period of disease, in such manner as to prevent effective contact with those not so exposed.

Reservoir

It is defined as any person, animal, arthropod, plant, soil or substance (or combination of these) in which an infectious agent lives and multiplies, on which it depends primarily for survival, and where it reproduces itself in such manner that it can be transmitted to a susceptible host.

Screening

It is testing for infection or disease in populations or in individuals who are not seeking health care.

Secondary attack rate (SAR)

It is defined as the number of exposed persons developing the disease within the range of the incubation period, following exposure to the primary case.

Secondary case

These are those cases which are developing from contact with the primary case.

Segregation

It has been defined as the separation for special consideration, control or observation of some part of a group of persons (or domestic animals) from the others to facilitate control of a communicable disease, e.g. removal of susceptible children to homes of immune persons.

Sensitivity

It is a statistical index of diagnostic accuracy. It is defined as the ability of a test to identify correctly all those who have the disease, that is true positive.

Serial Interval

The gap in time between the onset of the primary case and the secondary case is called the serial interval.

Source of infection

Defined as the person, animal, object or substance from which an infectious agent passes or is disseminated to the host.

Specificity

It is defined as the ability of a test to identify correctly those who do not have the disease, that is true negative.

Reporting Unit

A reporting unit is a health facility / individual in private or public sector, located in rural or urban area which collects information of the health conditions identified under IDSP in specified formats and transmits these in pre-specified timely manner to the next.

Sporadic

The word sporadic means scattered. The cases occur irregularly, haphazardly from time to time and generally infrequently.

Sterilization

It is the process of destroying all life forms including spores.

Surveillance

The continuous scrutiny of the factors that determine the occurrence and distribution of disease and other conditions of ill health, those are pertinent to effective control, and includes collection, analysis, interpretation and distribution of relevant data for action.

Sentinel surveillance

A method for identifying the missing cases and thereby supplementing the notified cases is required. The sentinel data is extrapolated to the entire population to estimate the disease prevalence in the total population.

The Cold Chain

The cold chain is the system of storage and transport of vaccines at low temperature from the manufacturer to the actual vaccine site.

Vaccines

Vaccine is an immune-biological substance designed to produce specific protection against a given disease.

Live vaccines (BCG, measles, oral polio) are prepared from live (generally attenuated) organisms.

Inactivated or killed vaccines –organisms killed by heat or chemicals, when injected into the body stimulate active immunity.

Zoonoses

An infection or infectious disease transmissible under natural conditions from vertebrate animals to man.

Epizootic- An outbreak (epidemic) of disease in an animal population (often with the implication that it may also affect human populations)

Enzootic - An epidemic occurring in animals e.g., anthrax, rabies, brucellosis, bovine tuberculosis.

Epornithic - An outbreak (epidemic) of disease in a bird population.

Module 1a

Principles of Surveillance & Implementation of Early Warning and Response (EWAR)

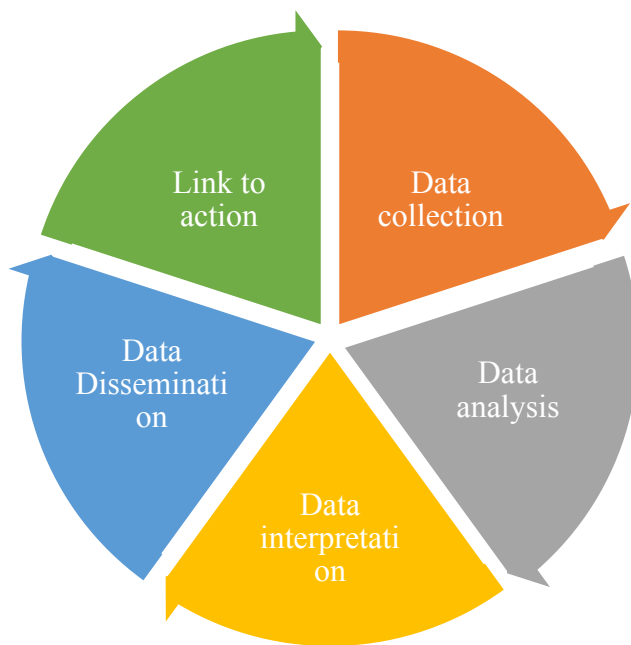
Specific Learning Objectives:

- *Define Surveillance*
- *Understand objectives of surveillance*
- *Compare different types of surveillance*
- *Identify sources of Indicator based surveillance and event based surveillance in their State/District.*

Surveillance is defined as an “**Ongoing, systematic collection, analysis, interpretation, and dissemination** of data regarding a **health-related event** for use in **public health action** to reduce morbidity and mortality and to improve health.” (CDC. Updated guidelines for evaluating public health surveillance systems. MMWR 2001;50 (No. RR-13)

Whereas surveys are data collection at one point in time.

Public health surveillance embodies a systematic cycle of public health actions. These include:



Objectives of Public health surveillance:

- To detect early public health events requiring rapid investigation and response, in order to ensure that events of all origins are rapidly detected and controlled. {Early Warning and Response (EWAR)}
- To measure disease burden, including monitoring morbidity/mortality trends.
- To guide for effective control of programmes and the corresponding allocation of resources.

Types of surveillance

1) Case-based (individual) vs. Aggregate

- a) Case based surveillance is the practice of measuring and monitoring the occurrence, progression and outcome of a disease via the collection of patient-level data for a series of key events. Case based surveillance is being conducted for HIV, diseases under elimination for e.g. Measles and in response to suspected outbreaks.
- b) Aggregate is collecting and reporting the total numbers of suspected/confirmed disease or health condition according to age group, geographical area, time etc. For e.g.:
 - i) Aggregate number of acute diarrhea cases reported in children <5 years week 1 in a District.
 - ii) Aggregate number of H1N1 cases in all Districts of Maharashtra in year 2017, 18 and 19.

2) Passive vs. Active vs. Sentinel:

- a) Passive Surveillance:
 - i) Regular reporting of disease data by all institutions that see patients (or test specimens) and are part of a reporting network is called passive surveillance.
 - ii) There is no active search for cases.
 - iii) It involves passive notification by surveillance sites and reports are generated and sent by local staff.
 - iv) Relies on the cooperation of health-care providers — laboratories, hospitals, health facilities and private practitioners — to report the occurrence of a disease to a higher level.

v) Once the data have been received, they must be compiled and then analysed to monitor disease patterns and identify possible outbreaks.

vi) Less expensive than other surveillance strategies and covers wide areas.

For e.g. A medical officer reports 10 cases of diarrhea from a village 'A' in his/her OPD.

b) Active Surveillance: However good the passive surveillance system is, there may be cases not recorded under it. For e.g.: patients with mild or moderate severity.

i) Active Surveillance involves visiting houses, health facilities, talking to health-care providers and reviewing medical records to identify suspected cases of disease under surveillance.

ii) When a case is found, the surveillance staff investigates it, document clinical and epidemiological data, arrange to send appropriate laboratory specimens and report the information rapidly.

iii) This method is usually used when a disease is targeted for eradication or elimination, when every possible case must be found and investigated. It is also used for outbreak investigations.

iv) Resource intensive

For e.g. Field team reports 25 cases of diarrhea from Village A during house to house search.

c) Sentinel Surveillance:

i) A sentinel surveillance system is developed to obtain more reliable and extensive disease related information that is not available through the routine reporting. For e.g. H1N1 surveillance.

ii) A hospital, health center, laboratory or a rehabilitation center which caters to a relatively large number of cases of the disease can be considered as a sentinel center.

iii) A sentinel center can provide information on one or more diseases.

iv) Since the sentinel centers are carefully selected, the number of the reporting units is much smaller, it is easier to maintain the quality and regularity of the reports.

v) Data collected in a well-designed sentinel system can be used to signal trends, identify outbreaks and monitor the burden of disease in a community, providing a rapid, economical alternative to other surveillance methods.

For e.g. Infectious Disease Hospital reports 5 confirmed cases of Cholera from Village 'A'.

- 3) Syndromic vs Presumptive vs Lab Confirmed:
 - a) Syndromic surveillance:
 - i) Relies on diagnosis made on the basis of clinical pattern by paramedical personnel and members of the community.
 - ii) The fundamental objective of syndromic surveillance is to identify illness clusters early, before diagnoses are confirmed and reported to public health agencies, and to mobilize a rapid response, thereby reducing morbidity and mortality.
 - b) Presumptive surveillance:
 - i) Though it is ideal to have all diseases under surveillance confirmed by laboratory tests, this is often not feasible.
 - ii) Presumptive surveillance relies on diagnosis made on typical history and clinical examination by Medical Officers and presumptive lab tests.
 - iii) The validity of presumptive diagnosis of surveillance conditions will be higher than that of the syndromic one undertaken by the health worker and will be supplemented by confirmation of diseases by laboratory reporting.
 - c) Lab confirmed:
 - i) Relies on clinical diagnosis confirmed by an appropriate confirmatory laboratory test.
 - ii) The validity of syndromic diagnosis and presumed cases made by Medical Officers can be confirmed only by laboratory testing.
 - iii) The identification of new agents and changes in the behaviour of micro-organisms especially in relation to susceptibility to anti-microbial are also important components of laboratory surveillance.

Early Warning and Response

In the last few decades, there has been rapid changes including demographic explosions and massive urbanization, population movement, increase in international trade and travel, emergence of new pathogens, use of techniques which induce new risks, chemical and nuclear accidents, environmental disasters and introduction of the threat of criminal acts and bioterrorism.

Conventional surveillance based on restrictive lists of predominantly infectious diseases may not be able to detect and respond to all these events and there is a need to implement a comprehensive “all hazards” surveillance. This requires collection of pertinent information through

environmental/ecological surveillance (e.g. vector density, water/air quality, climatic data, etc.) and health-related behavioural information (e.g. monitoring of absenteeism in schools or in workplaces, medicine sales and paramedical product such as insect repellent, activities on internet or social networks, etc.)

EWAR is an organized mechanism to detect as early as possible any abnormal occurrence or any divergence from the usual or normally observed frequency of phenomena.

Principles of EWAR:

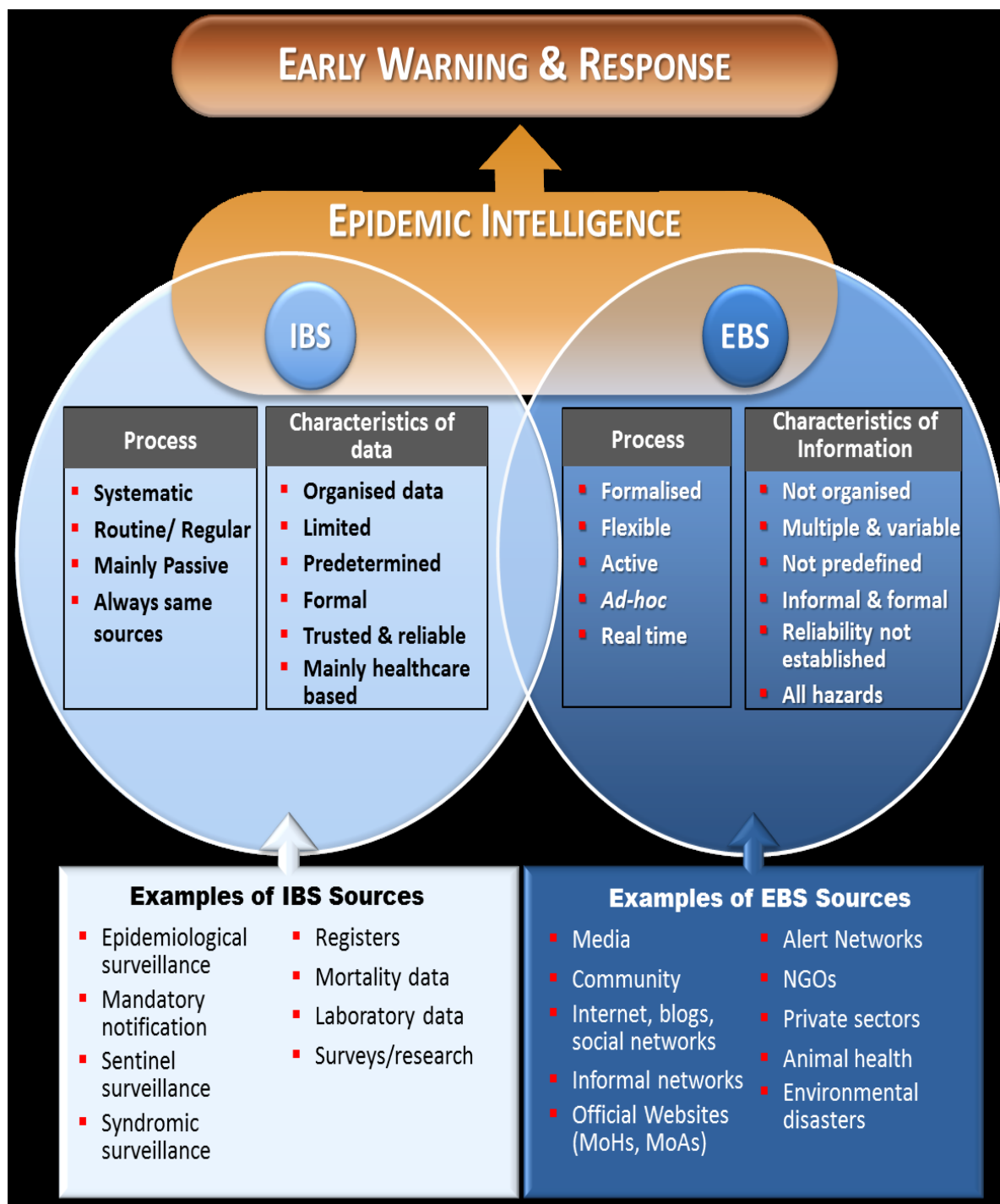
- Embedded in overall surveillance.
- Aim to inform and guide the public health response to acute public health events of all origins (Human, animal, environment).
- **Sensitive** to detect signals at the earliest possible stage (hence collect information from informal sources also).

Mechanism for Early Detection of event:

EWAR relies on a process called “Epidemic Intelligence” and two main channels of information, indicator-based surveillance and event-based surveillance.

- Indicator based Surveillance (IBS): Systematic collection, monitoring, analysis and interpretation of structured data.
 - Surveillance data from well identified health-based formal sources (Health facilities, Laboratories); may include non-human health sources (animal health data, meteorological data or entomological data).
 - Primarily passive, based on established case definitions (Disease-specific or presumptive)
 - Data is analysed in comparison with baseline values and thresholds to determine unusual disease patterns.
 - Data can be used for measuring impact of programmes or identification of priority health problems.

- Event Based Surveillance (EBS): Organized collection, monitoring, assessment and interpretation of mainly unstructured ad-hoc information regarding health events or risks, which may represent an acute risk to human health
 - Functional component of EWAR.
 - Primarily active
 - Information sources are multiple, often not predetermined, both official and unofficial, including rumors reported by media, National/State call Centre or informal networks.
- Epidemic Intelligence (EI): Systematic collection, analysis and communication of any information to detect, verify, assess, and investigate events and health risks with an early warning objective. EI integrated both sources of information (IBS and EBS) in order to detect acute public health events.



Source: Early detection, assessment and response to acute public health events: Implementation of early warning and response with a focus of Event-based surveillance, WHO 2014.

Exercise – 1: Examples of Indicator based surveillance and Event based Surveillance in IDSP

Indicator based surveillance (IBS)	Event based Surveillance (EBS)
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<u>Analysis report</u> by Epidemiologist of an increase in the number of Diarrheal cases in a block	<u>Ad-hoc report</u> by Health worker regarding clustering of Diarrheal cases in a village.
The local Public works department/Jal board alerts the health authority about the abnormal turbidity and pH of the local water source.	Local residents complain to their leader/association about the stench from the local water source due to sewage mixing
Confirmation of Veterinary Lab regarding occurrence of Lab confirmed A/H5N1 Influenza in a large commercial free-range broiler flock.	Unusual die-off of birds is reported by local media among backyard chickens
Indian meteorological department informs that an unusual heat wave will strike the country in the coming weeks	Media reports note several deaths due to the unusual hot weather in the country
Routine analysis of H1N1 data suggests that seasonal thresholds has been crossed.	Increased media searches for the word “flu”

Module 1b

Introduction to IDSP

Specific Learning Objectives:

- *Understand the objectives and functioning of Integrated Disease Surveillance Programme*
- *List the members of the State & District Surveillance Committee and its utility*
- *List the types of surveillance carried out under IDSP.*
- *List all the conditions under surveillance through IDSP system.*
- *Understand the functioning of Media Scanning & Verification Cell with ability to replicate in the State.*

Introduction to Integrated Disease Surveillance Programme (IDSP)

Background

Integrated Disease Surveillance Programme (IDSP) is a decentralized, State based surveillance programme in the country, intended to generate and detect early warning signals of impending outbreaks and help to initiate an effective response in a timely manner. The project design was based on the experience of implementation of a WHO supported National Surveillance Project for Communicable Diseases (NSPCD) which was launched by the Government of India in 1997-98 rolled over 101 districts. Under this programme, the States were the implementing agencies and the National Centre for Disease Control (NCDC), then *NICD National Institute of Infectious Diseases*, Delhi was the nodal agency for coordinating the activities. In November 2004, Integrated Disease Surveillance Project was launched with the funding support from World Bank. 1st April 2010 onwards World Bank provided funds (in the form reimbursement of expenditure) for the Central Surveillance Unit (CSU) and 9 States. For the rest of the States, domestic funding was available. The project was approved as a central scheme “Integrated Disease Surveillance Programme” (IDSP) during 12th plan period (2012-17) and now the programme continues under the umbrella of National Health mission.

Objective:

1. To strengthen/maintain a decentralized laboratory based IT-enabled disease surveillance system for epidemic prone diseases to monitor disease trends and to detect and respond to outbreaks in early rising phase through trained Rapid Response Teams.
2. To establish a functional mechanism for inter-sectoral co-ordination to tackle the Zoonotic diseases.

Programme Components:

- Integration and decentralization of surveillance activities through establishment of surveillance units at Centre, State and District level.
- Human Resource Development – Training of State Surveillance Officers, District Surveillance Officers, Rapid Response Team and other Medical and Paramedical staff on principles of disease surveillance.
- Use of Information Communication Technology for collection, collation, compilation, analysis and dissemination of data.
- Strengthening of Public Health Laboratories.
- Establishment of Inter-sectoral coordination at State level including department of animal health, wildlife, environment and forests, agriculture and food safety.

Integrated Disease Surveillance Programme (IDSP) - Strategy

The IDSP proposes a comprehensive strategy for improving disease surveillance and response through an integrated approach. In the integrated disease surveillance system:

- The district level is the focus for integrating surveillance functions.
- All surveillance activities are coordinated and streamlined. Rather than using scarce resources to maintain vertical activities, resources are combined to collect information from a single focal point at each level.
- Several activities are combined into one integral activity to take advantage of similar surveillance functions, skills, resources and target populations.
- The IDSP integrates both public and private sector by involving the private practitioners, private hospitals, AYUSH practitioners & hospitals, private labs, NGOs, Medical colleges etc.
- Integration of both rural and urban health systems as rapid urbanization has resulted in the health services not keeping pace with the growing needs of the urban populace.
- Integration with the medical colleges (both private and public) would also qualitatively improve the disease surveillance especially through better coverage.

Management structure of IDSP

i. Central Level:

Central Surveillance Unit (CSU) is established at National Centre for Disease Control (NCDC) for overall implementation of the Programme in the Country. The Joint Secretary, MOHFW (Administrative Head) and the Director NCDC (Technical Head) have overall responsibility for the Programme. A senior officer from NCDC (Addl. Director Level) is designated as National Program Officer (NPO), to coordinate the Programme activities with sections namely budget & finance, laboratory development, Information Technology and Communication, Data management& Monitoring and Human Resource Development. For better coordination and timely action, this unit has technical and administrative officers.

Functions of the central surveillance unit:

- Execution of approved Annual Plan of Action for IDSP
- Monitor progress of implementation of all the different components of the programme;
- Obtain reports from States on various activities under the programme including physical reports and expenditure statements
- Report regularly to the Central Executive Committee and National Disease Surveillance Committee;
- Production and dissemination of prototype standard guidelines, manuals, modules and other literature to ensure high quality in training, implementation and operating procedures under the project
- Implement central level activities: Training & Lab strengthening;
- Analysis of data received from the States and provide feedback on trends observed
- Coordinate with central agencies such as NCDC, ICMR and other referral laboratories;
- Conduct periodic review meetings with State Surveillance Officers and organizing workshops at the central level
- Acting as the nodal point or control room at the central level for coordinating responses to requests received from states during epidemics and disasters;
- Form and supervise the movement of the rapid response team at the central level to supplement the efforts of States during disasters or epidemics of very large magnitude.

- Managing activities of Media scanning and verification cell.

ii. **State Level: State Surveillance Unit**

The States are responsible for implementation of the disease surveillance activities of IDSP in conformity with National guidelines through State Surveillance Unit (SSU). SSU integrates disease surveillance activities in the State and reports to the competent authorities. A State Surveillance Unit has been constituted in the Department of Health &FW with a State Surveillance Officer (Joint Director level regular officer of State health services) as per following composition:

- I. Consultant Epidemiologist
- II. Consultant Microbiologist
- III. Consultant Veterinary
- IV. Consultant entomologist
- V. Consultant Finance
- VI. Consultant Training
- VII. Data Manager
- VIII. Data Entry Operators

Functions of SSU include the following:

- Analysis of all data being received from the districts and transmitting the same to the central surveillance unit.
- Coordinating the activities of the rapid response teams and dispatching them to the field whenever the need arises.
- Monitoring and reviewing the activities of the district surveillance units including checks on validity of data, responsiveness of the system and functioning of the laboratories.
- Coordinating the activities of the District public health laboratories and the medical college laboratories.
- Sending regular feedback to the district units on the trend analysis of data received from them.
- Coordinating all training activities under the programme.

iii. **District Level: District Surveillance Unit**

The focal point of all surveillance related activities at the periphery is District Surveillance Unit (DSU) established at Office of Chief Medical Officer – Health of the District. DSU is headed by a District Surveillance Officer (DSO) who is also a regular officer of State Health Services. At DSU, DSO plays a key role in the integration functions of the IDSP.

Composition

- District Surveillance Officer
- District Epidemiologist
- Data Manager
- Data entry Operator*

Data entry operators are provided to DSU as well as to each Government Medical college so as to assist them in reporting.

DSU will be responsible for following functions:

- Collation and analysis of all data being received from various service providers within the districts and transmitting the same to the State/Central surveillance unit.
- Coordinating the activities of the rapid response teams and dispatching them to the field whenever the need arises.
- Monitoring and reviewing the activities of the Programme including checks on validity of data, responsiveness of the system and functioning of the laboratories.
- Coordination with District public health laboratory and the medical college laboratories.
- Sending regular feedback to the reporting units on the trend analysis of data received from them.
- Coordinating all training activities under the programme.
- Inter-sectoral coordination with various other disease control programme like NVBDCP, Immunization Programme and with medical colleges, Private Practitioners etc.

Job Description of the District Surveillance Officer:

- Appraise the disease surveillance status to District collector, CMO, Zila Parishad /Chairman once a month.
- Arrange monthly District Surveillance Committee meetings.

- Ensure timely access & use of surveillance data by disease control Programme managers.
- Ensure that response/actions taken by Programme managers with regard to disease surveillance are recorded in a timely manner and shared with the State surveillance unit.
- Coordinate activities of RRT in the district
- Ensure that summary reports on disease surveillance are sent to the State, Programme managers and district administration on a weekly basis.
- Ensure involvement of private sector in the surveillance activity with special emphasis on quality.
- Ensure coordination of district public health laboratory in the activities of the peripheral units and ensure logistic support.
- Integrate the surveillance activities of the Medical colleges in the district as specified in the Programme PIP.
- Identify capacity building needs of different functionaries in the district and facilitate appropriate training / retraining if necessary
- Ensure regular feedback is provided from the District to the peripheral units both public and private participating in IDSP.
- Print and disseminate monthly surveillance bulletin and annual surveillance report for the district to all stakeholders.

The full time commitment of District Surveillance Officer is crucial to this function.

Recruitment of manpower at SSU and DSU has been decentralised to State level since 2010. The ToRs and minimum performance indicators of these staff are available at IDSP website.

Administrative structure

At the Central level, JS (MoHFW) is the administrative head of the Programme. At State and District level, State/District surveillance committees have been established for taking policy and strategic decisions, monitoring and coordinating with stakeholders. At State and District level, funds are handled through the NHM (State/District Health Societies) under the overall supervision of the State Department of Health and Family Welfare. To improve the efficiency of various committees formed at State/District level, it may be prudent to have a single surveillance committee that can provide oversight to various program.

State level

a) State Disease Surveillance Committee

A State surveillance committee has been set up in each State under the chairmanship of the Health Secretary to oversee all the surveillance activities in the State. The State Surveillance Committee would be a body for taking policy and strategic decisions, monitoring and coordinating with stakeholders at State level.

Its composition of State Surveillance Committee is as follows:

1. Health Secretary (Chairperson)
2. Director of Public Health (Co-Chair)
3. State Surveillance Officer. (Member Secretary)
4. Directors Health Services, Medical Educations (HODs)
5. Program managers of TB, Malaria, Polio, HIV
6. Representatives from Department of Environment and Home
7. Head of the State Public Health Laboratory
8. Representative of the State unit of the Indian Medical Association
9. Coordinating member from State Medical colleges surveillance team
10. One representative from the NGOs working for public health
11. Representative from Animal Husbandry Dept.
12. Representative from State Food Safety Dept.
13. Representative from State Wild Life and Forest Department
14. Any other co-opted members

Functions of State Surveillance Committee –

- To oversee all the surveillance activities in the State and be administratively responsible for program activities in the State.
- Coordinating with other departments during large-scale epidemics. Therefore, chairmanship by the Health Secretary is vital considering that the coordinating role of this committee with other departments during large-scale epidemics as it is felt that the Health Secretary would be in a better position to do so.

District level

1. District Disease Surveillance Committee

The district surveillance committee will be responsible for the regular monitoring of the Programme.

Its composition of District Surveillance Committee is as follows:

1. District Collector or District Magistrate (Chairperson)
2. Chief Medical Officer (Co-Chair)
3. District Surveillance Officer (Member Secretary)
4. Programme officers of TB, Malaria, HIV, RCH
5. Representative of Medical College (if any)
6. Representative from IMA
7. District Animal Husbandry Officer
8. District Forest Officer
9. Police Superintendent
10. Representative from the Water Board
11. NGO representative
12. Representative of Zila Parishad (Panchayat)
13. Head of the District Public Health Laboratory (if any)
14. Any other co-opted members

Functions of District Surveillance Committee –

- The district surveillance committee is responsible for the regular running & monitoring of IDSP program in the district.
- The Committee will meet once a month regularly and as often as needed during an epidemic to review IDSP program activities. A routine report of this meeting should be forwarded to the State Surveillance office once a month to understand the progress and problems in various districts. Reports of these meeting will be forwarded to the National Surveillance cell once in three months.

District Rapid Response Team (DRRT)

The DRRT is a multifaceted team that looks into the various aspects of an outbreak. There will be a DRRT team at each district. A similar team may be available at the regional and State level to support the DRRT if and when and if necessary.

Composition of this team is selected from a panel of experts available at the district or region. To ensure that all experts at State/District level get an opportunity to investigate outbreaks, proper roster of experts should be available at DSUs at all times. Also Back-up DRRT needs should be made in case usual DRRT is not available during any emergency.

The information on the panel will be available at the District Surveillance Office.

Sample composition of DRRT:

1. Nodal officer* in-charge of disease control in the district (Epidemiologist) – the team leader, usually with public health training and experience.
2. The Clinician – either a physician or a paediatrician who is able to make a clinical diagnosis from the cases. (Member of nearest medical college surveillance team)
3. The Microbiologist – (From District PH Laboratory) to collect the specimens and to transport them appropriately. Many districts may not have a microbiologist so a laboratory technician may be substituted. Where necessary, the State team should also include an entomologist in the team.
4. Food Safety Officer – to jointly investigate outbreaks due to food borne illnesses
5. Veterinary Officer from Animal Husbandry department to jointly investigate outbreaks due to zoonotic origin.
6. Any other person in the list of surveillance consultants with DSO.
7. Field level Health staff (MPHW, HW(M), ASHA etc –to assist the team in the community, do surveys, make community contacts and mobilize the community when necessary.

*The nodal officer will be selected from the Programme officers of disease control Programmes. The nodal officer will coordinate the selection of team leader for the DRRT based on the type of disease outbreaks.

Appendix 5

Exercise – 1

1. There is a measles outbreak in your District. Form a District RRT for outbreak investigation.
2. Who will be the members of District RRT, in case of an outbreak of Vector borne disease origin for e.g. Dengue.
3. The District has requested State to investigate an outbreak of fever with haemorrhagic symptoms. Form a State RRT for this unknown aetiology outbreak on the lines of DRRT.

The DRRT will be allotted resources specifically for response related activities so as to be effective. They will need:

- A dedicated and functioning vehicle so that they are able to visit the site at short notice. (This will be made available from existing vehicles at the district level by the DSO authorized by the District Collector)
- Drugs so that they can start the preliminary treatment.
- Diagnostic reagents and kits for doing preliminary diagnosis.
- Facilities to store and transport the samples.
- In some outbreaks, DRRT may require Personal Protection equipment (PPE) kits.

As required, State and national level teams can be brought into action as per predefined levels of the spread of the outbreak in the region and the type of disease.

Surveillance under IDSP:

Under IDSP, predominantly three types of surveillance are conducted:

1. Routine surveillance:
 - a. Indicator based – weekly reporting of aggregate data collected based on standard case definitions through standardised formats.
 - b. Event based surveillance – events detected through informal sources like Community informants, media, rumours etc whenever required.
2. Outbreak Surveillance:
 - a. Weekly reporting of outbreaks based on analysis of information gathered through indicator and event based surveillance
3. Special Surveillance: for e.g. Mass Gathering, PHEICs or Post Disaster (Discussed in detailed in separate module).

Core conditions under IDSP:

Vaccine preventable diseases	Diphtheria, Pertussis, Measles, Rubella and Polio
Vector borne diseases	Dengue, Chikungunya, Malaria, and Japanese Encephalitis
Water borne diseases	Hepatitis A, Hepatitis E, Cholera, Diarrhoea, Dysentery and Typhoid
Respiratory diseases	Influenza, Mumps, Chicken pox,
Clinical syndromes causing death/hospitalisation	Meningococcal Meningitis
Zoonotic diseases	Scrub Typhus, Anthrax, Kyasanur Forest Disease, Crimean Congo Haemorrhagic Fever and Leptospirosis

*Surveillance of COVID-19 is currently being conducted by IDSP as a part of special surveillance.

The standard case definition of diseases is given in a separate manual. Depending on the level of expertise of the person doing surveillance activity and specificity of the diagnosis, routine surveillance in IDSP is conducted as follows:

Indicator based Surveillance in IDSP:

- **Syndromic** – Diagnosis made on the basis of clinical pattern by paramedical personnel and members of the community.
- **Presumptive** – Diagnosis made on typical history and clinical examination by Medical Officers and presumptive lab tests
- **Lab Confirmed** – Clinical diagnosis confirmed by an appropriate confirmatory laboratory test.
- **Syndromic Surveillance**

The paramedical health staff (MPHW/ASHA) will undertake disease surveillance (both active and passive) based on broad categories of presentation. The clinical syndromes under surveillance are:

- 1) Fever

- a) Fever < 7 days
 - i) Only fever
 - ii) With rash
 - iii) With bleeding
 - iv) With daze/ semi-consciousness/unconsciousness
- b) Fever > 7 days
- 2) Cough with or without fever
 - a) < 2 weeks
 - b) > 2 weeks
- 3) Loose watery stools of less than 2 weeks duration
 - a) With some/much dehydration
 - b) With no dehydration
 - c) With blood in stools
- 4) Jaundice cases of less than 4 weeks duration
- 5) Acute flaccid paralysis cases in < 15 yrs. of age
- 6) Unusual symptoms leading to death or hospitalisation that do not fit into above.

These syndromes are intended to pick up majority of priority diseases listed under IDSP for surveillance.

- **Presumptive and Confirmed Disease Surveillance:**

Under IDSP the MOs of PHC, CHC, Medical Colleges and Sentinel hospitals will conduct presumptive surveillance routinely. Also, disease/conditions tested at laboratory by conducting tests other than confirmatory tests will be regarded as presumptive diagnosis.

Diseases under Presumptive surveillance

1. Acute Diarrhoeal Disease (Including acute gastroenteritis)
2. Dysentery (With blood in stool)
3. Acute Encephalitis Syndrome
4. Acute Hepatitis
5. Anthrax
6. Chicken pox

Diseases under Lab surveillance

1. Anthrax
2. Chikungunya
3. Cholera
4. Crimean Congo Haemorrhagic Fever
5. Dengue
6. Diphtheria
7. Typhoid

- | | |
|---|---|
| 7. Chikungunya | 8. Hepatitis A |
| 8. Crimean Congo Haemorrhagic Fever | 9. Hepatitis E |
| 9. Dengue | 10. Influenza |
| 10. Diphtheria | 11. Japanese Encephalitis |
| 11. Enteric Fever/Typhoid | 12. Kyasanur Forest Disease |
| 12. Human Rabies | 13. Leptospirosis |
| 13. ARI/ILI | 14. Malaria |
| 14. Kyasanur Forest Disease | 15. Measles |
| 15. Leptospirosis | 16. Meningococcal meningitis |
| 16. Malaria | 17. Non Typhoidal Salmonellosis |
| 17. Measles | 18. Pertussis |
| 18. Meningitis | 19. Rubella |
| 19. Mumps | 20. Scrub Typhus |
| 20. Pertussis | 21. Shigellosis |
| 21. SARI (including pneumonia) | 22. Two State Specific Diseases (For e.g. Brucellosis/Chandipura virus disease) |
| 22. Scrub Typhus | 23. Any other |
| 23. Any other State Specific Diseases (For e.g. Brucellosis/Chandipura virus disease) | |
| 24. Unusual Syndromes NOT Captured Above (Undiagnosed haemorrhagic fevers) | |

Surveillance of COVID-19 is currently being conducted by IDSP as a part of special surveillance.

Event based Surveillance in IDSP:

- **Media scanning & Verification Cell (MSVC):**

Central Surveillance Unit - IDSP established Media Scanning & Verification cell (MSVC) in 2008 for providing supplemental information for early detection of outbreaks. The general objective is to provide an early warning signals for detection of potential outbreaks/unusual health events so that an appropriate and timely action can be taken.

Outline of Media scanning and verification:

The outline comprises of five activities

1. **Source and collection of information (unusual health events)**
2. **Identification of media alerts**
3. **Alert verification**
4. **Response to the media alert**
5. **Monitoring**

- 1) **Source and collection of information:** Routinely and actively scanning the media can provide early signals of a health alert. Media information are gathered from two sources: the print media and electronic media
 - a) **Print media:** includes newspaper, magazine, reports etc. forms an aggregate of large information source. All national, regional and local newspaper and reports (daily, fortnightly, quarterly and annually) are screened for unusual health events.
 - b) **Electronic media:** The Internet has become a critical medium for clinicians, public health personnel, and lay-people seeking health information. Data about diseases and outbreaks are disseminated not only through online government portal but also through informal channels ranging from **press reports** (e-paper etc) to **web based data sources** namely (ProMed Mail, Health Map, Google Alerts, etc) and **social media** (face book, tweeter etc).
 - c) **Rumour reports:** The community informants, health workers, traditional healers and those working in private sector provide informal reports on unusual events in the community.
- 2) **Identification of media alerts:** Thee unusual events scanned through media generate high proportion of duplicates and irrelevant information. The epidemiologist filter and select unusual events “now called as media alerts” that are shared with concerned District/State for further investigation.
- 3) **Alert verification:** Verification of media alerts plays an important role in confirming the authenticity of the unusual event. For e.g., the press and internet media may present an information in a sensational fashion or from a biased viewpoint. Therefore, the authenticity of the events needs to established before proceeding to next step.

Verification should be done by the concerned District/State surveillance officer by asking additional information from the Block Medical Officer/MPHW of the area. It is also an opportunity to collect additional information such as number of cases and deaths, place and date of occurrences, presenting symptoms or lab findings.

- 4) **Response to the media alert:** Response begins as soon as the unusual event has been verified as being true and is followed by deployment of RRT for outbreak investigation and implementation of prevention and control measures.
- 5) **Monitoring:** Monitoring ensures continuous performance of surveillance and response system; performance indicator determine the effectiveness of the system mainly refer to timeliness and effectiveness. For instance, proportion of media alerts that has generated early warning signals; proportion of media alerts verified as true events; proportion the media alerts verified within 24hrs of notification etc.

Standard Operating Procedures (SOPs) for establishing a MSVC at SSU:

State Surveillance Units are encouraged to establish a similar mechanism to scan local newspapers/electronic media for unusual health related events pertaining to outbreak prone infectious diseases covered under IDSP. This activity provides early warning of occurrence of local and focal unusual health events/ potential outbreaks in advance. It can assist in the generation of hypotheses about potential epidemiological links between cases. It also helps in tracking further spread of disease.

Activities to be conducted:

At SSU:

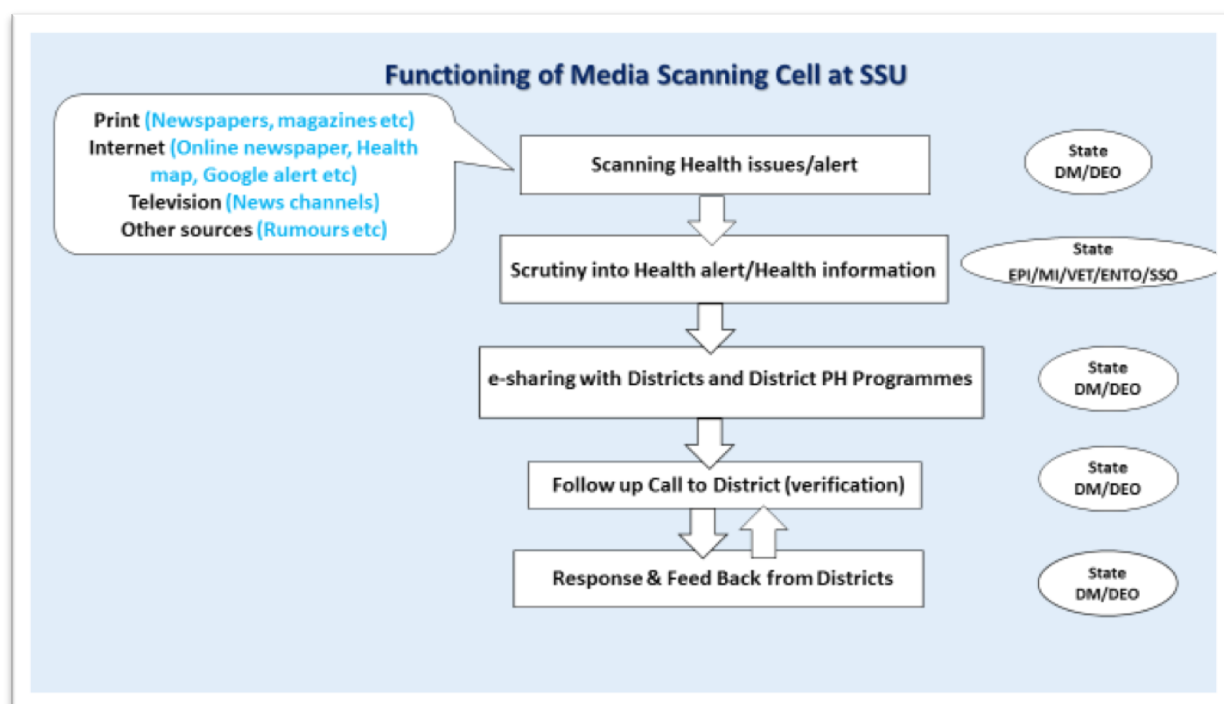
1. State Data Manger (SDM) scans media for unusual health related event(s) occurring in their State/ Districts as well as neighbouring States/bordering countries in the following media:
 - Paper newspapers
 - Online/e-paper editions
 - Google Alerts, ProMed and Health Map and any other informal sources
 - Rumour registers

The scanned information are to be scrutinised by State Epidemiologist/State Surveillance Officer shared in the format A to respective District/s.

An email account for media scanning verification cell at the State level may be created, so that the health events are shared with respective District Surveillance Units.

2. A copy of media alert which involves multistate involvement and adjoining Border States should be shared with CSU.

3. SDM should verify the alerts through phone and maintain a call log. *If the verified alerts results in an unusual event /outbreaks the epidemiologist should communicate with the concerned District to send a EWS to Central Surveillance unit.*
4. A repository of all media alerts generated and the investigation reports received are to be maintained in the prescribed database as **Format** by the SDM.
5. **States should update and send Format B** to CSU on a weekly basis through email. The investigation reports of the alerts are to be reported in English language.



FORMAT A

MSVC-(**** name of the state)				
State Logo	Media Scanning & Verification Cell-**** Media alert from the Media Scanning & Verification Cell, ****			
State Alert ID	Publication Date	Reporting Date	Place Name District / Block	News Source/Publication Language
***-001	DD/MYY	DD/MYY		www.timesofindia.com/English http://timesofindia.indiatimes.com/city/ahmedabad/61-taken-ill-after-wedding-feast-in-Saraspur/articleshow/50988146.cms
Title:		ABDCD		
Action By SSU/DSU - ****		Information communicated to SSU/DSU/CSU-Media Scanning Cell-IDSP, NCDC-Delhi		
Save a tree. Don't print unless it's really necessary!				
Integrated Disease Surveillance Programme (IDSP) State office Address				
For more information please contact: Media Scanning & Verification Cell-****: - Phone (00)00000 Email: - mediascanningcell****@gmail.com				
Join CSU on http://www.facebook.com/pages/Media-Scanning-Verification-Cell-IDSP/NCDC/137297949672921				

FORMAT B

< State Name >													
S.No.	Date of Alert	News Source	State Alert ID	State	District	Block	Disease	Subject	Date of Verification	Verified True /False	EWS sent	Report	Remarks
Month & Week No. [for e.g. April, 2016(Week No. 17)]													

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Outbreak Surveillance:

An outbreak is an increase - often sudden – in the observed number of cases of a disease or health problem compared with the expected number for a given place or among a specific group of people over a particular period of time.

Epidemic – The occurrence in a community or region of cases of an illness, specific health related behaviour, or other health related events clearly in excess of normal expectancy.

The term “outbreak” may be used interchangeably with “epidemic” although “outbreak” is used to describe a localized epidemic i.e. limited to a village, town or specific institution.

Source(MacDonald, Pia D.M., Methods in field epidemiology 2012)

- Changes in trends observed during routine analysis and suspected outbreaks detected through event based surveillance are confirmed by Outbreak investigations.
- The course of an outbreak/epidemic is dependent on how early the outbreak is identified and how effectively specific control measures are applied. The epidemiological impact of the outbreak control measures will be significant only if these measures are applied in time.
- When outbreaks occur or when the risk of such outbreaks is high, the inter-sectoral coordination with other government departments, non-governmental agencies and the community often becomes necessary. Hence, it is necessary that such coordination mechanism have been developed before the onset of an outbreak.
- District Surveillance unit will inform SSU and CSU of any occurrence of suspected outbreak/unusual event in their area through email/portal immediately. If in case, no suspected outbreak/unusual event is detected in the State, it is mandatory to send “Nil” reporting to CSU every week.
- In Outbreaks it may not be necessary to collect samples of ALL the cases for confirmation. Optimally, samples from 10% of cases with minimum of 5 samples need to be taken. Once this is confirmed, it should be enough for action to be taken.
- Daily outbreak monitoring report, apart from routine reporting, is necessary once an outbreak has been identified so that the situation can be monitored on day to day basis. This report may include: Daily case count, death count, brief on time-place-person, epicurve, details on severe cases/hospitalised cases and action taken. Daily monitoring of outbreaks should continue till outbreak is controlled. Outbreak will be declared over after completion of double the maximum incubation period after occurrence of last case.

Take Home messages:

- Public Health Surveillance is an ongoing process.
- In our country, Programme responsible for surveillance of epidemic prone diseases is IDSP i.e. Integrated Disease Surveillance Programme.
- Three types of surveillance are conducted under IDSP: Syndromic, Presumptive & Lab confirmed.
- Early detection & response to EWS through trained rapid response team is the main objective of IDSP.

Module 2

REPORTING UNITS AND THEIR ROLES & RESPONSIBILITIES IN DISEASE SURVEILLANCE

Specific Learning Objectives

- *Identify the reporting units involved in surveillance under IDSP belonging to public & private sectors; rural & urban area.*
- *List the key functionaries in reporting units responsible for surveillance related activities.*
- *Fill the specific reporting formats completely & correctly from reporting units*
- .

Introduction

In any surveillance system, it is utmost important to identify and involve all facilities collecting data on disease/s of interest. These facilities may be :Public or private, in rural or urban area or a big (medical college or corporate hospital) or small establishments (Sub-Centre/private clinic). Hence, without a robust listing of these units, the first step of surveillance, i.e. data collection will be incomplete. These health facilities are called as Reporting Units (RU) under IDSP

Reporting Unit

- A reporting unit is a health facility/laboratories in private or public sector, located either in rural or urban area which collects information of the health conditions identified under IDSP in specified formats and transmits these in pre-specified timely manner to the next higher level.
- It is the overall responsibility of the District Surveillance Officer to enlist and designate reporting units (for the type of surveillance – S, P & L) in his area for IDSP reporting.
- The enlisted reporting units (RUs) will be identified by a randomly generated unique code by the system after registering them into the IDSP portal so that identity and type of RU can be recognized. This task has to be performed by data manager at DSU.

Types of Reporting unit and its type code in the system:

S.NO	Reporting Unit Type	RU Type Code	Forms Type
1	SC/HSC	SC	S
2	CHC/Rural Hospitals	CH	P
3	HC/Addl PHC/New PHC	HC	P
4	Infectious Disease Hospital (IDH)	ID	P
5	Govt. Hospital / Medical College	MH	P
6	Private Health Center/ Private Practitioners	PC	P
7	Private Hospitals	PH	P
8	Private Labs	PL	L

9	Government Laboratories	GL	L
10	Private Hospitals(Lab.)	LPH	L
11	CHC/Rural Hospitals(Lab.)	LCH	L
12	HC/Addl PHC/New PHC(Lab.)	LHC	L
13	Infectious Disease Hospital (IDH)(Lab.)	LID	L
14	Govt. Hospital / Medical College(Lab.)	LMH	L
15	Private Health Center/ Private Practitioners(Lab.)	LPC	L

➤ **PROCESS OF INFORMATION:**

Tentative reporting units for routine disease surveillance

	Public health sector*	Private health sector*
Rural	SCs, PHCs, HWCs, CHCs, SDH, District Hospitals	Private - practitioners, hospitals, nursing homes, Medical colleges & laboratories.
Urban	Hospitals (Urban PHCs, Urban CHC, Municipal Hospitals), Infectious Disease Hospital/ ESI / Railway /Medical college hospitals, AYUSH Hospitals.	

* Any other reporting units designated by the District Surveillance Officer.

Functional mechanism of disease reporting system under IDSP

IDSP conducts weekly surveillance of epidemic prone diseases. Under IDSP, the reporting week start from “Monday” and ends on “Sunday”. To conduct syndromic, presumptive and Lab based surveillance under IDSP, three types of formats i.e. ‘S’ form, ‘P’ form and ‘L’ form has been devised. (Appendix 6)

Ideally every Monday, the filled hard copy of S, P and L form from each RU under the District has to reach District surveillance Unit (DSU). All reporting units will provide zero reporting if no cases were reported. At the DSU, the data entry operator will enter all forms from the RUs in the IDSP portal through DSU specific user id and passwords. This activity has to be completed by “Wednesday”. Once data from all forms has been entered, the same data can be visualized and further utilized at District, State and Central Level.

Operational mechanism of disease reporting system under IDSP

Collection of information for syndromic surveillance

- The Syndromic surveillance will be conducted at the field by the health workers of the public sector units at both urban and rural setting, to avoid data duplication the field health worker should compile the report at PHC. One S form is to be generated for one sub Centre.
- The surveillance is primarily active based on field visits conducted by Health worker. However, data collected during routine OPDs and immunization session also need to be taken into account
- Health worker should identify the syndrome based on symptom and clinical pattern and report syndromic diagnosis as per the S form of Integrated Disease Surveillance Programme (IDSP). *Refer Manual for Health Worker for the details of reporting.*
This form is to be filled in triplicate. One filled form to be maintained at the HSC, one at reporting PHC/CHC (for information and analysis) and one form need to be submitted to the District (for data entry in IDSP portal)
- The Hard copy of the document/ form is to be kept for 3 years as record.

Collection of information for presumptive surveillance

- Under IDSP, the MOs of PHC, CHC & Medical Colleges will carry out presumptive surveillance routinely by reporting all probable cases of interest where they cannot be confirmed by Laboratory tests. Refer to 'P' form cases definitions available at IDSP website.
- The surveillance will be primarily passive in type and will be undertaken at all reporting units by the Medical Officers.
- Weekly data on both outpatient and hospitalized cases should be compiled in the 'P' form by pharmacist/designated person.
- Large Medical setups like District Hospitals/Medical colleges and large nursing homes has huge OPD case load. In such scenarios, the data can be collected from relevant departments in tally sheets (placed at Appendix 7) on a daily basis. The daily data may be then compiled to produce the P form by a designated person in the hospital for the IDSP portal. In any case, efforts must be taken to at least collect information on hospitalized cases because of

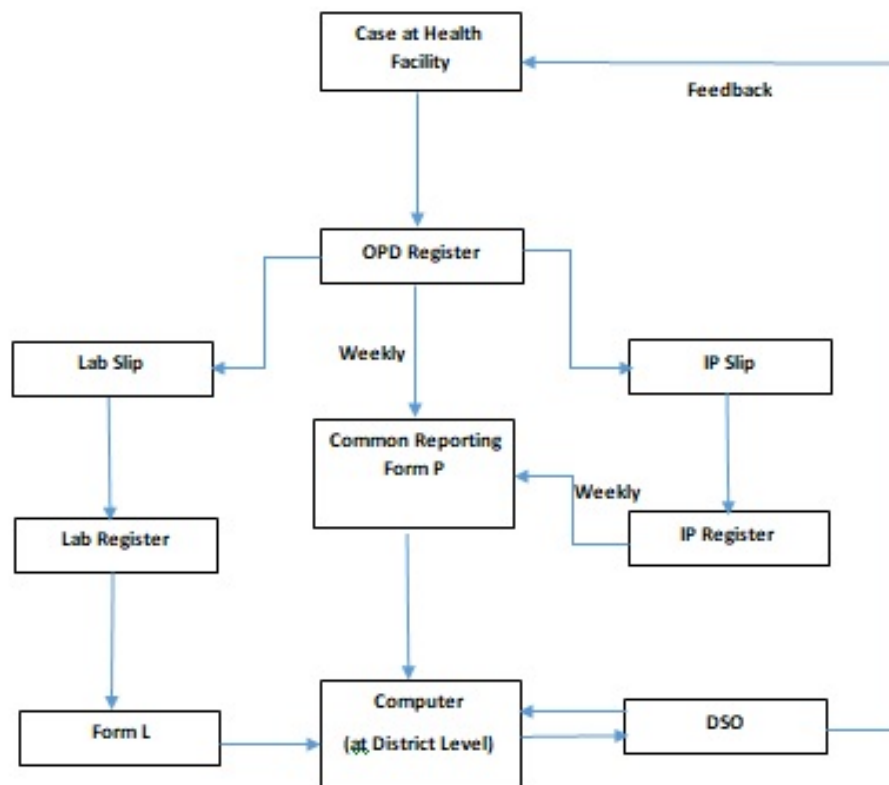
their strong probable diagnosis and severity of disease, it should not be missed by the surveillance system.

- The form should be duly filled and signed by Medical Officer in charge before submitting to the respective District Surveillance Unit. The overall responsibility of the completeness and correct filling of the data is the responsibility of the Medical Officer in charge or the head of the reporting unit / Health Facility.
- One P form to be generated for one 'P' form reporting unit.

Collection of information for Laboratory surveillance

- Under IDSP, the MOs of PHC, CHC & Medical Colleges will also carry out Laboratory surveillance routinely by reporting all lab confirmed cases of interest. Refer to 'L' form cases definitions at appendix 8. Complete line list of all lab confirmed cases except malaria is also to be reported in 'L' form.
- In case of private labs which have been included under the IDSP reporting network, the report may be collected on a weekly basis in the soft/hard copy directly over a mail and then entered into the portal.
- The form should be duly filled and signed by Laboratory in charge before submitting to the respective District. The overall responsibility of the completeness and correct filling of the data is the responsibility of the Laboratory in charge.
- One L form to be generated for one 'L' form reporting unit.

METHOD OF PASSIVE SURVEILLANCE FROM HEALTH FACILITY



Data Entry at District Level will be supervised by DSO

Feedback Weekly;

ALL reports of P and L forms must be reflected at Portal with in the time frame.

Responsibility of filling an IDSP form at Reporting units.

The designation of the person responsible for data compilation and transmission at each level is identified below:

1. S Form -Sub Centre - ANM
2. P Form - PHC, CHC, Private Practitioners/Hospitals/Laboratories, District Hospitals, Medical Colleges – Pharmacist MO I/C or any other designated person
3. L Form -Laboratory Technician, Laboratory in charge, MO in charge/Microbiologist.
4. Private Hospitals- Officer In-charge.

The quality of the data filled up by the health staff needs to be checked by a senior staff and only then transmitted. For all forms, the original has to be sent to the higher level while copy is to be maintained at the reporting unit from where it originated.

Which form is transmitted by whom to where and how frequently

Source / Forms	From	To	Functionary	Frequency *	Method of transmission	Supervision
From S form register Form S	Sub Centre	District Surveillance Unit(DSU)	ANMs	Weekly	Hard copy.	MO PHC/CHC
From OP/IP register and Lab Register Form P and/or Form L	PHC	District Surveillance Unit(DSU)	Pharmacist/MO/D ESIGNATED PERSON	Weekly	Hard copy or Block level data entry on IDSP portal.	BMO/MOIC PHC
From OP/IP register Form P and Form L	CHC	District Surveillance Unit	Pharmacist/MO/designated person	Weekly	Hard copy or Block level data entry on IDSP portal.	MS/THO/AMO/In charge CHC
From OP/IP register to Form P	PPs both rural and urban	District Surveillance Unit	Pharmacist/MO/designated person	Weekly	Email or Hard copy or any other electronic method	MO
From OP/IP register to Form P	Urban Dispensary	District Surveillance Officer	Pharmacist/MO/designated person	Weekly	Email or Hard copy or any other electronic method	MO
From OP/IP register Form P and Form L	SDH/Taluka Hospital	District Surveillance Unit	DEO/Pharmacist	Weekly	Email or Hard copy or any other electronic method	THO/MS /SDH Officer in charge
From OP/IP register Form P and Form L	Private Hospitals/Private Laboratories	District Surveillance Unit	MO/Designated person	Weekly	Email or Hard copy or any other electronic method	DSO
From OP/IP register - Form P Laboratory confirmed list - in Form L.	District Hospital/DPH L/Medical Colleges/NGO Hospitals/Corporation Hospital	District Surveillance Unit	Data Entry Operator	Weekly	Email or Hard copy or any other electronic method	DSO/ Corporation Medical Officer in charge

District Surveillance Unit

The district surveillance unit will collate the information received electronically from CHC, Medical colleges, District hospitals, and by mail from SPPs and other laboratories on a weekly basis. This will be analyzed and forwarded to State surveillance officer at weekly intervals. Pluses show level of responsibility indicated (+ low, +++ high)

Level	Functionaries	Data collection	Data Entry	Analysis	Investigation	Response	Feedback	Monitoring and Evaluation
Sub District Level	Community Informants/ASHA	+	-	-	-	+	-	-
	MPW/HAs	++	++	-	+	++	-	-
	DEO/Pharmacist/Lab Assistant	-	+++	+	-	-	-	-
	MO (PHC/CHC)	+++	±	++	++	+++	+	+++
	Private Practitioner	++	++	-	-	±	±	-
District Level	MO (Hospitals)	+++	+++	-	+	+	-	++
	Private Hospitals	+++	+	-	-	+	-	-
	MOs under Municipal Corporation	+++	+	+	++	++	-	+
	DEO	-	+++	+	-	-	-	-
	DATA MANAGER		+	+				+
	District RRT	-	-	-	+++	+++	+	-
	DSO/DISTRICT EPIDEMIOLOGIST	-	-	+++	+++	+++	+++	+++
	Municipal Health Staff	+	-	++	+++	+++	++	+
	Lab Technician (CHC/Hospital/DPHL)	+++	+	-	++	-	+	-
	District Magistrates	-	-	±	-	-	-	+
	NGOs	+++	±					
	Medical Colleges	+++	+	+	++	+	+	+
State Level	State Surveillance Unit	-	-	+++	++	++	+++	+++
National Level	NCDC/MoHFW	-	-	+	+	+	+	++

Take home messages:

- Every health facility either in Public sector or private sector should be enrolled as a reporting unit under IDSP.
- Every RU should report data on identified epidemic prone diseases under the Programme on weekly basis.
- Each person in a health facility should know their responsibility under IDSP.

Module 3

DATA ANALYSIS

Specific Learning Objectives

- *Identify the techniques of data analysis and importance of interpreting the same in a scientific manner.*
- *Outline the various sources of data in the district for disease surveillance and management of this data to draw valid conclusions.*
- *Identify disease baseline for each District.*
- *Compare analysis results with baseline to identify rising trend of cases within District(s).*

Objectives of Data analysis

- Identify disease baseline for each District.
- Analyze and interpret the data received under IDSP so that desired action can be initiated.
- Compare analysis results with baseline to identify rising trend of cases within District(s).
- If the trends cross a defined threshold, the possibility of outbreak should be considered.
- States should compare analysis results within a district/between districts to detect poorly performing areas.

Source of Data available under IDSP

- Syndromic case data
- Presumptive case data
- Lab Confirmed case data

Data presentation

To make the data meaningful and concise, data collected can be presented in various types of diagram. Most commonly used diagrams have been explained below:

1. Bar diagram: these are way of presenting a set of numbers by the length of bar – length of bar is proportional to the magnitude to be represented. The following are some examples of bar charts:

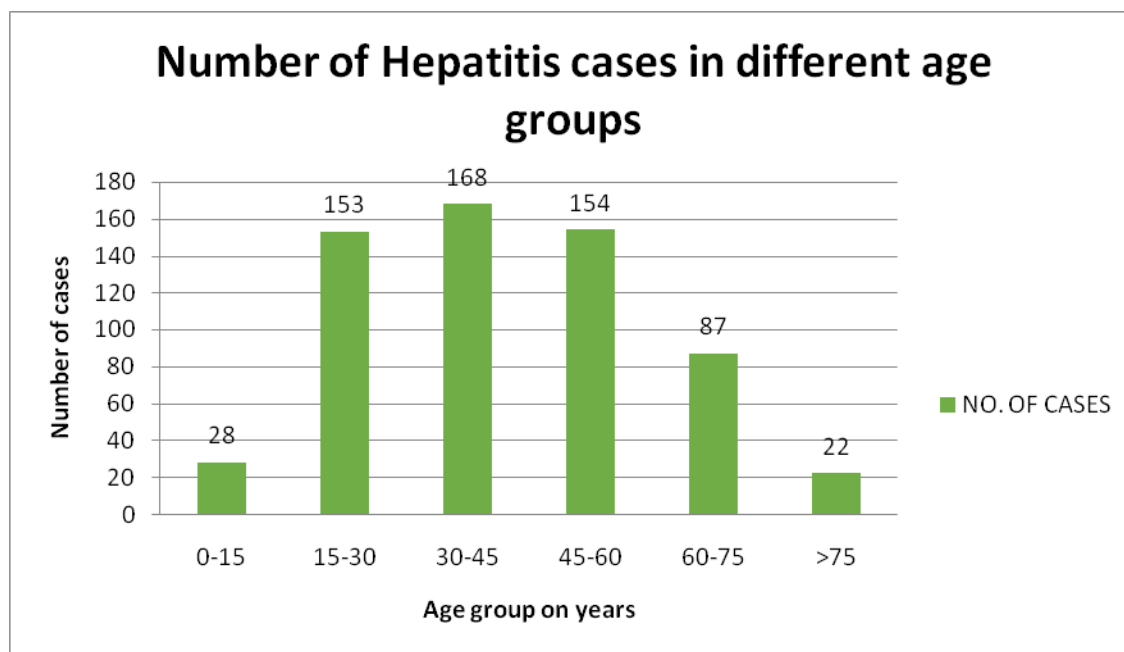
As per the tabulation below, the data can be presented in different form.

Table 1: Showing Age and gender wise cases of Hepatitis

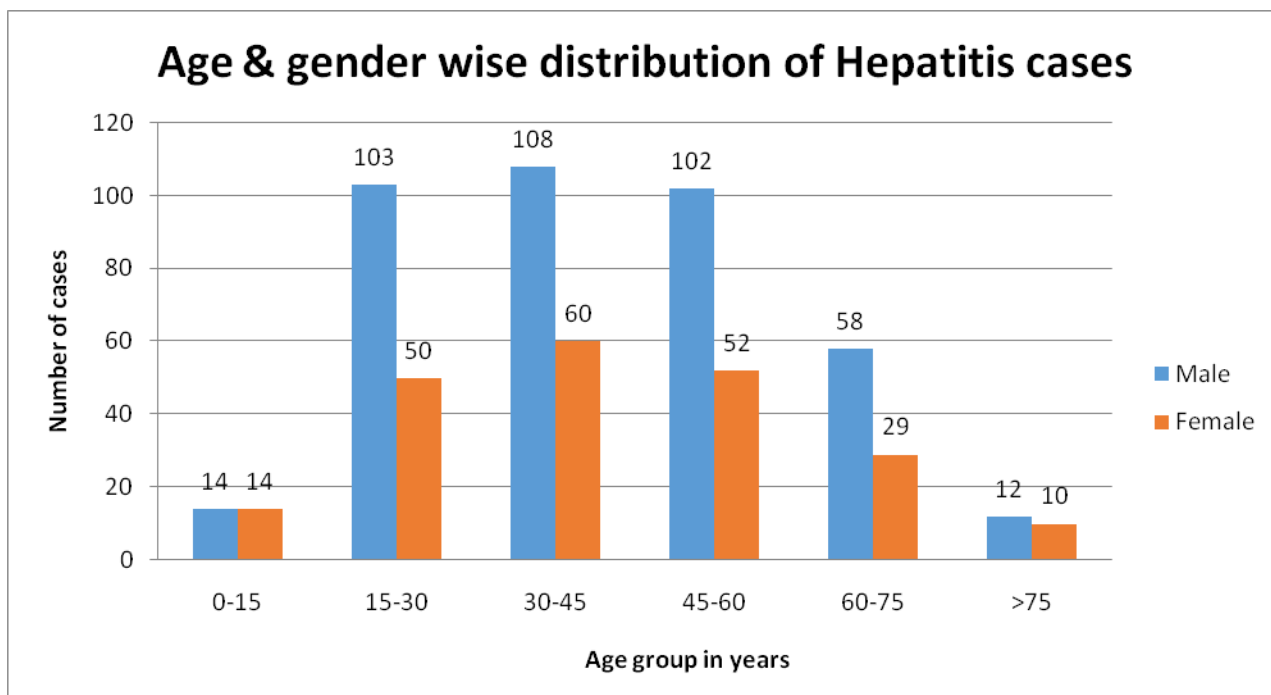
AGE (in years)	Male	Female	Total
0-15	14	14	28
15-30	103	50	153
30-45	108	60	168

45-60	102	52	154
60-75	58	29	87
>75	12	10	22
Total	397	215	612

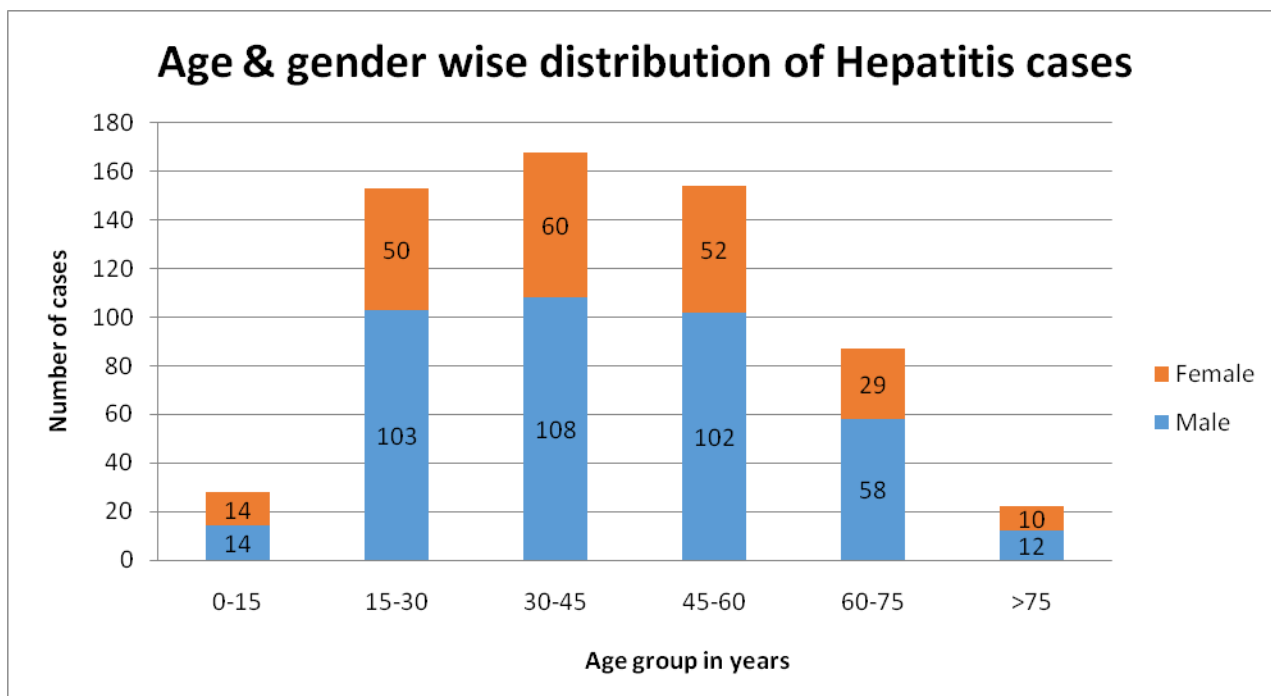
a. Simple bar diagram



b. Multiple bar diagram

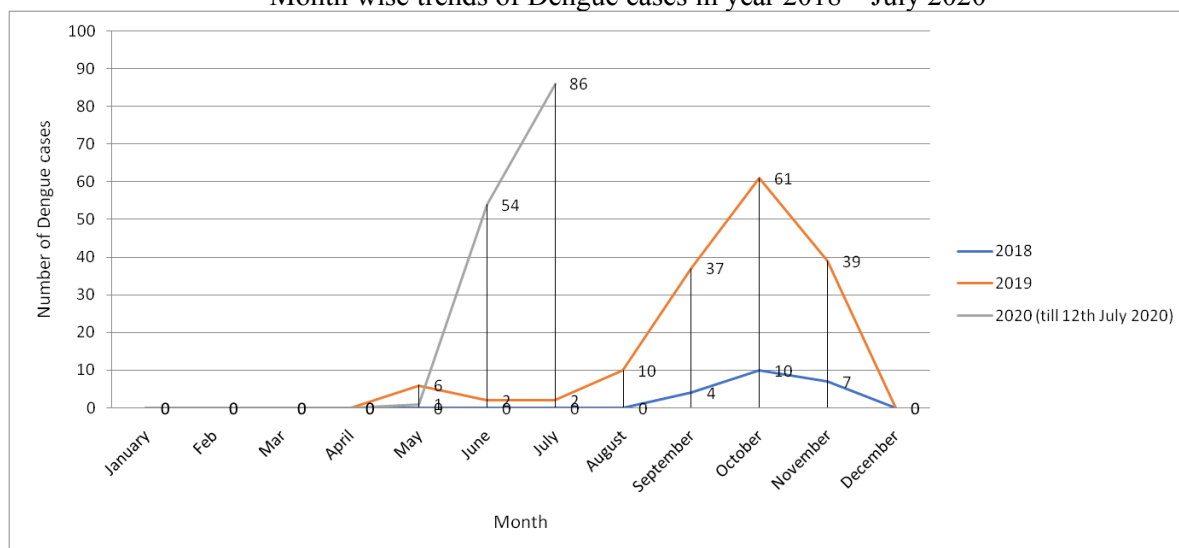


c. Component bar diagram



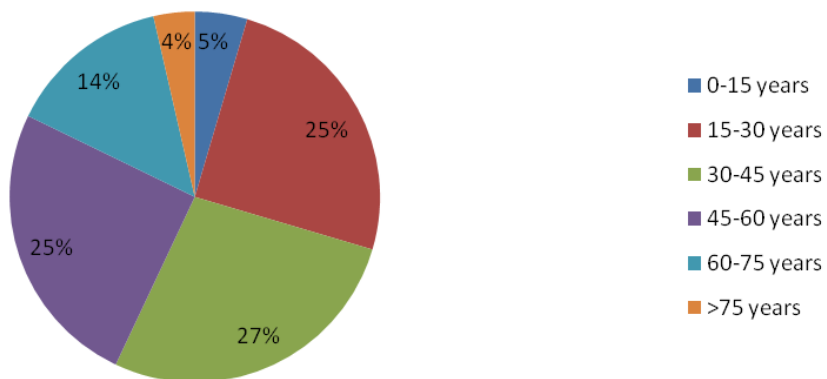
- Line diagram: Line diagram are used to show the trend of events with the passage of time.

Month wise trends of Dengue cases in year 2018 – July 2020



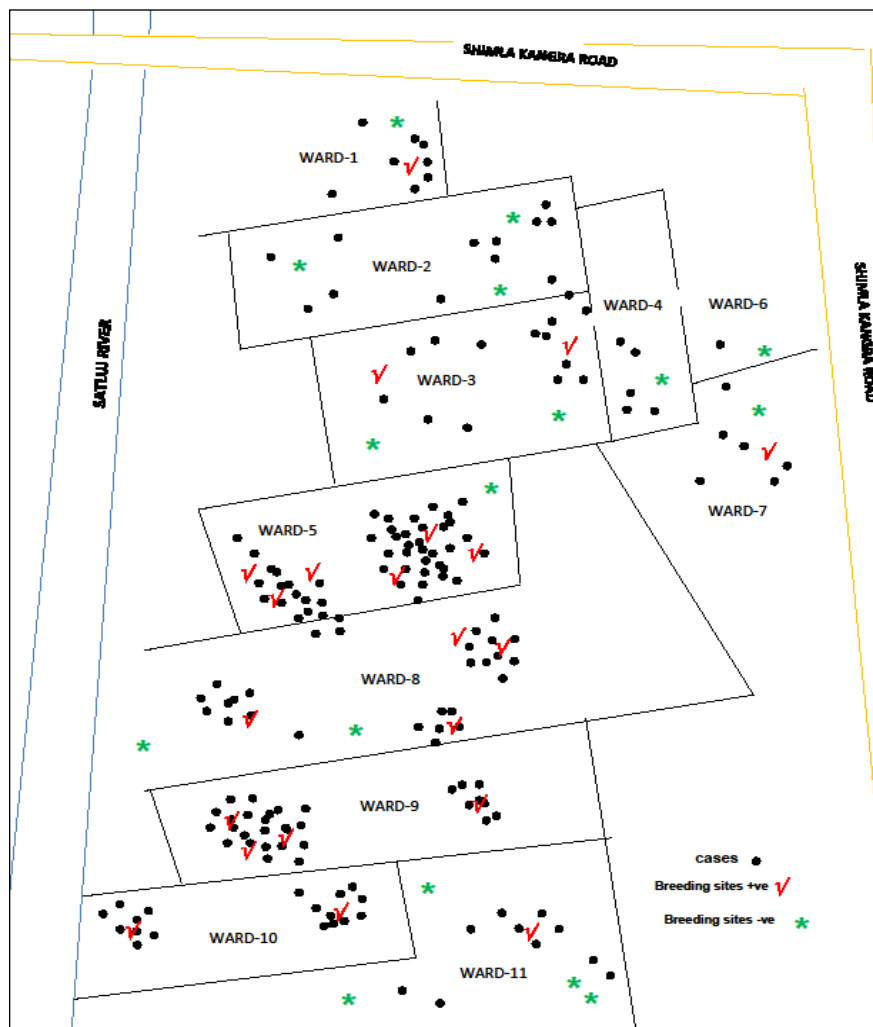
3. Pie Charts: In pie charts, instead of comparing the length of bar, the areas of segment of a circle are compared. For e.g., bar diagram showing number of Hepatitis cases in different age group can also be depicted in a pie diagram.

Age wise distribution of Hepatitis cases



4. Spot map: These maps are prepared to show geographical distribution of frequencies of characteristic.

Distribution of Dengue cases by area and location of breeding sites



Type of analysis and Frequency of analysis

Analysis is done at various frequencies- weekly, monthly/quarterly and annually as per table below.

Following reports should be generated as per the frequency mentioned:

1. Routine data analysis: Description by time, place, person including trend analysis
2. Calculation of baseline values and threshold levels for each disease in the district to identify possible outbreaks
3. Comparison of reported disease data between reporting units
4. Comparison of reported disease data between public and private reporting units
5. Correlating reported data from public health sources and lab data
6. Monitoring reports to assess quality of data and surveillance system: Timeliness, Consistency and Completeness of reports– discussed in Module – 7 supervision & monitoring

Table 1: Type and frequency of Data Analysis

S. No.	Type of analysis	Daily (During outbreak situations)	Weekly	Monthly/Quarterly	Yearly
1.	Description by time, place, person including trend analysis as and when applicable	✓	✓	✓	✓
2.	Timeliness, Consistency and Completeness of reports		✓	✓	✓
3.	Checking for crossing of threshold levels		✓	✓	
4.	Comparison between reporting units		✓	✓	
5.	Comparison between public and private		✓	✓	
6.	Comparison between data from public health sources and lab data		✓	✓	

Description by time, place and person

Most basic and important analysis that should be performed at District and State level is to analyze data w.r.t Time, Place & Person.

- **By time-** Describes distribution of cases over time. One has to look for changes in the number of cases over time. Time intervals may be in years, quarters, months, weeks or other unit of time. Wherever

available, Date of onset of illness is usually considered to be the most accurate representation of disease occurrence.

- Distribution of cases over time: It is most clearly presented as a graph with time on the X-axis and number of cases on the Y-axis. Then, compare the number of cases occurring in a current time period with the number reported during the same time period in each of the last 3-5 years. Also, compare the cumulative number of cases year-to-date or week with the cumulative number of cases year-to-date/week of previous years. In figure 1, we can compare number of Cholera cases reported in the country in year 2016, 2017 & 2018.

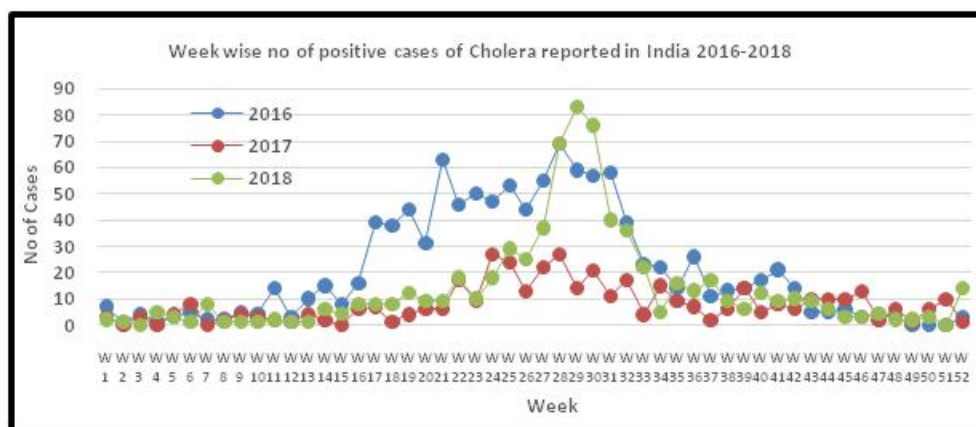


Fig 1: week wise

no of positive cases of Cholera reported in India (2016-2018)

- Trend analysis: Weekly analysis should compare the current week's number of cases data of a disease/health conditions collected under a particular form S/P/L with the corresponding data over the past three weeks for the same disease in the same reporting unit/blocks/district.
- While comparing data one must take note of missing value or any increase or decrease and make efforts for its validation/verification from the source if needed. While interpreting any increase or decreasing trend in the data, it is important to keep in mind the type of disease, its seasonal variations, endemicity as well as the quality of data.

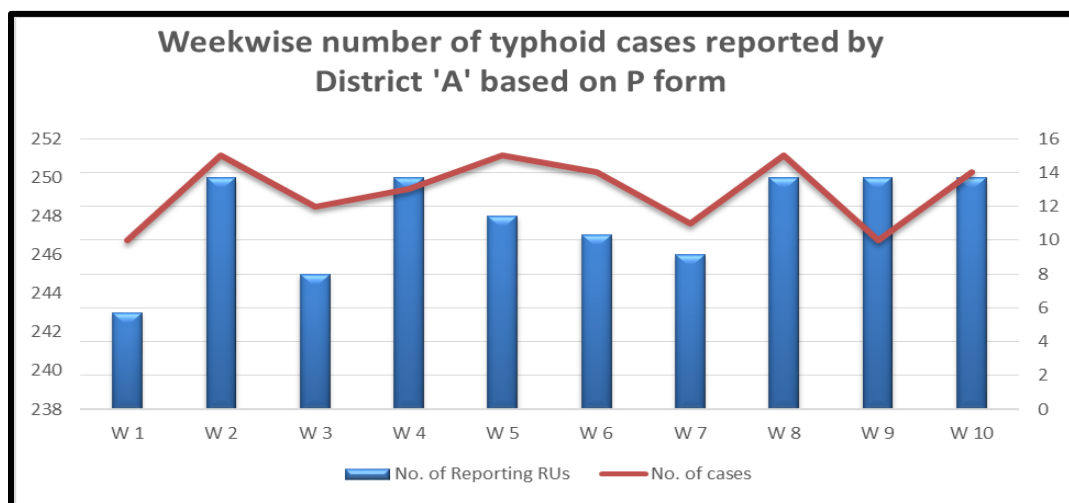
For example:

Scenario 1: Below example demonstrate number of Typhoid cases reported in 'P' form by a RU in District A from week 1 to week 10 of Year 2019.

Data: Week Wise no. of cases of Typhoid: -

District A: - Typhoid cases based on P form			
Reporting Week	Total no. of RUs	No. of Reporting RUs	No. of cases

W 1	250	243	10
W 2	250	250	15
W 3	250	245	12
W 4	250	250	13
W 5	250	248	15
W 6	250	247	14
W 7	250	246	11
W 8	250	250	15
W 9	250	250	10
W 10	250	250	14

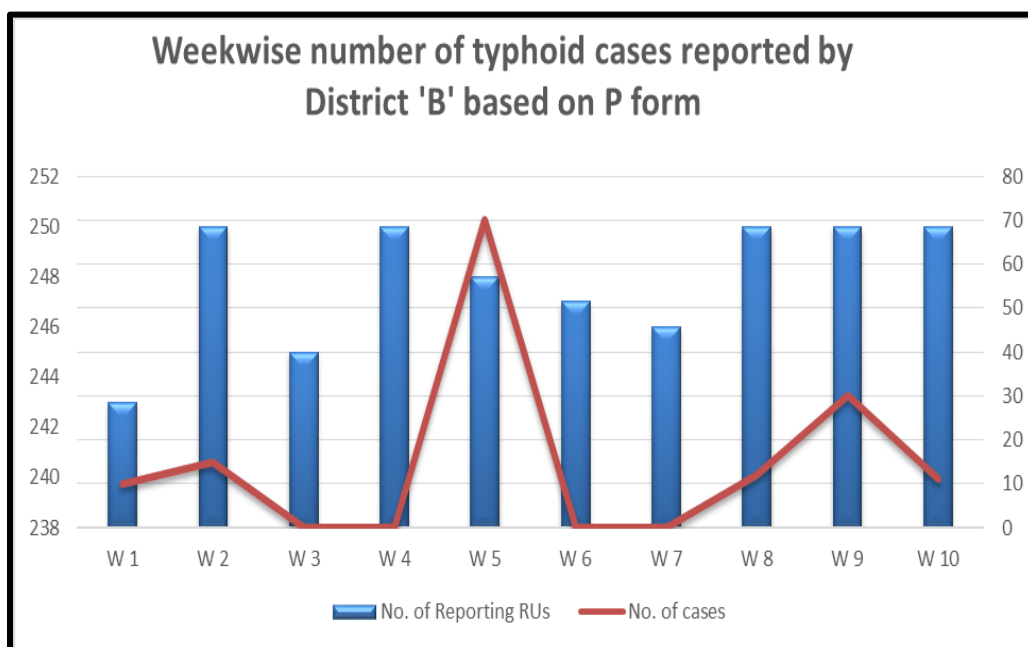


Interpretation: There is no unusual increase in number of cases of Typhoid keeping in view the number of Reporting Units.

Scenario 2: Unusual increase in no. of cases of Typhoid: -

District B: - Typhoid Report based on P form			
Reporting Week	Total no. of RUs	No. of Reporting RUs	No. of cases
W 1	250	243	10
W 2	250	250	15
W 3	250	245	0
W 4	250	250	0
W 5	250	248	70
W 6	250	247	0
W 7	250	246	0

W 8	250	250	12
W 9	250	250	30
W 10	250	250	11



Interpretation: Here in week no. 5 there is an unusual **increase** in no. of cases of Typhoid. Here it might be either a typing error or an outbreak situation. There is a need to verify the figures first. The data manager needs to identify the unit/s reporting more cases in the concerned week by drilling down the data, call them over phone or visit and confirm that the numbers are actual or any human error before labeling it as an outbreak.

Further there is an increase in number of cases in week no. 9 also as 30 cases has been reported as compared to 12 in the previous week (keep in mind that number of reporting units is same in both the weeks). Thus, here is an outbreak like situation and there is a further need to identify the specific reporting unit if any, showing the increase.

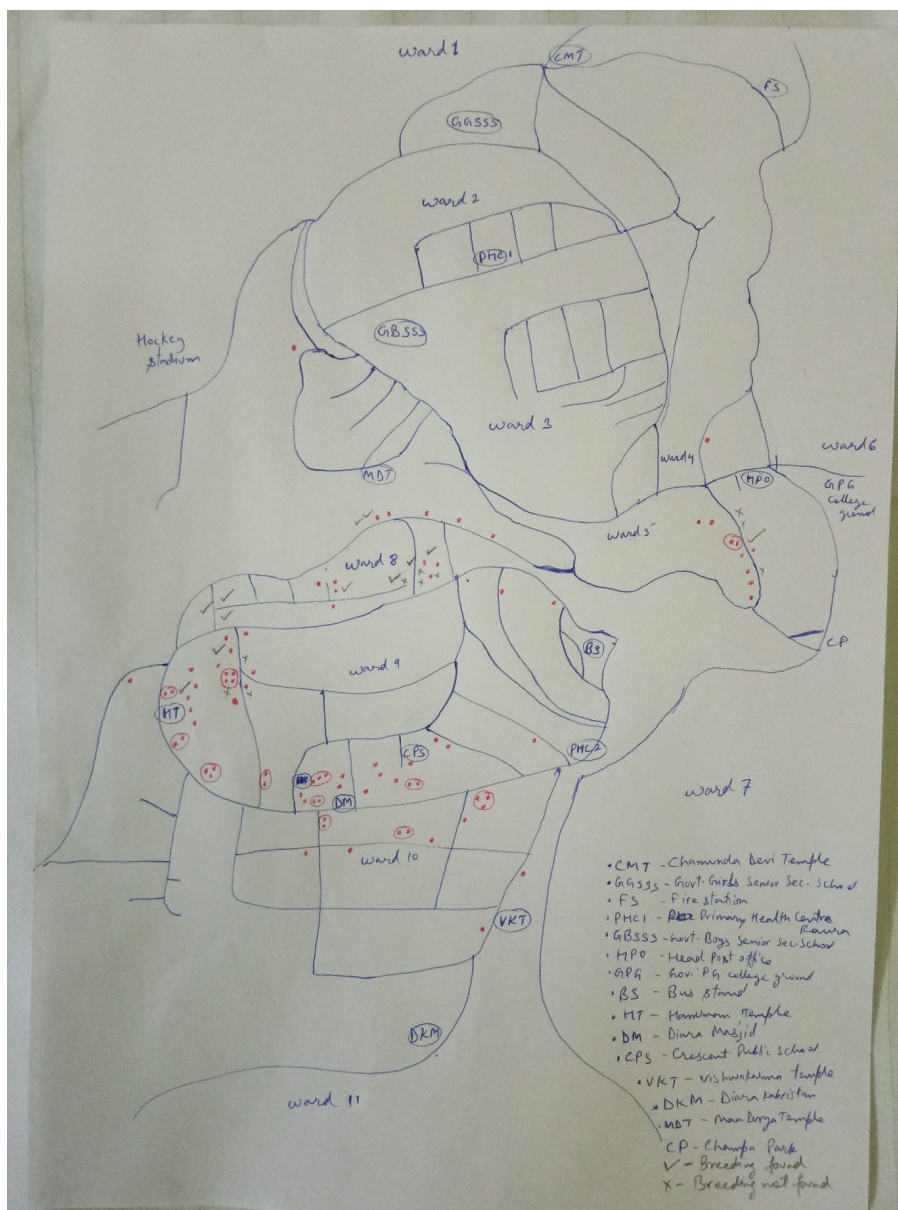
Table 2: Some of the possible interpretations of data

Scenario	Interpretation
Increasing trends	• Could be a potential outbreak • Could be due to better reporting • Could be a change in the detection and reporting due to change in case definition, establishment of new lab. • There could be a possible data error

Decreasing trends	• Could indicate improved control measures • Could indicate under-reporting because of incomplete reports • Could be a change in the detection and reporting due to change in case definition.
Plateau of the graph	• Could indicate stable situation. However, if the number of cases is consistently on the higher side, this could be a cause for concern. • Has to be corroborated with the completeness report.

- **By place-** Describes distribution of cases by place of occurrence of case. This analysis helps in identifying hot spots or high-risk areas and enables the system to do targeted interventions. For example:

District	Lab confirmed measles cases	Percent (%)	Cumulative (%)
1	10	6.3	6.3
2	12	7.6	13.9
3	02	1.3	15.2
4	67	42.4	57.6
5	10	6.3	63.9
6	57	36.1	100
Total	158	100	-



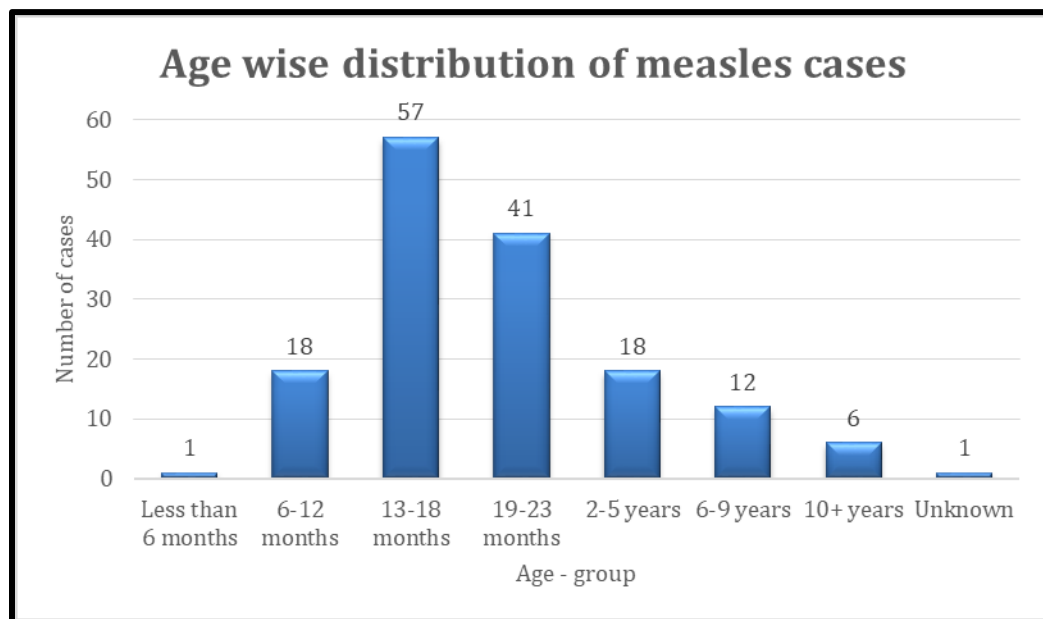
Interpretation

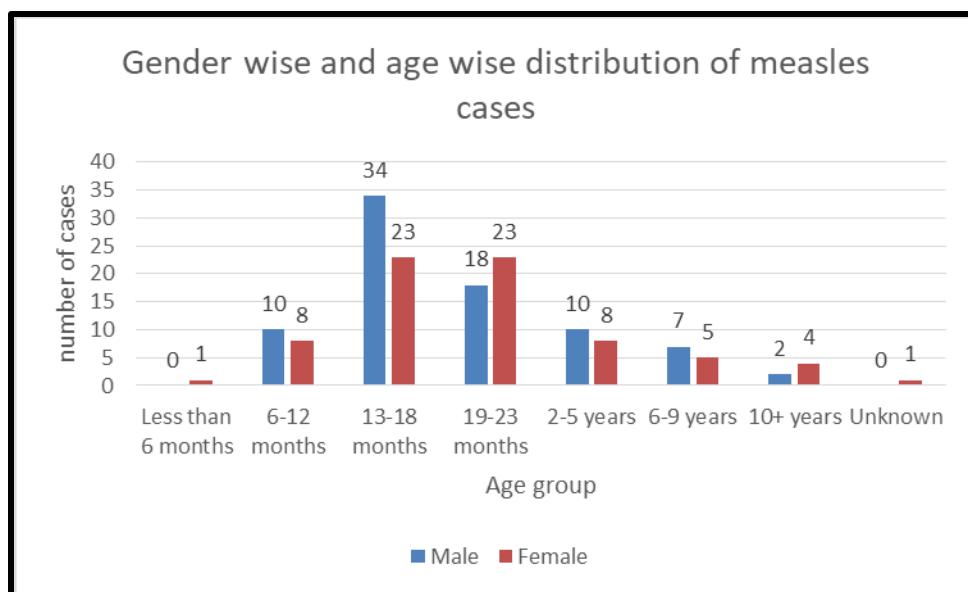
- The data demonstrated in the picture above shows marked clustering of reported Measles cases in districts 4 and 6.
- The number of reported cases in these two districts is worrisome regardless of the distribution of population in these areas
- But comparing disease occurrence in the six districts requires district population and calculating rates (such as incidence rate).
- The differences in reported cases by district in this example may be due to differences in population, disease incidence or case detection also.

- **By person**-Person attributes like age, gender, religion etc. can be used for analysis of data. Under IDSP, attributes such as age and gender are available in data extracted from 'L' form i.e. line list of labs confirmed data, Outbreak line list data and to some extent 'S' form i.e. Syndromic data where age categorization of <5 years is available.

Example: Age-wise distribution of Lab confirmed Measles cases

Age-group	Total number of cases	Male	Female
Less than 6 months	1	0	1
6-12 months	18	10	8
13-18 months	57	34	23
19-23 months	41	18	23
2-5 years	18	10	8
6-9 years	12	7	5
10+ years	6	2	4
Unknown	1	0	1
Total	154	81	73





Interpretation: Above graphs shows how data can be analyzed and interpreted depending upon the availability of data. The first graph showed that most affected age group is from 13 – 18 months, followed by 19 – 23 months. We can also see some cases in more than 5 years age group that suggest shift in age distribution of measles cases. This information should be further analyzed in light of total age wise population at risk to calculate age specific incidence rates and vaccination status of the cases to assess efficacy of vaccination programme.

Second graph shows age and gender wise distribution of cases. Throughout all the age groups there is not much difference in gender distribution of cases, although overall males are affected more than females.

Baseline value analysis & crossing of threshold levels

Baseline values shows the usual level of the disease which may vary over time during the season and off season. Baseline values are calculated as average of each week's cases in the previous seasons. Whereas, threshold is the number of cases in a particular week above which the health event is considered to be a signal to take a public health action. The weekly data should be always be analyzed to identify baseline values and compared with established threshold levels.

These can be obtained in the following manner:

- 1) Pre-existing National/Internationally developed thresholds- e.g., a single case of Polio in an area is considered as an outbreak and reason for action.
- 2) Based on historical data: Every District is expected to calculate its own disease baseline. There is no standardized method to calculate disease baseline and it can be calculated manually as well as

using specialized statistical programmes. A method is given below to calculate Disease thresholds manually in a most crude way.

Suppose if we want to calculate baseline for Cholera case in week 7 in 2019. By taking average cases of Cholera reported in week 7 in year 2016, 2017 & 2018, we form the baseline cases for week 7 in year 2019. However, this method is based on following assumptions:

- That, cases in none of the previous 3 years showed any exaggerated rise in number of cases or outbreaks of Cholera.
- There is no or minimal missing data in the last three years. If a District feels that there has been lot of missing data or reporting has been poor, then data for last five years should be taken.

After calculating baseline values for each disease, State/District may form their own threshold values depending on how sensitive or specific system one wants. For e.g. for a highly sensitive system, threshold could be defined as 1.25- or 1.5-times baseline cases in that week. For a low sensitive or higher specific system, threshold may be kept as 2.0 or 2.5 times the baseline cases in that week.

It is to be noted that baselines and threshold systems will be different for different disease as well as for Block, Districts & above. For an endemic disease, a higher threshold may be reasonable. Similarly, for a highly infectious disease- or disease-causing high mortality, threshold values may be quite low.

Example: If 35, 30 & 45 cases of Cholera were reported in the 7th week of year 2017, 2018 and 2019 respectively. Then the baseline data for the 7th week of 2020 would be 36.6 cases.

Calculating Thresholds: For a highly sensitive system the threshold will be 45.75 cases i.e., approx. 46 cases. For a low sensitive or highly specific system the threshold will be 73 cases.

Possible interpretations

Scenario	Interpretation
Number of cases much below the threshold	• No reason to worry • Check for under-reporting • Review the threshold value
Trends approaching the threshold	• Potential outbreak: review the situation and take necessary action.
Number of cases crossed the threshold	• Possible outbreak situation, need verification and take necessary action.

Comparison of cases between reporting units in the region

This is an important analysis for the quality of the data generated by comparing Incidence rates of the current month between various reporting units. One will not usually expect sharp increases or decreases in incidence rates unless some specific interventions are done. This should ideally be done from the Block level and above.

Comparison of cases reported from private sources with that of public sources

Every District should make serious effort to enroll as many private reporting units under their District as possible. The data generated from two independent sources i.e. public reporting units & private reporting units is a good proxy indicator of the quality of data. Regular reporting from private health facilities should be encouraged through continuous efforts of sensitization of health staff at block, district and State levels.

Possible interpretations:

Scenario	Interpretation
Majority of the reporting units in a District belong to public sector, with very few private reporting units	No/minimal effort is made by concerned officers/staff to enroll private reporting units in the system.
There is good number/proportion of private reporting units; but their reporting is poor.	Private reporting units should be continuously sensitized to report regularly in the IDSP system through CMEs. Regular sharing of data feedback along with praising their effort will keep them motivated to report regularly. Wherever applicable, State should implement Clinical establishment act to improve private sector reporting.
Trends of cases reported in public sources are similar to that in private sources	If the number of private sector RUs is good (proportionate to actual private health care facilities in the area), then it may be interpreted that the quality of

	data in the system is representative of the actual disease situation.
Trends of cases reported in public sources are NOT similar to that in private sources.	Quality of data in the Public health services may not be reliable and there may be an under- reporting of cases. Such scenario could be observed for diseases under elimination/eradication for e.g. Measles or malaria. A review of the reporting units may be planned along with the concerned program to look into the issue and take corrective actions. (assumption being that the Private sector data is reliable and number of private sector RUs is good)

Comparison of reports received from public health sources and the Laboratory sources

It is important to correlate the findings of the data analysis with the availability of data obtained from other sources to increase validity of results obtained. The comparison may be vis – a – vis.

- The water quality reports and the cases of water borne diseases. For example, contamination of a water source may be detected by the routine water testing and the resultant outbreak of jaundice may be well within the incubation period of the disease, thus pointing to a single source epidemic. (water testing reports are to be collected from other departments who deals with water quality)
- The entomological data and the cases of vector borne diseases. For example, a high vector density of Aedes mosquitoes could link to an outbreak of dengue fever in that area.

Reports to be generated at different Levels of reporting

Ideally, data analysis should be done at each level. The degree of analysis depends upon the capacity and competence level of the persons involved.

Level of Health-care	Manpower responsible for analysis	Report Generated
Sub-Centre	ANM, MPHW (M)	No report to be generated but expected to do simple compilation of numbers and seeing the trend of cases as per 'S' register.
PHC/CHC	Medical officer	To detect outbreaks and anticipating disease trends
At District	Data Manager, along with Epidemiologist under supervision of DSO.	All reports 1 – 6 to be generated at desired interval as in table no 1.
At State	Data Manager, along with Epidemiologist under supervision of SSO.	All reports 1 – 6 to be generated at desired interval as in table no 1.

IDSP 'S' form Register

Fig. 4 IDSP Surveillance Register
Reporting Week No. 14
Date of start of Reporting Week: 31.03.14
Date of end of Reporting Week: 06.04.14

S.No	Date	Name	Age	Sex	Fever				Cough with or without fever		Loose watery stools <2 weeks			Jaundice <4 weeks duration	Acute Flaccid Paralysis cases in <15 years of age	Unusual Symptoms leading to death or hospitalization that do not fit into the previous syndromes	Outcome
					Fever less than 7 days			Fever more than 7 days	<2 weeks	>2 weeks	With some/much dehydration	With no dehydration	With bleeding				
					Only fever	With rash	With bleeding	With daze/semi-consciousness/unconsciousness									
1	31.3.14	Pinky	8y	F	-	-	-	-	-	-	-	✓	-	-	-	-	
2	31.3.14	Ramu	8y	M	✓	-	-	-	-	-	-	-	-	-	-	-	
2	4.4.14	Ramu	5y	M	-	✓	-	-	-	-	-	-	-	-	-	-	
3	31.3.14	Maresh	42y	M	✓	-	-	-	-	-	-	-	-	-	-	-	
4	3.4.14	Nannu	3y	M	-	-	-	-	-	-	-	✓	-	-	-	-	Died on 4.4.14
PAGE TOTAL					1	1						2					
WEEK TOTAL					1	1						2					

Interpretation & Dissemination of results

- While the epidemiologist and data manager will generate required reports, it is the duty of the surveillance officer to correctly interpret the various reports. It must be emphasized that interpretation of data is more important to rather than just making graphs/tables for analysis.
- The results of the analysis should be shared regularly on monthly basis with all the members of the District Surveillance Unit and also at District Surveillance Committee meetings. The minutes of the meeting should be shared with State level and the same can be discussed later during regular State Surveillance Committee meetings. The analysis should also be shared with the stakeholders responsible to take appropriate action on the situation.
- During outbreak and epidemics, the reports should be shared within a week / 10 days with district administration, PRI members, municipal council/corporation officials and other stakeholders as decided by District Surveillance Officer (DSO).
- Findings of analyses should be reviewed regularly and then feedback to health providers or others in the community who are asked to report cases should be done to maintain faith and trust in the community.
- It is responsibility of the District Data Manager/District Epidemiologist to analyze the data and generate reports every week and bring to the notice of District Surveillance Officers for appraisal and necessary actions.
- It is very important that before sending data to concerned authorities, data should be cross-checked by DSO so that correct data is sent.
- Health-workers should be instructed that data should be collected in community with utmost sincerity and without any fear of punishment or adverse action against them from higher officials.
- Information can be presented through various tables starting from the primary one giving the number of cases to tables with summarized data and rates etc., or in the form of graphs like-a simple bar diagram to identify the incidence of diseases; pie diagram to show the load of diseases OR even maps depicting the place of disease occurrence.

Take home messages:

- Data analysis is one of the mainstays of the surveillance programme.
- A combination of accurate data and reasonable analysis is a powerful tool to identify potential and real outbreaks, and thereby taking focused action so that unnecessary morbidity and mortality can be prevented.

- It is equally important that analyzed report findings to be shared with both higher authorities as well as lower levels in time of action.

Module 4

Introduction to Integrated Health Information Platform (IHIP)

Specific Learning Objectives:

- *Salient features of IDSP module of IHIP.*
- *Pre-requisites at their level to successfully implement IDSP module of IHIP.*
- *Difference between IDSP Module of IHIP & Existing IDSP Portal.*

Use of Integrated Health Information Platform (IHIP) for Integrated Disease Surveillance Programme (IDSP)

The existing old Software Application was designed & developed by NIC in year 2007-08 as a MoU between IDSP & NIC. The software application did not support advanced features like Mobile Application, text SMS, e-mail alerts, GIS Utility, Dynamic reports etc. which were needs of the hour including near real time data reporting for surveillance of many emerging & re-emerging diseases in the country. **A Joint Monitoring Mission (JMM)** of Integrated Disease Surveillance Program (IDSP) was conducted in the year 2015 by Govt of India and WHO Country Office for India. It strongly recommended strengthening the public health surveillance system through re-prioritization of the list of diseases under the Program and also called for assessing the need for collecting accurate and reliable epidemiological data for action through revamping of ICT infrastructure under IDSP.

In context to this, apart from reprioritization of diseases under surveillance, drafting of surveillance standard document & data collection formats, IDSP's ICT master Plan was prepared and at the request of MoHFW, new IT Platform was designed & developed by WHO Country Office named as Integrated Health Information Platform (IHIP) in order to have holistic picture of data reported under different National Health Programmes with "One-Health Approach". IDSP is the first stakeholder to the IHIP Platform followed by National Malaria Elimination Programme (NMEP), HMIS and subsequently other programmes may join to the platform in future.

Salient features of Integrated Health Information Platform (IHIP):

- Web-enabled, electronic health information system for capturing geo-spatial epidemiology
- Application embedded with all applicable Government of India's e-Governance standards, Information Technology (IT), data & meta data standards to provide state-of-the-art technology

- Accessible at all levels (from villages, districts, states and central level)
- Near Real time, village level, case-based data reporting
- Community based Syndromic Surveillance reporting through Android mobile application
- Advanced data modeling & analytical tools
- GIS enabled Graphical representation of data into integrated dashboard
- Role & hierarchy-based feedback & alert mechanisms
- Geo-tagging of reporting health facilities
- Integrated data reporting approach among Syndromic, Presumptive & Laboratory Surveillance
- Scope for data integration with other national health programs

Integrated Disease Surveillance Programme (IDSP) module of Integrated Health Information Platform (IHIP) was soft launched in selected districts of 7 States (Karnataka, Andhra Pradesh, Himachal Pradesh, Odisha, Uttar Pradesh, Telangana & Kerala) by Secretary (Health & Family Welfare), Govt of India on 26th November 2018 at Nirman Bhavan, New Delhi followed by initiation of reporting of disease surveillance data under IDSP. IHIP Help-desk (1800-180-1104) & ticketing system in IHIP portal is also made functional in order to resolve queries observed during data entry operations. 18 states and all UTs have been included in the 2nd phase. In the 3rd phase IHIP will be subsequently rolled out & will be implemented in all other States. The platform was successfully used for special surveillance purposes during a Mass gathering event (Kumbh Mela at Prayagraj, UP)

Key requirements for implementation of IHIP:

- Availability of ICT infrastructure at all health facility level and android electronic tablets (ANMOL etc.) with sub center ANMs.
- Regular & consistent internet connectivity to upload the data on daily basis on near real time mode.
- Availability of designated data entry personnel at each health facility for regular work of data entry operations on IHIP.
- Regular supervision & monitoring of data & alerts reported through IHIP

Key Points for Trainings on IDSP module of IHIP:

- Preparation of detailed training micro plan on State & District TOT and trainings of all functionaries involved in disease surveillance in cascade manner till ANMs/MPHW(M/F) at Sub centers
- Call for Master trainers from national level
- Hands on trainings at well-equipped computer labs having internet connectivity at all training centres.
- Installation of IHIP Android application at participant's Smart Phones or Electronic tablets for demonstration & training of data capturing for Syndromic surveillance
- Availability of training portal User IDs & Password with at each level.
- Use of funds for training from common training pool under PIP.

Manuals to guide users on how to enter data in the IHIP portal:

1. Administrative Manual: for various managerial functions e.g. manage health facility, update profile status etc.
2. Health Worker's Android App Manual: This manual guide healthcare workers on how to download and use the IHIP android app for S-form data entry.
3. P Form Manual: Guides the P form users on how to enter data in the P form of IHIP.
4. Lab Manual: For entry of the laboratory data in the portal.
5. Event Alert and Outbreak Manual: basically, to explain the data flow of generating Event Alert form and Outbreak Investigation.

All Manuals are available in the IDSP website.

In IHIP, user ID provided to health care workers grants hierarchy-based access to the portal for data-entry and other functions.

Differences between IDSP module of IHIP and IDSP Portal

	IDSP Portal	IDSP module of IHIP Portal
1.	Capture aggregate data only	Capture disaggregate data of persons at all levels
2.	Paper-based data collection	Web based Data Collection
3.	Manually links data from S, P and L forms	Electronically linked data of S, P, L forms
4.	Weekly surveillance	Capture real-time or daily surveillance data

5.	Monitoring 22 health conditions	Monitor more than 33+ health conditions
6	Not being done	Integrate with ongoing surveillance programs Provide analysis on mobile and electronic devices

List of 33+ condition:

Syndromes	Diseases (Presumptive & Lab Confirmed)	
Acute Diarrheal Disease	Dengue	Hepatitis A/E
Dysentery (With blood in stool)	Chikungunya	Diphtheria
Only Fever < 7 Days	Malaria	Pertussis
Only Fever ≥ 7 Days	Acute Encephalitis Syndrome/Japanese Encephalitis	Measles
Fever with Rash	Enteric Fever/Typhoid	Rubella
Fever with Bleeding	ARI/Influenza Like Illness (ILI)	Meningitis (Meningococcal)
Fever with Confused State/Semi consciousness/unconsciousness	Severe Acute Respiratory Infection (SARI) including Pneumonia	Mumps
Cough with or without fever <2 weeks	Scrub Typhus	Cholera
Cough with or without fever >2 weeks	Anthrax	Shigellosis
Jaundice	Leptospirosis	Non-Typhoidal Salmonellosis
Acute Flaccid Paralysis < 15 Years of Age	Kyasanur Forest Disease	Influenza
Animal bite	Crimean-Congo Hemorrhagic Fever	Human Rabies
Snake bite	Chickenpox	

Take home message:

- IDSP-IHIP is a near real time, case based surveillance platform.
- Monitor more than 33+ health conditions
- Integrate with ongoing surveillance programs & provide analysis on mobile and electronic devices

Module 5

BASIC EPIDEMIOLOGY & INVESTIGATION OF AN OUTBREAK

Specific Learning Objectives:

- *To understand the basic concepts of epidemiology and its application in field settings.*
- *Define an outbreak / epidemic*
- *List the various means of detecting an suspected outbreak / early warning signal*
- *Describe warning signs of an impending outbreak*
- *List the members of Rapid response Team (RRT).*
- *Describe the steps of outbreak investigation.*
- *To outline the appropriate response measures as per disease category/health related events:*
 - *Water borne diseases*
 - *Vector borne diseases*
 - *Vaccine preventable disease outbreaks*
 - *Zoonotic disease outbreaks*
 - *Outbreaks of unknown aetiology*
 - *Air borne diseases*

Definition of an Outbreak:

The amount of a particular disease that is usually present in a community is referred to as the baseline or endemic level of the disease.

Occasionally, the amount of disease in a community rises above the expected level. ***Epidemic** refers to an increase, often sudden, in the number of cases of a disease above what is normally expected in that population in that area. **Outbreak** carries the same definition of epidemic, but is often used for a more limited geographic area.*

Outbreaks occur when an agent and susceptible hosts are present in adequate numbers, and the agent can be effectively conveyed from a source to the susceptible hosts. More specifically, an epidemic may result from:

- A recent increase in amount or virulence of the agent,
- The recent introduction of the agent into a setting where it has not been before,
- An enhanced mode of transmission so that more susceptible persons are exposed,
- An environment conducive to interaction between the host and the agent
- A change in the susceptibility of the host response to the agent, and/or
- Factors that increase host exposure or involve introduction through new portals of entry.

Need for outbreak investigation

The purpose of an investigation is to

- To define the magnitude of the outbreak in terms of time, place and person.
- To determine the particular conditions and factors responsible for the occurrence of an outbreak or an epidemic.
- To identify the aetiology of outbreak and determine the measures of control, and suggest recommendation to prevent future outbreaks.

Figure shows relative emphasis of investigative and control efforts (Intervention options) in disease outbreaks as influenced by levels of certainty about aetiology and source/mode of transmission. Investigation means extent of the investigation; control means the basis of rapid implementation of control/intervention measures at the time problem is initially identified. Pluses show level of response indicated (+ low, +++ high)

		Source / transmission (e.g. food, water, vectors etc.)	
		Known	Unknown
(agent) Aetiology (e.g. virus, bacteria etc.)	Known	Control +++ Investigate +	Control + Investigate +++
	Unknown	Control +++ Investigate +++	Control + Investigate +++

Priority for investigation is given when both cause of the disease/condition/death or source and mode of transmission is unknown. But symptomatic treatment for the affected population and a continuous surveillance should continue to identify for new cases, if they arise.

Investigation has to be done if either source/mode of transmission or cause is not known along with control and preventive measures.

If both source and cause is known then preventive and control measure has to be given importance.

Detecting a suspected Outbreak or Early warning signal

Various sources provide report of suspected outbreaks. These reports of suspected outbreaks have to be verified as early as possible.

Event Based Surveillance (explained in detail in module 1)

a. Community informants

- b. Media scanning and verification (print and electronic)
- c. Rumour register (if available) (format in fig 1)

Indicator Based Surveillance:

Review of routine data

One of the common ways of early detection is to review the data from the routine surveillance and check if it crosses threshold levels (as described in previous module). If the cases are approaching the threshold level or has crossed it, then an outbreak should be suspected. (*Threshold levels for each condition/disease to be set by analysing the previous 3-5 years data by the district.*) Remember to review the lab data also.

Another method is to be alert for any unusual events that maybe reflected in the routine data.

Epidemiologically some of the following warning signals are also considered to be investigated.

Warning signs of an impending outbreak

- **Clustering of cases or deaths in time and/or place*
- ***Unusual** increase in cases or deaths*
- *Acute febrile illness of unknown aetiology (after testing for locally prevalent diseases)*
- *Unusual isolate (novel influenza, drug resistant strains)*
- *Shifting in age distribution of cases*
- *High vector density*
- *Natural disasters*

***cluster** is an aggregation of cases in a given area over a particular period without regard to whether the number of cases is more than expected. For example, Foodborne disease outbreak is an incident in which two or more persons experience a similar illness after ingestion of a common food, and epidemiologic data implicates the food as the source of illness.

Reporting of an Early Warning Signal or suspected outbreak

Any Reporting unit can submit an early warning signal of an impending outbreak in their area to the District Surveillance Unit, irrespective of the fact that the signal may or may not be a confirmed outbreak. The EWS format may be utilised by the RU for the same.

FORMAT FOR INSTANTANEOUS REPORTING OF EARLY WARNING SIGNAL/OUTBREAKS AS SOON AS IT IS DETECTED

State:

District:

Date of reporting:

Is there any unusual increase in Cases/Deaths or unusual event in any area? Yes/No
If Yes, provide the following information:

Disease/Syndrome (Provisional/Confirmed)	
Area affected (Block, PHC, Sub-centre, Village)	
No. of cases	
No. of deaths	
Date of start of the outbreak	
Total population of affected area/village	
Salient epidemiological observations	
Lab results (type of samples, number of samples collected and tested, what tests, where, results)	
Control measures undertaken (investigated by RRT or not)	
Present status	
Any other information	

If an outbreak is suspected, the local health team (PHC/CHC medical officer) should verify the same. An Early Warning Signal will be submitted to the District Surveillance Officer by the fastest route to facilitate action. The EWS should be submitted

to the District Surveillance officer by the reporting unit as soon as verification of the suspected outbreaks made.

Who Should Respond to an Outbreak?

The PHC and CHC Medical Officer of the affected area along with local health team will be responsible for initial verification & response efforts in a suspected outbreak. On the basis of preliminary findings, existence of outbreak is confirmed by District Surveillance Officer. The District RRT will be deployed and will be responsible to investigate outbreak. If situation calls for coordinated action between various stakeholders or departments, the State level Rapid Response Teams (RRT) will be deployed for investigation, control & containment measures.

i) The Rapid Response Teams (RRT):

The RRT is a multi-faceted team that looks into the various aspects of an outbreak. It is suggested that the team should comprise of an epidemiologist, a clinician, a microbiologist, a veterinarian, experts in food safety or environment or entomologist etc. Depending on the type of outbreak.

In this regard, IDSP has already circulated a letter to all States/UTs indicating suggested composition of RRT at State and District levels. The letter is available in Resources section of IDSP website for ready reference. (<https://idsp.nic.in/showfile.php?lid=4301>)

The main role of the RRT will be to investigate and confirm outbreaks. It is to be noted that the RRT is not a permanent team who is waiting for an outbreak. They are individuals who are normally performing their usual roles, but in the event of an outbreak come together to undertake a special function. They should work in close coordination with the local health staff in the event of an outbreak. The names, addresses, email ID and telephone numbers of the RRT members should be available with the District and State surveillance officer at all times, so that they can be activated as soon as possible. Members who have been transferred etc should

be replaced with competent people as soon as possible. This list will be updated yearly

Sample composition of RRT:

8. Nodal officer (*) in charge of disease control in the district (Epidemiologist) – the team leader, usually with public health training and experience.
9. The Clinician – either a physician or a paediatrician who is able to make a clinical diagnosis from the cases. (Member of nearest District hospital/medical college surveillance team)
10. The Microbiologist – (From District PH Laboratory/Medical college laboratory) to collect the specimens and to transport them appropriately.
11. Where necessary, the team should also include an entomologist in the team.
12. Any other person in the list of surveillance consultants with DSO viz. Veterinarian, food safety officer, etc.
13. The Health Assistant – his role is to assist the team in the community, do surveys, make community contacts and mobilize the community when necessary. He would also be responsible for organizing the logistics.

**The nodal officer will coordinate the selection of team leader for the District RRT based on the type of disease outbreaks.*

For outbreaks of unknown aetiology and for other diseases District RRT will be selected from the available Programme officers. All Programme officers and members of RRT at the district level should obtain training on rapid response team and epidemic preparedness.

How to respond to an Outbreak?

i) Preparation for field work

Efforts should be made to investigate each and every outbreak /EWS. Investigations would reveal how the outbreak occurred, identify high-risk groups and areas, and evaluate control measures. Such investigations, other than controlling the outbreaks, help in identifying the gaps and taking necessary corrective action, as well as further strengthening of the health services.

The District RRT will be allotted resources specifically for response related activities so as to be effective by district administration. They will need:

- A dedicated and functioning vehicle so that they are able to visit the site at short notice. (This will be made available from existing vehicles at the district level by the DSO authorized by the District Collector)
- Drugs and other medical supplies so that they can start the preliminary treatment.
- Diagnostic reagents and kits for doing preliminary diagnosis.
- Facilities to transport the samples.

As required, State and National level teams can be brought into action as per the spread of the outbreak in the region and the type of disease.

Steps of outbreak investigation

1. *Determine the existence of an outbreak*
2. *Confirmation of the diagnosis*
3. *Construct a working case definition*
4. *Find cases systematically and record information*
5. *Perform descriptive epidemiology*
6. *Develop hypothesis*
7. *Testing of hypothesis*
8. *Compare the hypothesis with established facts*
9. *Implement Control and prevention measures*
10. *Monitoring the situation*
11. *Communicate finding*

1. Confirmation of the existence of an epidemic

If the outbreak is suspected from the routine surveillance data, it must be verified (lest it may be a data entry error). The fastest way to verify is to contact the MO nearest to the location of the outbreak and request him/her for confirmation. This may be done telephonically or through a special messenger. The MO should check

- If there is an abnormal increase in the number of cases or
- If there is a clustering of cases or
- If the cases are epidemiologically linked or
- If some trigger events have occurred (see above) or
- If many deaths have occurred

Be aware that apparent changes in disease frequency can result from:

- Changes in case definitions or changes in local reporting procedures
- Increased interest in a disease because of local or national awareness or more frequent requests from patients for exams and diagnostic procedures
- Improvements or changes in diagnostic or screening procedures
- Sudden changes in the size or composition of the population (e.g. influx of migrant workers)

If there is evidence of an outbreak, and if the aetiology, the source and the route of transmission is known, then the specific control measures by the RRT need to be immediately instituted.

If however, any one of the above is unknown, then the outbreak must be further investigated by the RRT to identify the specific cause. At the same time, general control measures should also be instituted.

Exercise: For the month of May, 12 cases of Dengue were reported in an urban block, District Bilaspur. You are not sure if either group of cases is a cluster or an outbreak. What additional information might be helpful in making this determination?

2. Verification of the Diagnosis

The next step, verifying the diagnosis, is closely linked to verifying the existence of an outbreak. In fact, often these two steps are addressed at the same time. Verifying the diagnosis is important: (a) to ensure that the disease has been properly identified, since control measures are often disease-specific; and (b) to rule out laboratory error as the basis for the increase in reported cases.

- i. Medical officer PHC to visit one or more patients with the disease to verify the diagnosis. In addition, clue regarding disease aetiology and spread may also be found during the conversation.
- ii. Review the clinical findings and laboratory results – In case, Lab results are inconsistent with the clinical and epidemiologic findings, laboratory technician or Microbiologist may be asked to review the laboratory techniques. If specialized laboratory work is needed, sufficient number of appropriate specimens, isolates and other laboratory material must be sent.

For e.g. a news item claiming a case of “Small pox” in particular village was published. Before confirming it to be an outbreak, the diagnosis needs to be confirmed as small pox has been eradicated long back. On verification by local health team consisting of Medical Officer and ANM/ASHA of the village, the diagnosis was confirmed to be chickenpox.

3. Construct a working case definition

A case definition is a standard set of criteria for deciding whether an individual should be classified as having the health condition of interest.

A case definition includes clinical criteria and — particularly in the setting of an outbreak investigation — restrictions by time, place, and person such as “fever $\geq 40^{\circ}\text{C}$ (101°F),” “three or more loose bowel movements per day,”. The case definition may be restricted by time (for example, to persons with onset of illness within the past 2 months), by place (for example, to residents of a particular area or to employees of a particular plant) and by person (for example, to persons aged < 15 years, or to pregnant women).

While constructing case definition, one must not include the exposure or risk factor you are interested in evaluating. Since, diagnoses may be uncertain, particularly early in an investigation, one can create different categories of a case definition, such as confirmed, probable, and suspect, that allow for uncertainty.

4. Find cases systematically and record information

Search for additional cases using case definition. Usually, the first effort to identify cases is directed at healthcare practitioners and facilities — physicians' clinics, hospitals, and laboratories — where a diagnosis is likely to be made i.e. through passive surveillance. Alternatively, they may conduct **active surveillance** by conducting house to house search to collect information on any additional cases.

Prepare a line list that includes all the criteria in the case definition. Record personal information like age, gender education and occupation etc., date of onset of illness and all clinical features, geographical area land mark or house number or location, laboratory results & relevant exposures.

Questionnaire/line list will capture questions that will identify the primary case, secondary cases, possible source, routes of transmission and contacts. (Sample line list is below)

Village	Planning Unit	District	Date of Onset	Age in years	Age in months	Sex	Fully Immunization Status	Sore Throat	Fever	Greyish white adherent membrane in Throat	Bloody nasal discharge	Hoarseness of voice	Bull neck	Nasal regurgitation	Difficulty in swallowing	Sample collected	Date Collected	Date sent	Laboratory result	Death
Nai	Singar	MEWAT	04.07.2019	3	9	M	N	Y	Y	Y	N	Y	N	N	Y	Y	09.07.2019	10.07.2019	2	N
RAJAKA	Nagina	MEWAT	23.06.2019	9	0	F	N	Y	Y	Y	N	Y	N	Y	Y	Y	16.07.2019	17.07.2019		N
DEVLA	Ujina	MEWAT	02.07.2019	3	11	M	N	Y	Y	Y	N	Y	N	Y	Y	Y	24.07.2019	24.07.2019	2	N
Wajidpur	Marora	MEWAT	21.07.2019	0	11	M	N	Y	Y	Y	N	Y	Y	N	Y	Y	01.08.2019	02.08.2019		N
Nuh	Nuh	MEWAT	30.07.2019	12	1	M	N	Y	Y	Y	N	N	N	N	Y	Y	05.08.2019			N
Akleempur	Nagina	MEWAT	01.08.2019	4	0	M	N	Y	N	Y	Y	Y	Y	Y	Y	Y	08.08.2019	09.08.2019		N
Singar	Singar	MEWAT	02.08.2019	3	10	F	N	Y	Y	Y	N	Y	Y	Y	Y	Y	08.08.2019	09.08.2019		Y
Godhola	Jamalgarh	MEWAT	08.08.2019	0	8	F	N	Y	Y	Y	N	Y	Y	Y	Y	Y	16.08.2019	17.08.2019		N
Akeda	Nuh	MEWAT	12.08.2019	6	1	M	N	Y	Y	Y	N	Y	Y	Y	Y	Y	16.08.2019	17.08.2019		N

5. Analyze and summarize

Information collected is analysed for time, place and person distribution. Time course of an epidemic can be shown by epidemic curve or epicurve. Place distribution to know the clustering of cases, which provides clues to probable source of infection. Person distribution is to know the high risk population in terms of age, gender, occupation, religion/caste and other characteristics.

Epidemic curves are a basic investigative tool during an outbreak.

- The epi curve shows the magnitude of the epidemic over time as a simple, easily understood visual. It permits the investigator to distinguish epidemic from endemic disease. Potentially correlated events can be noted on the graph.
- The shape of the epidemic curve may provide clues about the pattern of spread in the population, e.g., point versus intermittent source versus propagated.
- The curve shows where you are in the course of the epidemic — still on the upswing, on the down slope, or after the epidemic has ended. This information forms the basis for predicting whether more or fewer cases will occur in the near future.
- The curve can be used for evaluation, answering questions like: How long did it take for the health department to identify a problem? Are intervention measures working?
- Outliers — cases that don't fit into the body of the curve —may provide important clues.

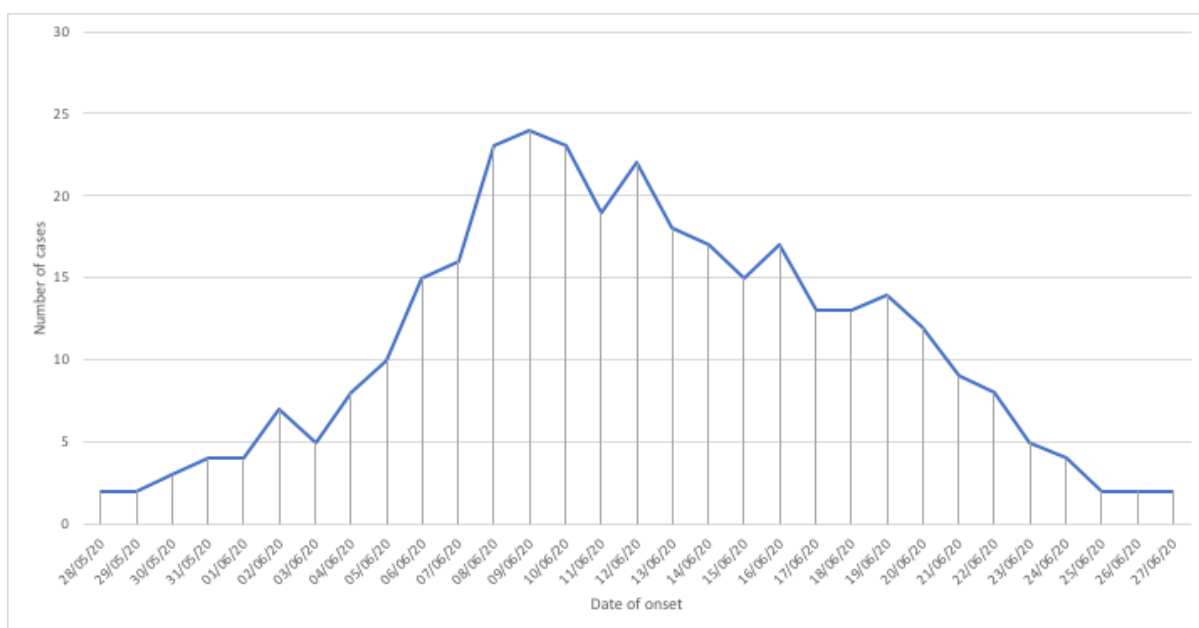
To draw an epidemic curve, you first must know the time of onset of illness for each case.

Interpretation of Epidemic Curves

An examination of the shape and duration of the epidemic curve can provide clues about the possible source as illustrated in the table below. However, epidemic curves don't always neatly conform to one of these three patterns.

- a. An epidemic curve that has steep upslope and a more gradual down slope is a characteristic of a **point source epidemics** a number of people are exposed to a same source during a limited period of time. An example would be a food handler at a restaurant who has a subclinical infection with hepatitis A. The food handler

would shed virus for perhaps only a few weeks. In point source epidemics the cases tend to occur during a span of time equal to the average incubation period of the disease. The illustration above shows a point source epidemic of hepatitis A in which all of the cases occur within a one month period consistent with hepatitis A's average incubation period of about 30 days.

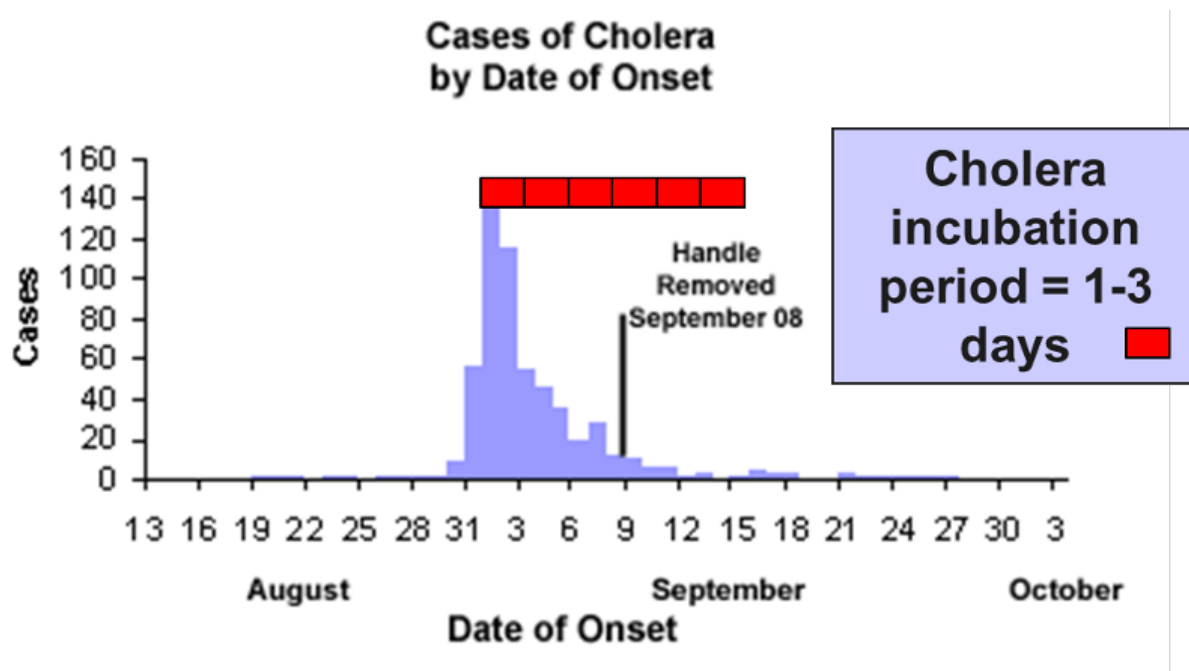


b. Common Source Epidemic:

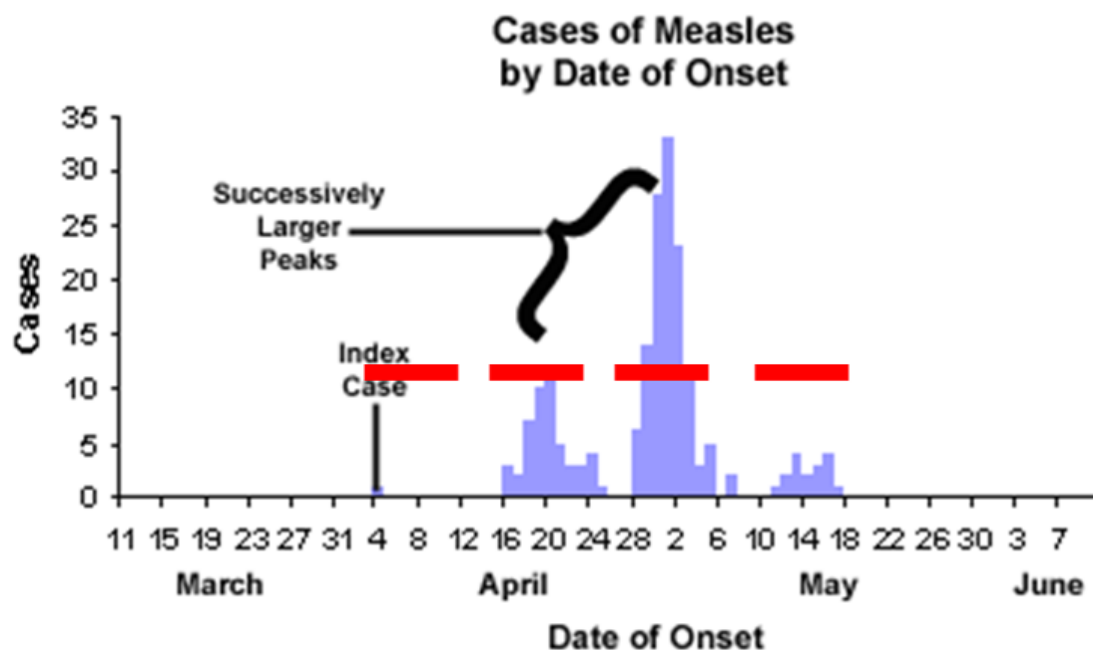
- i. If the duration of the exposure is prolonged, the epidemic is called a **continuous common-source epidemic** and the epidemic curve has a plateau instead of a peak. The range of exposures and range of incubation periods tend to flatten and widen the peaks of the epidemic curve.
- ii. If the exposure to the causative agent is sporadic over time, the epidemic curve is called **intermittent common-source epidemic**.

The illustration depicts the outbreak of cholera that occurred in the Broad St. area of London in 1853. The source was a community well that had become contaminated with *Vibrio cholerae*. Cholera has an incubation period of only 1-3 days. Note however, that the epidemic lasted for more than two weeks. Cases

diminished because residents fled the area, but it wasn't terminated until the pump handle was removed.



- c. **Propagated Epidemic:** In a propagated epidemic an initial cluster of cases serves as a source of infection for subsequent cases and those subsequent cases, in turn, serve as sources for later cases. This can result in a series of successively larger peaks, reflective of the increasing number of cases caused by person-to-person contact, until the pool of susceptible people is exhausted or control measures are implemented. The figure above shows a measles outbreak in which an index case triggers a cluster of cases, and they, in turn lead to a second cluster of cases, leading finally to a third cluster.



6. Develop hypothesis

As noted previously, these steps are not undertaken in a rigid serial order. In fact, the order may vary depending on the circumstances, and some steps will be undertaken simultaneously. As soon as an outbreak is suspected, one automatically considers what the cause might be and the factors that are fuelling it. One of the most important steps in generating hypotheses when investigating an outbreak is to consider what is known about the biology of the disease, including its possible modes of transmission, whether there are animal reservoirs of disease, and the length of its incubation and infectious periods.

The RRT will ultimately review all the various investigative findings and reports/results received and formulate a provisional hypothesis to explain the cause of the outbreak. This will answer the following questions:

- What was the causal agent?
- What was the source of infection?
- What was the transmission pattern?
- Who are the people at risk?

The descriptive epidemiology may provide useful clues that can be turned into hypotheses. If the epidemic curve points to a narrow period of exposure, what events occurred around that time? Why do the people living in one particular area have the highest attack rate? Why are some groups with particular age, sex, or other person characteristics at greater risk than other groups with different person characteristics? Such questions about the data may lead to hypotheses that can be tested by appropriate analytic techniques.

7. Testing of hypothesis

From an epidemiologic point of view, hypotheses are evaluated in one of two ways: either by comparing the hypotheses with the established facts or by using analytic epidemiology to quantify relationships and assess the role of chance. The first method is likely to be used when the clinical, laboratory, environmental, and/or epidemiologic evidence so obviously supports the hypotheses that formal hypothesis testing is unnecessary. For e.g. if in a Food Poisoning outbreak, the analysis incriminated a food of high protein and low acid content that supports growth of staphylococcal organisms and production of enterotoxin (as is the case with mushrooms), the hypothesis fits well with our understanding of staphylococcal food poisoning. However, if the analysis incriminated coffee or water – highly unlikely sources of staphylococcal enterotoxin – findings must be reassessed, more information should be gathered, reconsider clinical diagnosis and pose & test new hypothesis.

Circumstances, where such information is not straightforward, epidemiologists use analytic epidemiology to test their hypothesis. The key feature of analytic epidemiology is a comparison group to hallmark comparison group to quantify relationships between exposure and disease, and to test hypothesis about causal relationships. The two most common types of analytic epidemiology studies used in field investigations are retrospective cohort studies and case-control studies. Further read (<https://www.cdc.gov/csels/dsepd/ss1978/lesson6/section2.html#step7>)

8. Compare the hypothesis with established facts

While epidemiology can implicate vehicles and guide appropriate public health action, laboratory evidence can confirm the findings. Similarly, environmental studies are equally

important in some settings. They are often helpful in explaining why an outbreak occurred. For example, in an investigation of *E. coli* outbreak, the epidemiologists were able to identify lack of chlorination of the well supplying water to that area. Further, the well was found close to the septic tank for the community. Labs were able to culture *E. coli* from the well, the supply line, and the tap at that area. Thus the epidemiologic, environmental, and laboratory arms of the investigation complemented one another, and led to an inescapable conclusion that the well had been contaminated and was the source of the outbreak.

9. Implement Control and prevention measures

The primary goal of outbreak investigation is its control and prevention of additional cases. Although listed as step 9, in practice, control and prevention measures should be implemented as soon as possible. For e.g., in the above-mentioned. coli outbreak, chlorination of well, treatment of cases and IEC regarding hygiene and hand washing will start as early as possible. Good practices like developing info graphics for IEC have been adopted in few places. These info graphics can be referred during outbreak investigations. (refer supplementary material)

10. Monitoring the situation

The DSO / MHO should monitor the situation on a regular basis. Ideally, they should review the status on a daily basis and give feedback to the RRT as well as feed forward to the State. The main points to monitor are:

- The trends in the cases and deaths.
- The containment measures that are being implemented
- Drugs / vaccine stock
- Logistic issues – communications, vehicles,
- Community involvement
- Media response

This should continue till the outbreak is officially declared to be over.

Declaring the outbreak to be over

The DSO / MHO should declare the outbreak to be over only when there have been no new cases for a period of 2 incubation periods since the onset of the last case. This implies that

a very active case search should continue during this period to ensure that cases are not missed.

11. Communicate findings

Within 10 days after the outbreak has ceased, a final outbreak investigation report must be submitted by the local health authorities. This report must be comprehensive and give a complete picture of the multi-factorial causes of the outbreak, the precipitating factors, the evolution of the epidemic, description of the persons affected, time trends, areas affected and direction of spread of the epidemic. It should have complete details of lab results including regional lab (cross verification and strain identification), confirmation of the provisional diagnosis and other relevant information.

It is important that feedback from the report is shared with the lower levels and also other districts.

A Final outbreak investigation report should include:

- a. Title of the report: Title should include the term outbreak, the disease, population or place and time.
- b. Introduction:
 - i. Date & time of notification and setting (community, hospital) where the outbreak occurred.
 - ii. Date and time of investigation initiated by the RRT
 - iii. Describe the events that led to discovery of the index case of the outbreak.
 - iv. Provide the scientific context (describe the organism and whether it is emerging, epidemic, endemic etc.)
 - v. Describe the objective(s) of the investigation: The objective of this report is to describe the epidemiological investigation of the outbreak that occurred in 'X' Village.
- c. Investigation methods:
 - i. Identify the start and finish dates of the outbreak and describe how the end date was determined including the incubation period and date of the last reported case.
 - ii. Provide the case definitions

- iii. Describe data collection activities including any questionnaire development (case finding, line-listing, clinical history, risk factor assessment).
 - iv. Provide a systematic description of how the outbreak was investigated including –Laboratory investigations, and-Environmental sampling.
- d. Results:
 - i. Epidemiological – Descriptive epidemiology results including:
 - 1. Cases:
 - a. Demographic data
 - b. Clinical data (symptoms, signs, duration of illness, incubation period)
 - c. Outcome of illness (hospitalization, death, chronic effects)
 - 2. Location of cases (rural/urban)
 - 3. Epidemic curve and other graphs (age-sex analysis, symptoms description)
 - 4. If team has conducted analytical study, then
 - a. Compare characteristics of cases and controls
 - b. Describe exposed population
 - c. Describe the results of analytical study
 - ii. Microbiological/toxicological
 - 1. Number and nature (serum/CSF/stool etc) of specimens submitted for testing and results of laboratory testing.
 - iii. Environmental
 - 1. Describe observations and pertinent findings from environmental investigation(s)
 - 2. Describe the results of trace-back investigations
 - 3. Results of environmental testing (if any)
- e. Discussion: Analysis and interpretation of the investigation results and any conclusions drawn as a result of this investigation.
 - i. Discuss the main hypothesis
 - ii. Describe the likely causative agent and mode of transmission

- iii. Describe the risk factors (in case of analytical study)
 - iv. Explain what was done to control the outbreak
 - v. Describe the conclusions and actions taken.
- f. Recommendations: Discuss lessons learned and recommendations for controlling disease and/or preventing/mitigating exposure.

Major control measures expected by teams to undertake during outbreak scenarios

Water Borne Disease Outbreak (For e.g., Acute Diarrheal disease due to Cholera, Typhoid, Hepatitis A & E)

If one is suspecting water borne outbreak – then the team has to ensure

- First & foremost is access to safe drinking water: Ideally it would be best to communicate to the people not to use any of the local sources for drinking purposes and to supply safe water in sachets or through water tankers for the duration of the epidemic.
- If the main source of drinking water is well, then all wells in the area should be cleaned or emptying out of water by portable pump sets and then chlorinated.
- Identification & surveillance of high risk cases – Pregnant females in case of Hepatitis E
- Sanitary disposal of human waste: This is a major source for water contamination and a major cause for outbreaks. Sanitary disposal of faeces and other human waste during an outbreak is a major task and must be well planned out.
- Adopting safe practices in food handling.
- If the source of an outbreak is a broken pipeline, it has to be repaired.
- Intersectoral coordination with PHED & Local bodies.
- IEC
 - hand washing,
 - sanitation and personal hygiene,
 - safe drinking water
 - food handling and at household

Vector Borne Disease Outbreak: Dengue, Chikungunya, Zika or Malaria etc

- Monitoring Vector indices (example: breteau index, house index)
- Vector control: Integrated vector control measures as per NVBDCP guidelines
- Regular monitoring of vulnerable population – example: Pregnant women in case of Zika
- Intersectoral coordination with VBD Officer, PHED & Local bodies.

- IEC
 - Prevent breeding of mosquitoes
 - Personal protective measures (mosquito nets, repellent, full clothes, wear light coloured clothes)
 - Better health seeking behaviour

Vaccine Preventable Disease Outbreak

- Adequate supply of vaccines, syringes and needles
- Adequate staff those are able to administer the vaccines.
- Ring immunisation where applicable.
- Supportive treatment for e.g. Vitamin A prophylaxis in case of measles
- Prevention of complications.
- Monitoring of vulnerable population
- Intersectoral coordination (immunization officer, ICDS, public relation officer etc)
- IEC

Zoonotic Disease Outbreaks (CCHF, KFD, Scrub Typhus, Leptospirosis etc)

- Inter-sectoral coordination with Animal Husbandry department, wild-life & Local bodies.
- safe disposal of dead body including animals
- Reporting to higher authorities.
- Vaccination of vulnerable animal and human
- Adequate supply and usage of PPE
- Chemoprophylaxis (e.g.: Doxycycline/Azithromycin prophylaxis for leptospirosis)
- Establishment and implementation of isolation facility as per guidelines
- Control the movement of animals
- IEC to avoid panic

Air borne disease outbreak (Measles, Chickenpox, Influenza)

- Isolation
- PPE for health worker/ contacts

- Chemoprophylaxis and vaccination of vulnerable population
- IEC
 - Hand washing
 - Personal hygiene
 - Health seeking behaviour
 - Cough etiquettes

Unusual Syndromes Causing Death

Whenever, RRT confronts an unusual scenario causing high death rate, both outbreak investigation and management will take priority. The RRT team should conduct a quick preliminary assessment of situation (common symptoms, events leading to death and probable mode of transmission) and focus on death reduction. Pre-identified tertiary level healthcare facilities able to handle such situations should be immediately informed.

- Dedicated Referral transport system
- Availability of isolation facility.
- Availability of Basic life support and emergency medical care
- Adoption of standard Infection prevention & Control at Health facility
- Contact tracing and isolation of suspects
- Verbal autopsy to understand probable cause of deaths
- Safe disposal of carcass
- PPE for handlers, contacts
- IEC to avoid panic

Daily situational report of outbreak

During the whole period of the outbreak the nodal MO/RRT should continue to give daily situation updates of the outbreak to the next level. The report should include the list of new cases/deaths, lab results received, any new findings, any containment measures taken etc. This daily report should continue till the end of the outbreak (i.e. no case during a period which is double the incubation period). This has two main uses

1. It keep the authorities at the higher level informed so that they can make the appropriate decisions

2. It helps to review the outbreak and response, identify system failures and take corrective measures so that similar events are not repeated.

Thus reports are an important learning tool and should not be seen as a mindless chore. But for this to happen, the authorities at the appropriate level should read the reports and take the necessary action.

Daily report should at least contain:

1. New cases & Cumulative cases
2. Clinical severity of cases
3. Deaths (new & cumulative)
4. Samples collected
5. Lab reports
6. Control measures taken
7. Situation of supplies
8. Requirement
9. Hospitalisation and discharged records.
10. Any other

Take home messages:

- Every EWS/outbreak should be reported to District immediately.
- Every EWS needs to be investigated by local medical team for its veracity.
- Outbreaks to be verified by RRT and final outbreak report to be submitted.
- Outbreak investigation is a skill learnt in field by experience.

Fig 1: Rumour resister format

Unique Identifier of reporting unit				District			
					Action taken		
Date of rumour	Description of rumour	Source of information	Village/urban ward	Taluk/block/sub division	Epidemiological workup	sample	Outbreak response initiation

Case Study

Investigating an Outbreak of Unusual Disease in Cuddalore, Tamil Nadu*

Learning Objectives

After completing this case study, the participant should be able to:

- Define an outbreak
- Enlist steps in an outbreak investigation
- Examine line list and use descriptive information to generate hypothesis regarding potential risk factors
- Hypothesis generation for rare exposures
- Evaluate hypothesis epidemiologically
- Compare food specific attack rate to identify possible food vehicle.

Acknowledgement

This case study is based on an investigation of an actual outbreak that occurred in Cuddalore, Tamil Nadu in 2015. The investigation was conducted by Dr Janardhan Nayak, EIS Officer Batch 2014.

This case study was written by Dr. Tanzin Dikid, NCDC, with review by Dr. Richard Dicker, US CDC.

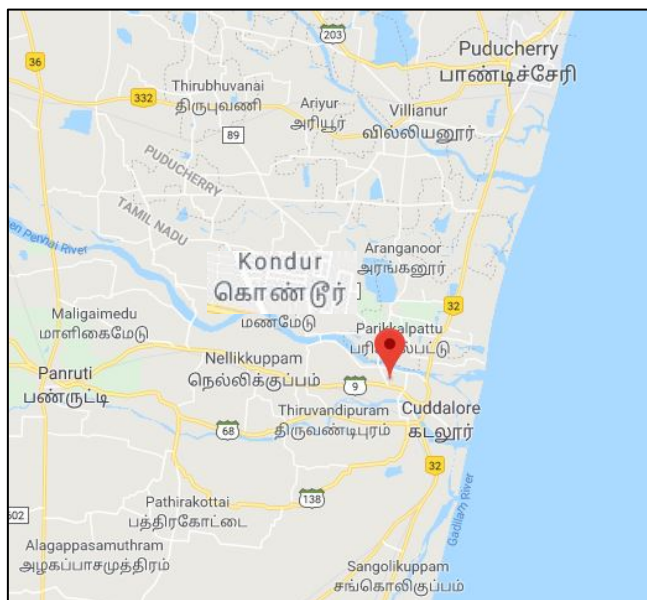
Section 1. Early information

At 8:00 pm on 4 April 2015, the District Surveillance Unit, Cuddalore learned that 64 persons of Kondur village had been admitted at the Government District Hospital, Cuddalore with complaints of vomiting and giddiness. The Central Surveillance Unit was informed the same night.

The District Rapid Response Team (RRT) investigated and coordinated case management with treating physicians. Two EIS Officers joined the RRT on 5 April. The RRT quickly determined that all the affected persons were residents of Kondur village and were suffering from vomiting, giddiness and paraesthesia. The physicians were managing the cases symptomatically.

Question 1. Is this an outbreak?

Kondur Village is in Cuddalore District, Tamilnadu. According to Census India 2011, Kondur Village had a population of 12,506 residents, of whom 1,087 were children 0-6 years old.



Question 2. What factors play a role in deciding whether to investigate a possible outbreak?

Section 2. Developing a case definition and finding cases

The District Rapid Response Team conducted a house-to-house survey of the areas from 6 to 8 April. Results of the survey showed that, on 4 April 2015, 199 persons reported onset of nausea, vomiting, giddiness, abdominal pain/ cramp,

diarrhoea, paraesthesia of lip, gum and mouth, fever, dizziness and headache.

The RRT decided to develop a working case definition before they began to look for cases.

Question 3.1. What is a case definition?

Question 3.2. Formulate a case definition for this phase of the investigation.

Question 4. What case-finding strategy would you use?

Question 5. Which variables would you include in a data collection tool? Limit your list to no more than 10 variables.

The District RRT planned to collect the data on paper data collection forms.

Question 6. After data collection has occurred, what are options for organizing the data for review and analysis?

Section 3. Finding Cases

The RRT formulated an operational case definition of

“nausea or vomiting or giddiness in a person of any age in Kondur village on 4th April 2015”.

The RRT conducted a house-to-house survey of 303 households that included 1410 village residents.

Question 7. Are all four symptoms required to be considered a case?

The survey identified 199 persons with signs and symptoms consistent with the case definition.

The RRT put the data into a line list, similar to the following:

Table 1. Example of line list of first 2 cases, Cuddalore outbreak, April 2015

Case No.	Onset date	Onset time	Address	Age	Gender	Occupation	S/S reported	Exposure A (Y/N)	Hospitalization status (Y/N)
1	4 th April	5.00 PM	Gali No.4, Kondur village	35	M	Fisherman	Nausea, vomiting	Y	Y
2	4 th April	3.30 PM	Gali No. 6, Kondur village	19	F	Housewife	Giddiness, vomiting	Y	Y

Of the 199 cases, 150 (75%) were farmers by occupation. No recent common feasts or party had occurred in the village. 56 of 199 cases gave history of drinking *toddy*(local beer). None had a history of using any recreational drugs. Only 2 of

199 had a history of exposure to any pesticides while spraying their fields. Symptom onset began between 4.45 -11.00 pm. The RRT analysed the data by time, place and person.

Fig 1. Distribution of cases according to time of illness, N=199

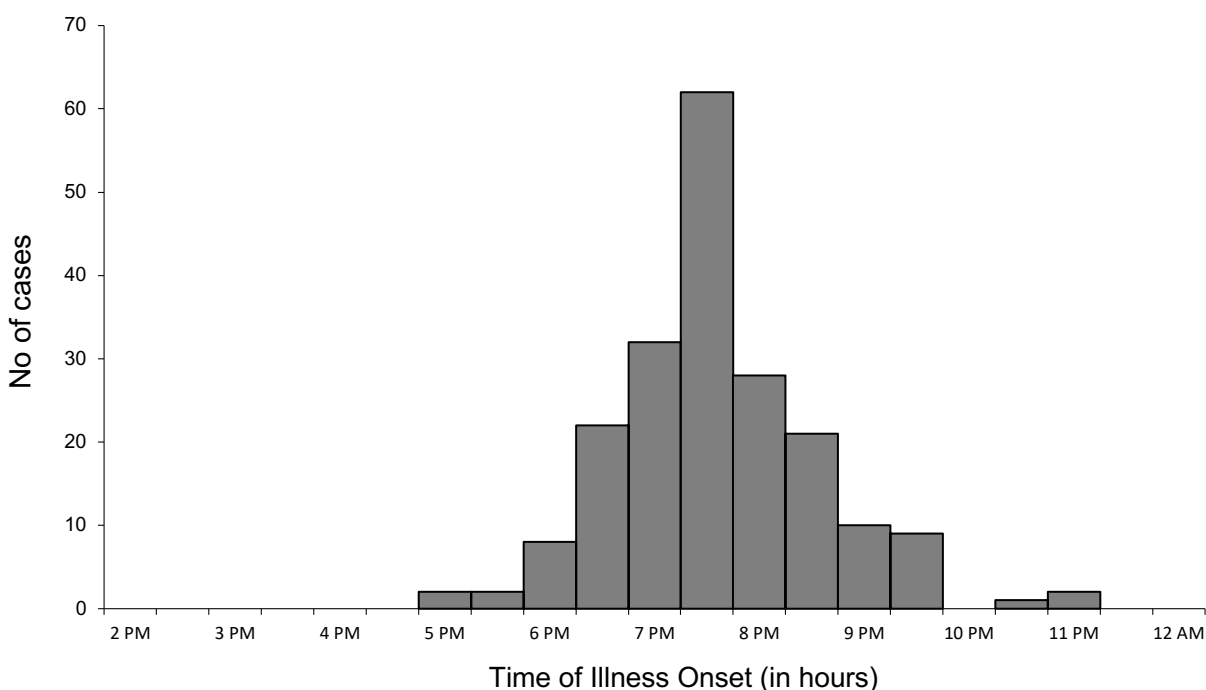
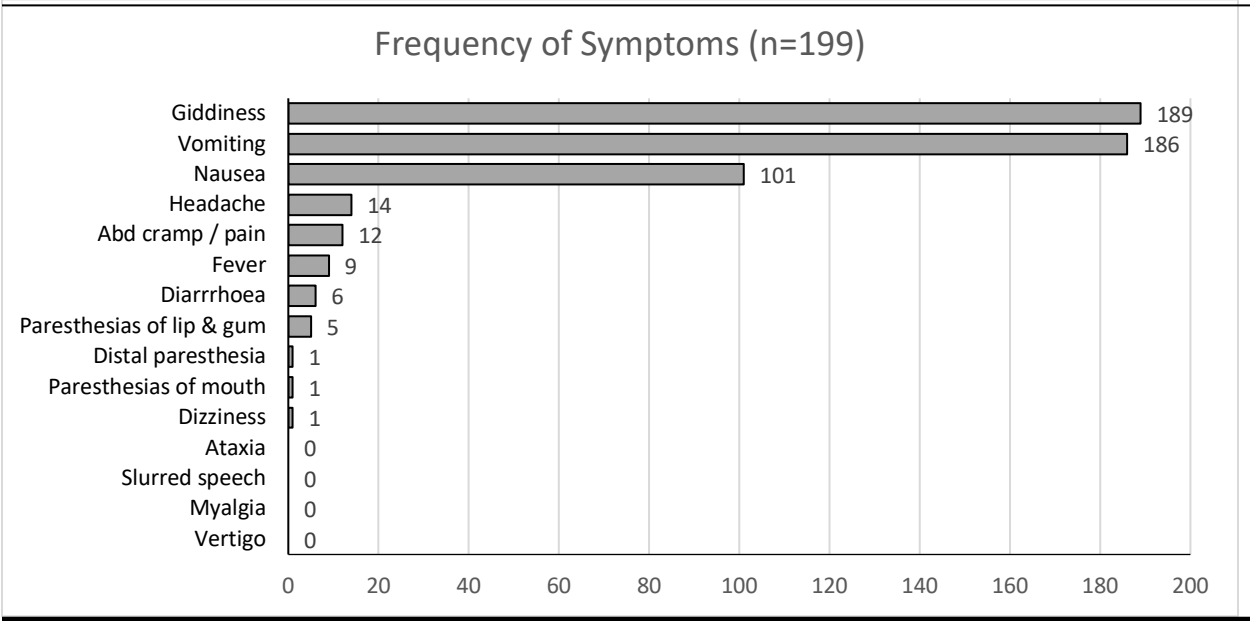


Table 2. Distribution of cases on the basis of age group and gender

Age group (years)	Population, n=1410	Cases, n=199	Attack Rate %
0–5	123	21	17
6–15	286	50	17
16–45	767	103	13
46–60	173	21	12
>60	61	4	7
Female	700	105	15
Male	710	94	13

Figure 2. Distribution of cases on the basis of clinical profile



Question 8. Summarize the descriptive epidemiology.

Section 4. Hypothesis generation

The RRT's next step was to generate one or more plausible hypotheses.

Question 9. Which parameters should a plausible hypothesis address?

Question 10. In an outbreak situation, what methods does an epidemiologist use to generate a robust hypothesis?

Question 11. In what type of outbreak situations would you consider using less common ways of obtaining information for hypothesis generation?

The RRT's review of descriptive data suggested a point source outbreak with short incubation period. A close examination of the reported symptom profile showed that nausea, vomiting and giddiness, and upper GI symptoms were predominant complaints. Some neurological symptoms, including paraesthesia of lip and gums, were also reported.

The RRT decided to conduct in-depth interviews with patients and local authorities. They also decided to limit the reference period for possible exposures to within 3 days. They divided themselves into teams. One team did in-depth

interviews with 27 affected residents. The other team spoke with health department officials, food department officials, and private practitioners.

Health department officials and private practitioners noted that cases with similar symptoms were reported from this area in the past and were possibly linked to dietary exposure. The affected village has an adjoining coastline. Commercial ships dock at a nearby area. There were no major industries around. Results of in-depth interviews with 27 cases were summarized as follows:

Table 3. Frequency of some common exposures among cases

	N=27	%
Occupation		
Farmer/ Farm labour	9	(33)
Fisherman	19	(70)
Semiskilled (plumber/ electrician)	1	(3.7)
Factory/ Shipyard worker	1	(3.7)
Drinking water		
Bore well # 1	5	(18.5)
Bore well #2	7	(26)
Unprotected well	4	(15)
Private underground water	10	(37)
Water from overhead tank # 1	1	(3.7)
Water from overhead tank # 2	0	(0)
Milk		
Cold milk	2	(7.4)
Hot milk	21	(77)
Untreated milk	4	(15)
Phirni (ice cream)	3	(11)
Sea food		
Fresh fish	18	(66.6)
Dried fish	8	(30)
Lobster	3	(11.1)
Crab	9	(33.3)
Clam	25	(92.5)
Pesticide handling		
Yes	12	(44.4)
H/o substance use or toddy use		
Yes	09	(33)
H/O attending a feast or party		
Yes	06	(22)

Question 12. Summarize the descriptive epidemiology you have learned so far.

Question 13. Develop a hypothesis based on this evidence.

Section 5. Hypothesis testing

After analysing results of the descriptive data and hypothesis generating interviews in the previous section, the RRT hypothesized that “*eating clams was associated with the reported illness*”.

Typically hypothesis in a field investigation are evaluated using a combination of environmental evidence, laboratory science, and epidemiology. Clam samples were collected from local vendors and their source of clam harvesting was traced back.

Environmental testing by marine biologists identified the clams as *Meretrixmeretrix* species. They were not able to isolate any toxin from the clams or the sand and water collected from the clam-harvesting site. The water was found to be heavily contaminated with *E.coli* and *Bacillus* sp.

Results of the stool sample collected were negative for *Vibrio cholera*, *Salmonella* sp and *Shigella* sp.

Question 14. How would you evaluate the hypothesis epidemiologically?

Question 15. Apart from an epidemiologic stud, what other lines of inquiry can contribute meaningfully to this investigation?

Epilogue:

In addition to the epidemiological investigation, the investigator also conducted in-depth interviews with the local women. They reported that consumption of clams is very common in this coastal village as it is a readily available source of nutrition. For some, it is also considered therapeutic for common ailments. The usual practice is to consume scooped flesh and soup after heating in oil and discard the shell. Clams are purchased fresh from local vendors on the day of preparation itself.

In this instance local women recalled the clams “*smelling weird*” when they purchased it on 4th April. When local vendors were interviewed, they noted that clams are commonly harvested from nearby Pennai River. However, on this fateful day clams were harvested from a different site in the hope of getting larger sized clams.

Marine biologists from the nearby University revealed that dumping of anthropogenic wastes, run off from agricultural lands and rivers, coastal upwelling are the major factors resulting in blooming of microalgae that produce toxins. These marine toxins are heat-stable and water-soluble. Shellfish, being filter feeders, tend to accumulate these toxins. Blooming of microalgae is seasonal in nature and some water bodies with high anthropogenic activity around it are more susceptible to it.

Of 10 health practitioners interviewed, 7 (70%) reported that they had seen patients in their practices with some sort of seafood-origin food poisoning. But they were not aware of neurological symptoms being associated with food poisoning or of its fatal nature.

The investigator recommended the following to the local health authorities:

- **Creating awareness among the local population regarding safe clam harvesting sites and avoiding the practice of eating of clams (shellfish) during the season of algal bloom.**
- **Training for all level service providers to strengthen their knowledge on early identification and management of shellfish poisoning.**
- **Initiation of surveillance for seafood (shellfish) poisoning.**

Although laboratory results were indeterminate for any microbial or toxic aetiology, confirmation of the aetiology of the outbreak was not possible. The systematic epidemiological and environmental investigation provided a scientific basis for recommendations and appropriate public health action.

This investigation also underscores the importance of a coordinated and timely effort by a multidisciplinary team of epidemiologists, marine biologists and the food safety department led to containment of this outbreak of shellfish and prevention of new ones.

Module 6

LABORATORY COMPONENTS UNDER IDSP

Specific Learning Objectives

- *To understand the Laboratory Component under IDSP*
- *To understand the role of Microbiologist in surveillance and out-break investigations*
- *Role of Laboratories in routine surveillance and outbreak investigation (trigger events)*
- *To understand the collection, storage and transportation of specimens*
- *Safety precautions while collecting specimens*
- *Sample retention policy after testing and reporting of samples*
- *Ensure appropriate tests and quality control (Internal Quality Assurance & External Quality Assessment Scheme EQAS).*
- *Biosafety in Laboratories*
- *To understand biomedical waste management practices to be followed*
- *Spill management*

Introduction

Laboratory support to disease surveillance activities has been recognized as an essential component of any surveillance programme both for communicable as well as non-communicable diseases.

Under Integrated Disease Surveillance Programme (IDSP) strengthening of public health labs is an important component which is focused on developing lab capacity in the country so that States have the diagnostic facilities to conduct surveillance of epidemic prone diseases in a decentralized manner. The laboratories will assist in passive routine surveillance of selected diseases as well as support outbreak investigations.

The IDSP laboratory functioning plan is currently based on two strategies:

a. District Public Health Labs (DPHLs)

b. State Referral Labs (SRLs) Network

- a. The District Public Health Labs:** These are District Hospital Labs strengthened by IDSP to cater to the health care needs of the community and generate a quality lab based routine surveillance data for locally endemic infectious diseases.

A DPHL:

- i. Is integrated within the existing District Hospital

- ii. Has an established system of receiving routine clinical specimens (from the CHCs/PHCs and field)?
- iii. Performs testing for lab confirmation of epidemic prone diseases for both out patients and inpatients attending the hospital
- iv. Ensure submission of weekly surveillance data in L form of IDSP to the DSU in time along with line list of positive cases
- v. Support outbreak investigations in the District

1) **The DPHLs are expected to perform the following tests broadly** (for details refer appendix 11)

- a. Gram staining
- b. Peripheral blood smear
- c. Bacterial culture (Blood, Stool, Throat swab and CSF)
- d. Serology: WIDAL, ELISA and Rapid tests
- e. Any other tests for State specific diseases
- f. H₂S and MPN test for water quality

2) **List of equipment required for testing** (for details refer appendix 12)

b. State Referral Lab Network

Under this network, services of existing functional laboratories (at Government Medical Colleges) are being used to allow access to quality laboratory services **for investigation and lab confirmation of outbreaks in the linked Districts.**

Tests to be performed by the SRL during outbreaks are same as for DPHL plus some specific tests. Also, SRLs have additional roles and responsibilities as mentioned in appendix 11

Role of Microbiologist in Surveillance and Outbreak Investigation

- **Development of DPHL**
 - Support development of IDSP district labs and monitor through regular on-site visits
 - Establish Quality Systems in District labs
 - Implementation of Bio waste management policies (BMW)
 - Facilitate implementation of EQAS in identified laboratories.
- **Outbreak investigation**
 - Be part of state RRT.

- Ensure that all reported outbreaks in the state are subjected to the lab confirmation
- Ensure that the lab reports of outbreaks investigated are incorporated in the final outbreak report and communicated to the CSU expeditiously.
- **Lab based surveillance**
 - Ensure L-form reporting from all reporting units
 - Coordinate analysis of laboratory data.
- **State Referral Lab network**
 - Coordinate with referral laboratory for testing of clinical samples from all suspected outbreaks in the linked districts.

Role of Laboratories in IDSP

- DPHLs under IDSP strengthen the capacity of respective District by providing Laboratory Support in testing the epidemic prone Diseases & diseases of local importance.
- **Data Management** Under IDSP data is collected on epidemic-prone diseases on weekly basis (Monday–Sunday). The information is collected on specified reporting format, namely “L” designed to collect data on **laboratory confirmed** cases to be filled by Laboratory staff
- Laboratories in Government sector (PHCs/CHCs/DH//DPHL), Medical Colleges and private sector form the ‘L’ reporting units under IDSP and submit disease surveillance data every Monday of the week to District Surveillance Unit.
- The weekly data gives information on the disease trends and seasonality of diseases.
- Labs provides vital support in Disease outbreak identification and Investigation

Role of Laboratories in Outbreak Investigation

During outbreak investigation, the laboratory results are used to diagnose the patient so that appropriate treatment can be given, as well as verify the cause of suspected outbreaks. As a Public Health Manager/epidemiologist, one needs to identify what samples are to be collected and where they have to be sent, so that there is minimum delay in confirming the diagnosis. For this, State/District RRT must also be aware of the Labs conducting tests for specific pathogens. Most importantly, two-way communications must be established between the outbreak investigation team and the laboratory. In addition, veterinary/agricultural/food safety investigations may be handled in different laboratories, thus effective intersectoral communications are important.

The role of the public health laboratory is mainly reactive, rather than proactive. However, laboratories should also be involved in ongoing surveillance of infections in the population and able to **‘flag up’ an increase in the number or nature of particular infections and thus trigger investigations** (for details refer appendix 13)

Most importantly, two-way communications must be established between the outbreak investigation team and the laboratory. In addition, veterinary/agricultural/food safety investigations may be handled in different laboratories, thus effective intersectoral communications are important.

Collection of clinical specimens for laboratory diagnosis is an important step during outbreak investigation. Successful laboratory confirmation of a disease depends on:

- Advance planning
- Collection of appropriate and adequate specimens
- Correct packaging and rapid transport to an appropriate laboratory. It must confirm before sending any sample to the Lab whether it is currently able to perform the specific test or not.
- Proper bio safety and decontamination procedures to reduce the risk of further spread of the disease
- Consider the logistic requirements for sampling equipment and supplies, specimen handling and transport to the laboratory (timing, transmit temperature requirements, shipping procedures, and documentation) and decontamination procedures in advance
- RRT lab kit and check list for lab kit (for details refer appendix 14)

Whom to sample during an outbreak?

- Not necessary to sample all the cases during an outbreak, avoid overwhelming the lab with excessive samples. However, depending on lab capacity, testing may continue during the outbreak, to assess the progression of outbreak, in addition to epidemiological/clinical assessment of the outbreak as per field investigation.
- Ensure sufficient no of specimens (initially 5 – 10 samples, and after confirmation of diagnosis, 10% of the cases) representing all types of population
 - Typical cases (should represent the majority of the samples)
 - Untreated patients (e.g., without antibiotics)

- Atypical cases (few of the samples)
- Healthy contacts (few)

Specimen Collection, Transportation and Storage

1. What to collect? 2. When to collect? 3. How to collect?

The appropriate selection, collection, rapid transport and processing of specimens is very important for microbiologic diagnosis as any lab result depends on the quality of specimen and its condition on arrival in the lab. When sample collection and management are not priorities the laboratory can contribute little to patient care / community health. It is the responsibility of the laboratory to provide complete and accurate specimen management information to the health care workers involved in collection addressing safety, selection, collection, storage, labelling, transportation and acceptability.

Peripheral blood smears, sputum for smear and culture, blood for serology, blood, stool, pharyngeal / nasopharyngeal swabs and urine for culture and water for water quality test are the common specimens to be collected under IDSP. In outbreak conditions, the Rapid Response Team will order for appropriate samples.

General instructions

1. Treat all specimens as potentially infectious material. Use standard precautions for handling all specimens.
2. Samples should be collected during acute phase of the illness, whenever possible.
3. Whenever possible, collect all culture specimens prior to administration of any antimicrobial agents.
4. Samples should be collected from actual site of infection with minimum contamination from adjacent tissues, organs and secretions.
5. All specimens must clearly be labelled with Patient's name, a unique identification number, the time and date of collection and the test that has been requested.
6. A requisition form needs to accompany each different specimen type. It should include the patient's name, a unique identification number, demographic information and the patient's health status, nature and source of specimen, antibiotic status along with the initials of Medical Officer. (Specimen Referral Form (SRF) appendix 15)
7. Specimens should be in tightly sealed, in leak proof containers. Appropriate sample collection devices, containers and media should be used for optimal recovery of micro-organisms.
8. Adhere to guidelines when transporting specimens.
9. If unable to transport specimens promptly or unable to process specimens as soon as received in lab, store them at appropriate temperature.

Criterion for Rejection of Samples:

On the following conditions, samples should not be accepted by the lab for further processing. These should be clearly stated to health personal collecting samples, beforehand.

1. Information on sample container does not match the requisition form.
2. Sample is leaking from sample container.
3. Sample container is soiled.
4. Requisition form is soiled.
5. Sample is grossly contaminated.
6. Sample quantity not sufficient.
7. Sample has dried up.
8. Sample received for culture, but is in formalin.
9. Sample transported in improper media or improper temperature.
10. Sample received >2 hours of collection and not preserved properly.
11. Sample stored for > 1 week, even if refrigerated.

What are Standard Precautions?

Standard Precautions are the minimum infection prevention practices that apply to all patient care, regardless of suspected or confirmed infection status of the patient, in any setting where health care is delivered. Standard precautions include —

1. Hand hygiene.
2. Use of personal protective equipment (e.g., gloves, masks, eyewear etc).
3. Respiratory hygiene / cough etiquette.
4. Sharps safety
5. Safe injection practices (i.e., aseptic technique for parenteral medications).
6. Sterile instruments and devices.
7. Clean and disinfected environmental surfaces.

Collection of Stool Sample**Investigation for diarrheal disease (Cholera & other Enteropathogens)**

Indications to collect stool sample (mainly for Cholera, Shigella and Salmonella as these are not self-limiting and require antibiotics):

1. Take history of travel, history of intake of food/water suspected to be contaminated, h/o similar illness in family, friends, and neighborhood.
2. Voided first morning (preferably), freshly passed, stool sample should be collected in clean, dry, wide mouthed, leak proof screw capped container with tight fitting lid and no

preservatives, disinfectants, detergents or metal ions (Metal ions like Barium slats in toilet paper or barium enema)

3. For the isolation of pathogen specimen should be collected soon after onset of diarrhea and preferably before the initiation of antibiotic therapy or after 2 weeks gap of last antibiotic dose.
4. If required, two or three specimens may be collected on consecutive (on IPD cases) / alternate days (in OPD cases).
5. As far as possible, do not collect stool samples from a bedpan. Avoid contamination with water. Avoid contamination with urine.
6. Do not soil rim/outside of container. Do not fill till brim. If solid stools, small quantity is sufficient and in case of liquid/semi-solid stools, 1/3rd filled container is enough. Replace cap tightly.
7. If delay in processing is anticipated, sample should be preferably stored in fridge at 4°C as pathogens survive longer than at room temperature. DO NOT freeze. DO NOT incubate.
8. In case collected elsewhere, sample should reach to the laboratory within 1- 2 hours. If delay in transportation is anticipated, specimen should be placed in transport media and kept at room temperature. For suspected Salmonella and Shigella, Carry Blair is ideally recommended and survives up to 48 hours at room temperature. For suspected cholera, APW is ideally recommended (1ml ample in 10 ml APW) and survives up to 8 hours till it reaches lab.
9. Rectal swab samples may be collected in case of infants; severely debilitated patients where voided stool sample collection is not feasible.

Collection of Rectal swab

1. Moisten the rectal swab in sterile normal saline
2. Position the patient in left lateral position (right knee and hip in slight flexion), facing the other side and at edge of table.
3. Introduce the swab inside the anal sphincter and go up to 2-4 (2.5) cm inside rectum.
4. Rotate the swab clockwise and anti-clockwise for 5-10 seconds ensuring rectal mucosa is firmly rubbed and withdraw the swab without touching the adjoining skin and ensure that the swab is visible soiled.
5. Immediately put the swab in suitable transport media by inserting the swab completely into the media to prevent drying.

6. Break off the excess wooden portion of swab stick and screw cap the bottle of transport media.
7. Transport at room temperature to the nearest lab.
8. If delay longer than 2 hours is anticipated for processing, specimen should be kept in transport media at room temperature.
9. In case no transport media is used, the rectal swab should be transported at 4°C and stored at 4°C till processed in lab.

Collection of Throat swab

Investigation for Respiratory Tract Infections (Diphtheria, H1N1 & other viral pathogens)

1. Make the patient seat comfortably, tilt the head back and insert the throat swab.
2. Hold the tongue down with the tongue depressor. Use a strong light source to locate areas of inflammation and exudate in the posterior pharynx and the tonsillar region of the throat behind the uvula.
3. Rub the area back and forth with a nylon or Dacron or calcium alginate swab (cotton swab not recommended as it may inactivate the virus).
4. Care must be taken to sample the posterior pharyngeal wall. Any purulent exudates should also be sampled.
5. Withdraw the swab without touching lateral walls of buccal cavity, tongue, teeth or gums.
6. After collection, place the swab into sterile tube or another suitable container.
7. For the recovery of viral agent, after collection, place the swab into viral transport media.
8. Transport specimen at cold chain (2-8°C)
9. If not processed immediately in laboratory, specimen may be refrigerated (2-8°C) for 24 hours or frozen at -20°C or -70°C if longer delay is anticipated.

Collection of Nasopharyngeal swab

1. Make the patient seat comfortably, gently elevate the tip of the nose.
2. Moisten a flexible calcium alginate/Dacron swab in sterile normal saline and gently insert into the one of the nares.
3. Guide the swab parallel to the floor of nose and move upwards along the nasal septum into the posterior nasopharyngeal space where distinct feel of resistance is met.
4. Leave the swab for 15-30 seconds in place if the patient can tolerate discomfort.
5. Slowly remove the swab while slightly rotating it.

6. After collection, place the swab into viral transport media (VTM), breaking applicator's stick.
7. If undue resistance is met, repeat procedure through opposite nares.
8. Transport specimen at cold chain (2-8°C)
9. If not processed immediately in laboratory, specimen may be refrigerated (2-8°C) for 24 hours or frozen at -20°C or -70°C if longer delay is anticipated.

Collection of Cerebrospinal Fluid (CSF)

Investigation for Central Nervous System (CNS) infections (for viral, bacterial, parasitic, and fungal pathogens)

1. CSF is collected by a medical procedure known as lumbar puncture (LP). The specimen must be taken by a physician experienced in the procedure.
2. Between 1 and 2 ml of CSF is collected in each of the 3 tubes, tube 1 for biochemical analysis, tube 2 for staining and culture, last one for cytology.
3. In general, send the specimens to the laboratory and process as soon as possible.
4. Transport media should not be used for CSF specimen
5. For bacteriology studies, transport CSF specimens at room temperature. It should never be refrigerated.
6. For viral studies, transport CSF specimens at cold chain (4-8°C).
7. If not processed immediately in laboratory, CSF specimen for viral studies may be refrigerated for 24 hours or frozen at -20°C or -70°C if longer delay is anticipated.

Collection of Blood Sample:

For Serology:

To be used for Dengue, Chikungunya, Zika, Hepatitis A, Hepatitis E, KFD, CCHF, Malaria etc.

1. Venipuncture is performed for serology studies. After collection, transfer the blood aseptically, from the syringe without squirting in to a sterile screw capped, plastic, and leak proof specimen container.
2. For serum collection, transfer blood in red topped vacutainer (with no anticoagulant) or golden topped vacutainer (with Gel). Allow the blood to clot 15-30 minutes and separate by centrifugation.
3. For plasma collection, transfer blood in vacutainer with anticoagulant additives. Thoroughly mix the blood with the additives by gently inverting the tube eight times (whole blood) and separate by centrifugation.

4. Transport specimen at cold chain (2-8°C).
5. If not processed immediately in laboratory, specimen may be refrigerated (2-8°C) for 24 hours or frozen at -20°C or -70°C if longer delay is anticipated.

For Microbiology Culture:

To be used for Typhoid, Brucellosis etc.

1. Venous blood sample is collected for microbiology culture.
2. After collection, inoculate blood into blood culture bottle from syringe without removing needle.
3. If required, two or three specimens may be collected on consecutive / alternate days.
4. Transport to the laboratory at room temperature as early as possible.
5. If it is not possible to collect blood separately for culture, it can be done from the clot after separation of serum for serology.

For Peripheral Blood Film:

To be used for Malaria etc.

1. Capillary blood from finger-prick or whole blood is collected for thick and thin blood smears/Rapid Antigen Malaria testing (RAT).
2. Transport slides within 24 hours at room temperature. Do not refrigerate (can alter cell morphology)

Sample Collection for Bacteriological Analysis of Water

For analysis by Coliform count (MPN method)

Collection of samples

- Collect water in screw capped pre-sterilized bottles of 230 ml capacity
- Collect a minimum of 150 ml water

Tap Water

- Flame the mouth of the tap (in case of metal taps only)
- Allow the water to run for some time before filling the bottle up to the required level

Stream/river/lake water

- Immerse the bottle with its mouth closed with the stopper a foot below the surface of water

Transport media

Transport media are essentially solutions of buffers with carbohydrates, peptones and other nutrients (excluding growth factors).

- Transport medium aims to preserve a specimen (viability of bacteria/virus) and minimize contaminant overgrowth from the time of collection to the processing of the specimen.
- Depending on the type of organisms suspected in the sample, transport media may vary.

Examples of common transport medium which may be required for transporting specimens

1. Medium: Used for stool samples that may contain Salmonella, Shigella, Vibrio or Campylobacter
2. **Venkatraman Ramakrishna (VR) medium:** Used to transport faeces from suspected cholera patients.
3. **Alkaline peptone water**—for cholera
4. **Viral Transport Medium (VTM):** Used for transporting swab specimens for the recovery of viral agents. In the absence of viral transport medium, submit swabs in sterile, sealed vials with several drops of saline added, to prevent desiccation.
5. **Other bacterial transport media:** Used for throat swab / nasopharyngeal swab for the recovery of bacterial pathogens e.g. Amies transport media, Regan- Lowe transport media for *B. pertussis* etc.

Packaging and Transportation of Samples (Triple Packaging System)

Transportation of Sample from OPD/Ward/Casualty/ICU to the laboratory within the same institute

- Tightly closed and appropriately labeled vial containing the sample should be transported to lab in a closed box (like vaccine carrier, thermocol boxes etc.) with absorbent material (cotton /tissue paper) wrapped around the vial immediately after collection.
- Temperature should be maintained as advised.

Transportation of Sample from the Hospital/Institution to the laboratory located elsewhere

All samples should be transported as WHO recommended (based on UN Recommendations on the Transport of Dangerous Goods dealing with Infectious Substances and Diagnostic specimens,) Standard Triple Packaging System (3 receptacles) **Figure 1**

Basic triple packaging system

Primary Receptacle

- Labeled, water tight, leak proof receptacle containing specimen. E.g. Vacutainer, microcentrifuge tube, vials etc.
- To be wrapped in enough absorbent material (cotton, tissue paper, waste newspaper) for wrapping primary container.

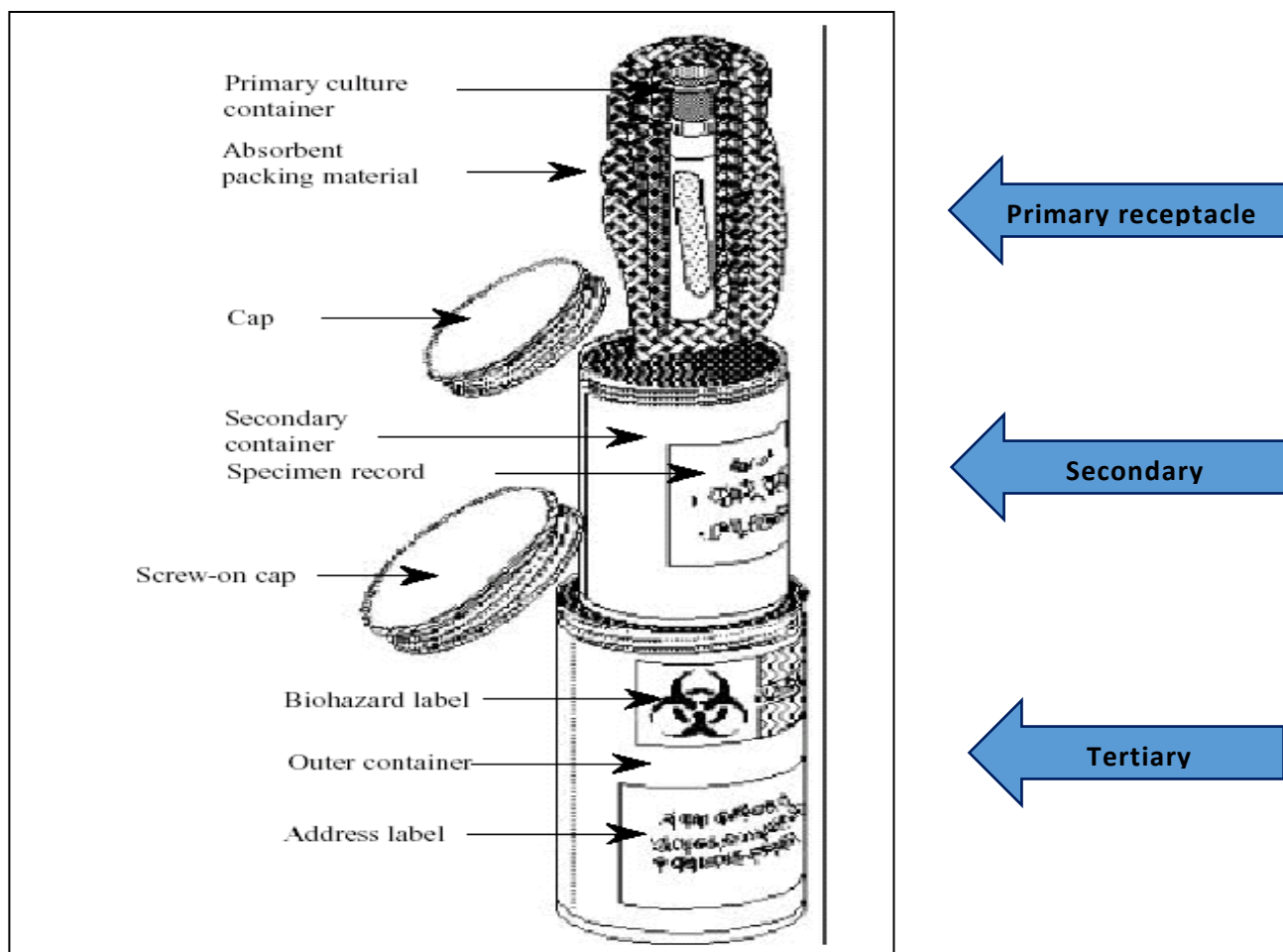
Secondary Receptacle

- Secondary container to hold primary container
- Durable, water tight, leakproof container e.g. Falcon tube, sealed plastic bag
- Several wrapped primary receptacles may be placed in one secondary receptacle
- Specimen data form or requisition form should be wrapped/fastened/taped around secondary receptacle (Label: Patient ID No.: Patient's Name: Hospital Name: Date of sample collection)

Tertiary Receptacle (outer package)

- Protects from outside influences like physical damage, water in transit.
- Sturdy, waterproof, insulated like thermocol boxes, vaccine carrier
- Ice packs/ gel pack or dry ice should be kept between secondary and tertiary receptacle.
- Must be displayed outside the packaging -
 - Biohazard symbol
 - Destination /receiver's address /contact number
 - Sender's address and contact number & emergency contact number

Figure1 Example of basic triple packaging / labeling system for “Infectious Substance” transport



Specimens required in common outbreak prone conditions:

Specimens required during common outbreak prone conditions are given below. However, specific programme guidelines may be referred to for details and latest updates.

Sl. No	Syndrome/Disease	Outbreak Prone Diseases	Test to be Done	Sample to be Collected	Volume	Time of collection	Recommended PPE	Mode of collection	Transportation
1.	Acute Febrile Illness	Typhoid	Blood Culture & Sensitivity	Venous Blood	infants: 0.5 – 2 ml children: 2 – 5 ml adults: 5 – 10 ml	Within seven days of illness (preferably prior to antibiotic therapy)	Lab Coat, Gloves, Eye/ face protection* <i>*to protect against splashes and aerosols</i>	Blood should be put into the media bottle immediately with all aseptic precautions	Blood culture medium at room temperature
			Widal Test	Serum	2 ml	After 5-6 days of illness (2 nd wk of illness) better results if paired sample collected at an interval of 7-10 days	Lab Coat, Gloves, Eye/ face protection*	Collect blood centrifuge/keep at room temp for 30min - decant serum into sterile container**	in cold chain (2-8°C)
		Dengue	NS1 Ag Test	Serum	2ml	First week of illness before fifth day	Lab Coat, Gloves, Eye/ face protection*	Plain / red/ golden topped vacutainer	in cold chain (2-8°C)

			IgM ELISA		2ml	After 5-6 days of illness	Lab Coat, Gloves, Eye/face protection*	Plain / red/golden topped vacutainer	
		Chikungunya	IgM ELISA	Serum	2ml	After 5-6 days of illness	Lab Coat, Gloves, Eye/face protection*	Plain / red/golden topped vacutainer	in cold chain (2-8°C)
		Zika virus disease	IgM ELISA	Serum	2ml	After 5-6 days of illness	Lab Coat, Gloves, Eye/face protection*	Plain / red/golden topped vacutainer	in cold chain (2-8°C)
		Scrub typhus	IgM ELISA	Serum	2ml	After 5-6 days of illness	Lab Coat, Gloves, Eye/face protection*	Plain / red/golden topped vacutainer	in cold chain (2-8°C)
		Leptospirosis	IgM ELISA	Serum	2ml	After 5-6 days of illness	Lab Coat, Gloves, Eye/face protection*	Plain / red/golden topped vacutainer	in cold chain (2-8°C)
			Rapid Test: MAT	Serum	2ml	~Day 10-12 after onset of illness.		Plain / red/golden topped vacutainer	in cold chain (2-8°C)
		Malaria	Peripheral Blood smear examination	Finger blood prick	-	Acute stage of illness (Prior to antimalarial therapy)	Lab Coat, Gloves, Eye/face protection*		At room temperature

			Rapid Antigen Test	Whole blood	2 ml	Acute stage of illness / Prior to antimalarial therapy	Lab Coat, Gloves, Eye/ face protection*	Violet topped vacutainer/ Vial with anticoagulative	in cold chain (2-8°C)
2.	Acute Diarrheal Diseases/ Dysentery with or without Jaundice	Cholera & other Enteropathogens	Culture & Sensitivity	Stool	1 to 2ml of stool / rectal swab	Acute stage of illness / Prior to antibiotic therapy	Lab Coat, Gloves, Eye/ face protection*	Stool/Rectal swab in transport medium (Cary Blair Media)	At room temperature (RT) if transport media is used; Else in cold chain
		Hepatitis A Hepatitis E	IgM ELISA	Serum/ Plasma	2 ml	After 5-6 days of illness (2 nd wk of illness); better results if paired sample collected at an interval of 7-10 days	Lab Coat, Gloves, Eye/ face protection*	Plain vacutainer with no additive or anticoagulant/ red/ golden topped vacutainer	in cold chain (2-8°C)
3.	Fever and maculopapular rash	Measles	IgM ELISA	Serum	2 ml	After 5-6 days of illness	Lab Coat, Gloves, Eye/ face protection*	Plain / red/ golden topped vacutainer	in cold chain (2-8°C)
4.	Respiratory Tract Infections	Diphtheria	Gram stain Culture & Sensitivity	Throat Swab from the lesions, Bits from Pseudomembrane	---	Acute stage of illness / Prior to antibiotic therapy	Lab Coat, Gloves, Eye/ face protection*	Clean sterile container	in cold chain (2-8°C)

		H1N1	RT-PCR	Throat Swab	-	First week of illness	Lab Coat, Gloves, Eye/face protection (Mandatory BSL-2 lab & practices)	Throat swab in VTM	in cold chain (2-8°C)
5.	Meningitis/ Encephalitis Syndrome	Japanese Encephalitis (JE)	IgM ELISA	Preferably both CSF & Serum	2ml	After 5-6 days of illness	Lab Coat, Gloves, Eye/face protection*	Clean sterile vial	in cold chain (2-8°C)
		Meningococcal Meningitis	Gram stain, Culture & Sensitivity	Preferably CSF/Blood	2ml	Acute Stage of illness	Lab Coat, Gloves, Eye/face protection*	Clean sterile container/ Blood in blood culture media	At room temperature
			Latex Agglutination Test	Preferably CSF	2ml		Lab Coat, Gloves, Eye/face protection*	Clean sterile container	At room temperature
6.	Viral Hemorrhagic Fever	Kyasanur Forest Disease (KFD)	IgM ELISA	Serum	2ml	After 5-6 days of illness	Mandatory BSL-3 lab & practices	Clean sterile vial	in cold chain (2-8°C)
			RT-PCR	Whole blood/Serum		Acute Stage of illness	Mandatory BSL-3 lab & practices		
		Crimean Congo Haemorrhagic Fever (CCHF)	IgG/IgM ELISA	Blood/Serum/Plasma	2ml	After 5-6 days of illness	Mandatory BSL-4 lab & practices	Clean sterile vial	in cold chain (2-8°C)
			RT-PCR	Blood/Serum/Plasma	2ml	Acute Stage of illness	Mandatory BSL-4 lab and practices		
7.	Disease	Anthrax	Gram stain Culture & Sensitivity	Blood, skin lesions or respiratory	---	Acute stage of illness / Prior to	Lab Coat, Gloves, Eye/face protection	Clean sterile container	in cold chain (2-8°C)

				secretions depending on type of illness		antibiotic therapy	(Mandatory BSL-2 laboratory and practices)		
8.	Water Surveillance	Bacteriological Analysis of Water	Screening by H ₂ S Test	Water sample from sources in sterile containers •Tap Water Flame the mouth of the tap (in case of metal taps only) Allow the water to run for two minutes before filling the bottle 20 ml directly into the test kit		once in every 3 months/ need based during an outbreak	Lab Coat, Gloves, Eye/ face protection*	water from source should be collected in to the container - contamination should be avoided	
			For analysis by Coliform count Confirmation by MPN test	up to the required level •Stream/river /lake water Immerse the bottle with its mouth closed with the stopper a foot below the surface of water 200 ml in the sterile bottle available in DSL					

Sample Storage, Retention and Disposal:

Laboratory should establish written laboratory policy for sample storage, retention and disposal after testing and reporting of each type of sample.

Written policies should be developed that include:

Sample storage

- description of what samples should be stored
- retention time
- location & conditions for storage (atmospheric and temperature requirements)
- system for storage organization—one method is to store samples by day of receipt or accession number.

Sample retention

- Set a laboratory policy for retention of each type of sample. Some samples can be quickly discarded and others may need to be retained for longer periods.
- Monitor stored samples and do not keep for longer than necessary.
- Planning is required for samples that may need long-term storage. Review inventory of stored samples at specified intervals to determine when they should be discarded.

Sample referral

When referring samples to other laboratories for testing:

- Obtain detailed procedures from laboratory where samples are being sent.
- Ensure the sample is labelled correctly, in the correct container, accompanied by a requisition form that specifies the required test(s) and includes the sending laboratory's contact information.
- Carefully monitor samples that are referred:
 - keep a record of all tests and samples referred, date of referral and name of person referring the test
 - record and report results received for each referred sample
 - monitor turnaround times and record any problems encountered.

Sample disposal

Laboratory should ensure that disposal of all laboratory waste including patient samples is handled and disposed in a safe manner.

- Establish and follow procedures to disinfect samples prior to disposal.

Quality Management System (QMS):

Quality Management System (QMS) is very important for achieving good laboratory performance consistently. Laboratory quality can be defined as the accuracy, reliability and timeliness of reported test results.

In order to accomplish quality of laboratory investigations in DPHL, a comprehensive QMS is required in the DPHL network to provide reliable lab results and it is a continuous on-going process.

QMS comprises a set of essential building blocks for a Laboratory's work flow to fulfil stated quality objectives.

The work flow is divided in to three phases/processes.

- 1. Pre-analytic (Pre-examination)**
- 2. Analytic (Examination)**
- 3. Post-analytic (Post-examination).**

In order to mitigate or reduce the risk of error in the analytical phases/processes, the QMS should include

- 1. Quality Control**
- 2. Quality Assurance**

Quality Control (QC): It is defined as the procedures used to monitor the testing process and ensure that the test run is valid.

Quality Assurance (QA): Is the sum total of all activities that are undertaken to ensure generation of reliable and accurate test reports. The basis for any clinical laboratory quality control programme is a written QC policy. The DSO should ensure that the lab maintains all records pertaining to the quality checks.

QA can be seen as the sum of QC, IQA and EQA, i.e., $QA = QC + IQA + EQA$.

Following are components of QA:

- ◆ Internal quality control (IQC)
- ◆ External quality assessment (EQA)
- ◆ Quality manual- quality policy, scope of QMS,
- ◆ organization and management structure of the laboratory, roles and responsibilities of lab management team, documentation
- ◆ Sample collection Manual
- ◆ Lab safety Manual
- ◆ Quality indicators for monitoring laboratory performance

Internal Quality Control (IQC)

Each laboratory should have an internal quality assessment scheme. This can be carried out by regular use of certified reference material, replicate testing, retesting of retained items and correlation of results of different characteristics of an item

To achieve and maintain IQC the following should be checked and followed:

1. Pre-analytical stage (Pre-examination)

a. Test Request and Specimen Collection

- i. Test ordered on **Specimen Referral Form (SRF)** (appendix 15)
- ii. Log of all specimens collected- date, time, source
- iii. Legible labeling.

b. Collection and transport of specimens the quality of microbiological report is dependent upon the

- i. quality of the specimen submitted
- ii. nature and timing of specimen
- iii. sampling method and transport
- iv. use of transport media and transit time and
- v. adequacy of information given to the laboratory.

2. Analytical stage (Examination)

a. Test Processing

- i. Reagents- Storage temperature, date of preparation and expiry wherever applicable
- ii. Control result record, frequency of use
- iii. Equipment- Temperature log book, Equipment maintenance log books, Calibration

3. Post-analytical stage (Post-examination)

This is another important phase of laboratory testing and needs to include

- Reporting and verifying of microbiological test results in a timely manner; avoid clerical errors
- Interpreting test reports correctly
- Taking appropriate action when a result has serious implications for a patient or public health
- Maintain Turn Around Time (TAT)

External Quality Assessment (EQA) is one component of quality assurance. An EQA scheme should not be too complicated, costly, or time consuming. The main objectives of an EQA scheme are to confirm that a laboratory's SOPs and internal QC procedures are working satisfactorily

EQA can consist of:

- On-site evaluation of laboratories by proficiency testing.
- Participating laboratories are expected to process the survey specimens using the same methods which they use routinely with patient specimens.
- In a proficiency testing (PT) program, challenge samples are provided at regular intervals.

In IDSP system EQA may be conducted as follows:

1. Within the State IDSP system

- a. SRL (Lab in Microbiology Dept. of Medical College) may conduct External Quality control for District Public Health laboratories.

2. Through an external agency:

The DPHL/SRL may enrol themselves with Institution conducting EQAS.

Biosafety in Laboratories

What is Biosafety?

Biosafety is the discipline that addresses the safe handling and containment of infectious microorganisms and bio-hazardous materials.

To protect:

- laboratory workforce
- the environment and community

Potential Hazards in a Laboratory

- **Biological**
 - e.g. Pathogenic organisms from specimens or cultures via aerosols, mucosal splash
- **Chemical**
 - e.g. Laboratory chemicals used in procedures, latex allergy.
- **Physical environment**
 - e.g. Laboratory design, poor worker practices and behaviors, equipment placement, needle-stick injury, accidents (burns, cuts, slips, trips, falls) limited work space, overcrowding, fires

Biosafety

Levels:

There are four biosafety levels. Each level has specific controls for containment of microbes and biological agents. The primary risks that determine levels of containment are infectivity, severity of disease, transmissibility, and the nature of the microbe, or the agent in question, and the route of exposure.

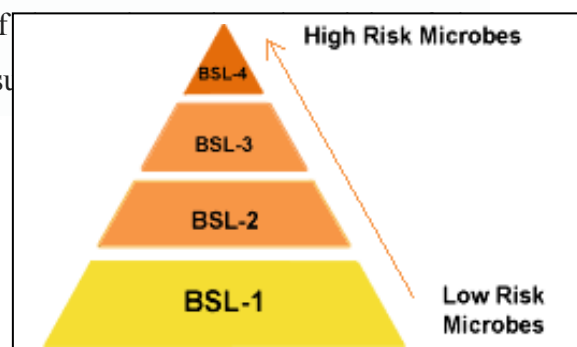
Laboratory facilities are designated as

basic – Biosafety Level 1

basic – Biosafety Level 2

containment – Biosafety Level 3

maximum containment – Biosafety Level 4



Biosafety level designations are based on a composite of the design features, construction, containment facilities, equipment, practices and operational procedures required for working with agents from the various risk groups.

All diagnostic and health care laboratories must be designed and organized for Biosafety level 2 or above

General Precautions

1. Biohazard warning sign must be displayed on the doors of the rooms where microorganisms of Risk Group 2 or higher risk groups are handled.
2. Only authorized persons should be allowed to enter the laboratory working areas.
3. Laboratory doors should be kept closed.
4. Children should not be allowed to enter laboratory working areas.

Bio-Medical Waste Management (BMWM)

What is Waste? Anything which has to be discarded is called waste.

“Bio-medical waste” means any waste, which is generated during the diagnosis, treatment or vaccination of human beings or animals or research activities. This does not include general waste. BMW Management should be followed wherever the bio medical waste is generated. The most common documented transmission of infection from waste to health care worker is through contaminated metallic waste.

Lab to keep updated themselves with the latest BMW guidelines.

Rules and Acts Governing Bio-Medical Waste Management and Handling

- Bio-Medical Waste (Management and Handling) Rules, 1998
- Bio- Medical Waste (Management and Handling) Rules, 2011
- Bio- Medical Waste Management Rules, 2016
- Bio-Medical Waste Management (Amendment) Rules, 2018

Table1 Container and Color Coding for Disposal of Bio-medical Lab Wastes

Color Coding/Waste Category	Type of Bag/Container Used	Type of Waste	Treatment/Disposal Options
Yellow 	Non-chlorinated plastic bags Separate collection system leading to effluent treatment system	(a) Human /animal anatomical waste (b) Blood/soiled waste (c) Expired or discarded medicines (d) Chemical/chemical liquid waste (e) Discarded linen, mattresses, beddings contaminated with blood or body fluid, “routine mask and gown” (f) Microbiology/other clinical laboratory waste	Incineration /Plasma pyrolysis /deep burial (e) pre-non- chlorinated chemical disinfection (f) Pre-treat to sterilize with non-chlorinated chemicals on-site
Red 	non-chlorinated plastic bags or containers	Contaminated waste (recyclable) tubing, bottles, intravenous tubes and sets, catheters, urine bags, syringes (without needles) and gloves	Autoclaving/microwaving /hydroclaving and then sent for recycling. Not be sent to landfill
White 	Puncture, leak, tamper proof containers(Translucent)	Sharps: Needles, syringes with fixed needles, scalpels, blades or any other contaminated/used sharp objects that may cause puncture and cuts.	Autoclaving or dry heat sterilization followed by shredding or mutilation or encapsulation
Blue 	Puncture proof/leak proof box with blue coloured marking	Glassware: Broken or discarded /contaminated glass / medicine vials and ampoules except those containing cytotoxic wastes.	Disinfection or autoclaving/ microwaving, hydroclaving and then sent for recycling

Spill management

Spill management protocol should be in place for dealing with blood and body substance spills.

Protocols should be included in procedural manuals, and emphasized in training programs.

The keeping of a record of all incidents is recommended (appendix 16)

Procedure to clean up spills

- Pour 1% freshly prepared sodium hypochlorite solution over spills in sufficient quantity
- Cover the spill with paper towel or absorbent material
- Leave for 10 minutes before cleaning it

- Wipe up the whole spill with fresh absorbent material using gloved hands and discard in a contaminated waste container e.g. an autoclave bag, for autoclaving and disposal
- All contaminated materials should be disposed of as infectious waste
- Wipe the surface with soap and water

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5. Guidelines for the safe transport of infectious substances and diagnostic specimens. (http://www.who.int/csr/resources/publications/biosafety/WHO_EMC_97_3_EN)
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Module 7

Supervision, Monitoring

And

Evaluation

Specific Learning Objectives

1. *Describe the objectives and steps in supervision of activities.*
2. *Categorize the surveillance & Monitoring activities of IDSP to be performed by officers at the State/District/Block level.*
3. *Assess the quality of surveillance system in his/her area using the monitoring indicators.*

Introduction

Managers at top level have to develop health plans based on objectives & goals; devise strategy and allocate necessary resources. Managers at the middle level are more concerned with whether they are getting desired output from the inputs that are being utilized. Managers at the operational level have to supervise actual operations and to ensure that planned activities are being carried out as per schedule. Monitoring and evaluation are the most effective tools for the managers at all level to implement any programme effectively and efficiently.

Integrated Disease Surveillance Programme is expected to improve quality of disease surveillance in the country. Various categories of personnel are being involved under the surveillance system at different level of the health care delivery points. These Health Personnel are doing data collection, collation, compilation, analysis and interpretation with feedback for appropriate timely preventive action for the control of outbreak of the disease. Therefore, health surveillance system must be continuously supervised, monitored and periodically evaluated if a high quality of surveillance has to be ensured.

Supervision:

Supervision concentrates on people. It is an art or process by which designated individual or group of individuals oversee the work of others and establish control to improve the work and as well as the workers also. Constant and supportive supervision would vastly improve the quality of the surveillance and motivate the staff to improve their performance

Monitoring:

A process of measuring, recording, collecting and analyzing data on actual implementation of the programme and communicating it to the programme managers so that any deviation from the planned operations are detected followed by diagnosis for causes of deviation is carried out and suitable corrective actions are taken. Ongoing monitoring and prompt corrective action is also imperative for the success of any surveillance Programme.

Evaluation:

It is an essential management tools which help to ensure that health activities are implemented as planned and to assess whether desired results are achieved, if not how it should be redesigned.

Importance of Supervision, Monitoring and Evaluation under IDSP.

- All surveillance activities should be constantly supervised and monitored.
- Supervision help the health staff to improve their knowledge and performance and should not be a fault-finding exercise.
- Supervisors and health professionals' work together to review progress, identify problems, decide what has caused the problem and develop feasible solutions.
- Monitoring using standard performance indicators always help the managers for ensuring proper implementation of programme.
- If the performance of surveillance does not meet the necessary standards, prompt action should be taken to improve it.
- Constant monitoring ensures that the surveillance system is effective.
- Monitoring indicators should be developed for each level.

1. Supervision under IDSP

IDSP is district-centered programme with independent control at district level. The District Surveillance Officer (DSO) thus takes primary role for Supervision, Monitoring and Evaluation of all activities at the district level. However, the Medical Officers (MO) at block level will do the supervision of all health manpower posted at each reporting unit (RU) under his jurisdiction. State Surveillance Officer (SSO) may require the periodic supervision of District Surveillance Unit staff during his / her visit to district. Similarly, CSU staff will also supervise SSU staff during their state visit.

Role of Supervisor

- Communicate and clarify major job duties, priorities, and expectations and also help people to achieve their work objectives.
- Document good and unacceptable performance. Give praise worker when it is due.
- Provide continuous coaching and constructive feedback in a timely manner and also explain the value of their work.
- Correct poor performance and reinforce good performance and also provide opportunity for personal development.

Pre-requisite for supervision under IDSP.

1. Job Descriptions: For effective supervision each category of health staff should have job descriptions (charter of duties) under surveillance. The job description should clearly describe the surveillance activity to be performed by each category

of health staff. It should also mention who the health staff reports to and also under which supervisor the staff functions.

2. Resources: The supervisory team would require resources like vehicle, fuel, funds for TA/DA etc.
3. Attitude: The supervisory team should not be a fault-finding mission, but a support to the field people so that they are able to implement their activities.
4. Supervisory check list: It helps the supervisor to do their job effectively during their supervisory visit.

Steps for supervision under IDSP.

The following are the steps for supervision:

1. Supervisory plan: A supervisory plan should be prepared and at least each reporting unit visited quarterly. Supervisory visits of the reporting units are vital to rectify any problems like shortages of reporting formats, problem encountered during filling up of the forms etc. This plan must be informed to the field staff so that they are prepared for the visit.
2. Make a supervisory checklist: A checklist is a tool for the supervision by the supervisor. This checklist helps him / her to review all the required activities to be performed under IDSP by each reporting unit. (Refer supervisory checklist at Appendix 17)
3. Review the previous supervisory visit reports: This will help the supervisor to get firsthand information about the reporting unit. It will also make him / her aware about the follow up actions taken from the previous supervisory visit.
4. Supervision visit: Whenever supervisor / supervisory team visit the reporting unit. The visit must be preplanned and the schedule of the visit must be communicated to the staff of the reporting unit. During the visit the following activities to be performed by the supervisor / supervisory team:
 - a. Explain the purpose of the supervisory visit. (Should not be fault finding way)
 - b. Observe the activities performed by the worker.
 - c. Review records.
 - d. Fill the supervisory checklist.
 - e. Enlist the gaps identified.
 - f. Discuss with the workers about the gaps.
 - g. Enlist the reason for the identified gaps (Logistics problem).
 - h. Gaps identified should be tackled on the spot if possible, or solved at a later stage.
 - i. Guide and impart on-the-job training to the worker for improved quality of activities.
 - j. Supervision register/Diary: A register must be kept at the RU. Supervisor must put his remarks highlighting major points and sign with the date of the visit.
 - k. Supervisory report: A report of the visit must be prepared and the supervisor also communicate the report to the health staff afterwards
5. Feedback: During the visit the supervisor should provide feedback to the health staff so that corrective measures can be implemented to improve the surveillance.

Both positive and negative feedback should be given so that the supervisee will be aware of his / her performance immediately. Provide feedback on:

- a. Underline achievements
- b. Mention opportunities for improvement.

2. Monitoring under IDSP

Monitoring is the means of watching the progress, achievement and standards of work of a programme. Ongoing monitoring and prompt corrective action is also imperative for the success of any health programme.

Surveillance activities to be monitored for:

- Collection and compilation of data.
- Laboratory performance.
- Analysis and interpretation of data.
- Follow-up action.
- Feedback mechanism.

Monitoring at what level and who will do it?

- IDSP is district-centered Programme with independent control at district level. The DSO thus takes primary role for Supervision and Monitoring and Evaluation of all activities at the district level.
- The Programme is owned by the State and hence the state surveillance officer has overall responsibility of the quality of data generated at each state.
- Central agencies - Central Surveillance Office, NCDC, has responsibility to guide and give feedback on quality control

Quality of Surveillance system

1. Timeliness
2. Completeness
3. Consistency

For programme purpose and to maintain uniformity, the following definitions of timeliness, completeness and consistency may be followed:

- 1) **Timeliness:** It reflects alertness of the system.

A report (from a reporting unit) is said to be on time, if it reaches the designated level within the prescribed time period. If it reaches later, then the report is considered to be of late (and of lesser public health use).

The timeliness of a reporting unit can be calculated by assessing how many of its expected reports have come on time.

- A District is said to be in-time if data from all reporting units under it is reported through IDSP portal **before Thursday of the subsequent week**.
- Hence, to ensure that the data entry in the portal gets completed by Wednesday, all reporting units must submit their completely filled surveillance form by Monday.

- DSU & SSU will be the units responsible for weekly monitoring of Timeliness of RUs in their area. Physical visit must be performed to the District/RU by the SSO/DSO which is not submitting reports >80% of the week.

Timeliness of weekly reporting (Target >80%)

Timeliness of reporting = Total number of weekly reports received on time X 100 / Total number of weekly reports expected.

Note: All identified reporting units must report, **even weekly 'Nil' reporting is important**, so as to keep a constant check and strengthen surveillance system in our country.

2) **Completeness-** Completeness in surveillance may include the following:

- Completeness of reporting units
- Completeness of case reporting

a) **Completeness of reporting units:** Refers to the proportion of RUs that submitted the IDSP form irrespective of the time when the report was submitted. It reflect coverage of the surveillance system.

Completeness of reporting units = Total number of reports received within a week X 100 / Total number of weekly reports expected.

DSU & SSU will be the units responsible for weekly monitoring of completeness of RUs in their area. Physical visit must be performed to the District/RU by the SSO/DSO which is not submitting reports as per the target provided.

b) **Completeness of case reporting:** Refers to the match between number of cases reported and the actual number of cases. Actual number of cases can be obtained from OPD registers or Lab registers of the Reporting units. It reflect data quality.

Completeness of the case reporting at the RU level (above Sub Centre) can be checked by the Medical officer In charge. MO IC is the Officer responsible for submission of correct data in the P and L form. Hence, while signing the form, MOIC must check for the following:

- Random checks for reported diseases by comparing it with OPD data
- Checking for diseases with "0" reported cases in a particular week.
- Blank data cell. (efforts should be made to fill each cell in the form)

Similarly, random checks should also be made by DSO/SSO for checking completeness of case reporting at a particular RU.

- An alert system should have timeliness and completeness approaching 100%. Also, completeness of case reporting gives an idea about the reliability of the data; for example,

if completeness of reports were only 50%, then the incidence of disease would be under reported by 50%.

3) **Consistency**– It reflects the regularity and sincerity involved in data transmission.

- A reporting unit is said to be consistent, if it has reported for at least 42 weeks in a year (or $\geq 80\%$ of weeks at any specified time period) to DSO/District Epidemiologist.
- A district is said to be consistent, if for a particular period, at least 80% of RUs have reported consistently for 80% of the week.
- A State is said to be consistent if at least 80% of the districts (having functioning RUs) report consistently for 80% of the week for that particular period.

a) **Consistency of Reporting Unit (RU) (Target >80%)**

Consistency of Reporting Units (RUs)= Number of Weekly reports submitted in a specified period x 100 / Total Number of Weeks in that Specified Period

b) **Consistency of District (Target >80%)**

Consistency of District= (Total Consistent RUs of District x 100/Total Reporting Units)

c) **Consistency of State (Target >80%)**

Consistency of State= (Total Consistent Districts of State x 100/ Total Number of Districts)

Possible interpretations

Scenario	Interpretation
District A is timely and complete	An expected scenario, everything is working well.
District B is timely, but regularly incomplete	The DSO of B understands the importance of reporting on time. But there are some reporting units under the jurisdiction of B who are not reporting on time. B's DSO has to find out what the problem is.
District C is late, but reports are complete	The DSO of C has not understood or unable to make RUs understand the importance of reporting on time. He/she is probably waiting for all the reporting units under his/her jurisdiction to report before submitting final report. Emphasis needed on timely reporting.

Demonstration exercise on Completeness, Timeliness & Consistency:
 Suppose, a District “X” has 5 P form Reporting units (A, B, C, D & E). The report submission status of the 5 RUs is given in table below.

RU – Reporting unit
 IT – In time Submission of weekly report
 L – Late Submission of weekly report
 NR – Never reported weekly report

a) Timeliness of each RU is calculated as below:

RU	Total number of weekly reports received on time	Timeliness
A	20	100%
B	8	40%
C	0	0%
D	8	40%
E	18	90%

Only, 2 RUs i.e. A & E are reporting with a timeliness of >80%.

- $$\frac{\text{Total number of weekly reports received}}{\text{Total number of weekly reports expected}} \times 100$$

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RU	Total number of weekly reports received irrespective of time (N = 20)	Completeness
A	20	100%
B	12	60%
C	0	0
D	18	90%
E	18	90%

- d) Suppose, for current year, target for completeness of reporting is 90%, what will be the Completeness of the reporting for District “X”?

The completeness of the District is calculated as:

$$\frac{\text{Total number of weekly reports received from all RUs} \times 100}{\text{Total number of weekly reports expected}}$$

$$= 68\%.$$

- e) How many RU are consistent in their reporting?

A reporting unit is said to be consistent, if it has reported $\geq 80\%$ of weeks at any specified time period. Hence, 3 RUs are consistent in their reporting i.e. A, D & E since they reported in ≥ 16 weeks during the 20 weeks.

- f) Is the District consistently reporting?

A district is said to be consistent, if for a particular period, at least 80% of RUs have reported consistently for 80% of the week.

Since, only 3 RUs i.e. A, D & E are reporting $>80\%$, the District reporting cannot be called as consistent.

“Monitoring Plan” for DSO

- Categorization of the all reporting units in three groups – Good, Average and Needs improvement, on the basis of completeness & Timeliness.
- All Officer In-charges of the RUs must be instructed to join monthly meeting for their appraisal.
- DSO may go for frequent visit to all the RUs of the category three, i.e. needs improvement. The RUs that come under second group, “average” may be visited for two times in a month. In order to maintain the frequency of visits, the Data Manager/ Epidemiologist/ other Public Health Officers may also be deployed for monitoring.
- During visit schedule for the above two groups, DSO may also visit on the way situated “Good” reporting units for encouraging.
- During the visit DSO must find out root cause for the below par performance.
- All efforts to be directed towards elimination of root cause for bellow performance.
- DSO must conduct “On the Job” training for the improvement.

Indicators for the middle and top-level managers under IDSP

Input indicators

1. Percentage of reporting units at each level with functioning computers/Blank reporting formats.
2. Percentage of staff positions filled in the reporting units
3. Percentage of staff at each level trained under IDSP.
4. Percentage of districts with functional RRTs.
5. Percentage of districts with functional DPH labs/Sanctioned DPHLs

Process Indicators

For weekly monitoring: These indicators will be reviewed every week when the data is collated and reports generated. These are as follows: -

1. Percentage of reporting units using case definitions
2. Number (%) of reporting units providing regular /timely /complete reports
3. Number (%) of private facilities providing regular/timely /complete reports.
4. Number of samples received/tested in DPHLs for ELISA/culture (as per tests mandated in IDSP)

Output Indicators

For monthly / quarterly monitoring: These indicators allow for midterm review and correction of the Programme performance, so that the surveillance system remains alert and vigilant. Some of the indicators that may be used are

1. Completeness of report for the period
2. Timeliness of report for the period
3. Consistency of the reporting system for the period.

Outcome Indicators

For annual monitoring: These indicators give an idea of the overall performance of the Programme and help the Programme manager identify gaps. Many of the indicators are similar to the monthly / quarterly ones but help by giving a long-term perspective.

1. Completeness of report for the year.
2. Timeliness of report for the year
3. Percentage of outbreaks where human samples sent for lab confirmation.
4. Percentage of outbreaks that have been lab confirmed.
5. Number of monthly meetings at CHC with surveillance staff over last 6 month.
6. Proportion of outbreaks that have been investigated within 48 hours of detection
7. Number of surveillance committee meetings held in a year

Periodicity of monitoring

All monitoring indicators should be analyzed at monthly/quarterly & annual basis. Levels at which monitoring & evaluation activities are required

Level	Functionaries	Data collection	Data Entry	Analysis	Investigation	Response	Feedback	Monitoring and Evaluation
Sub District Level	Community Informants/ASHA	+	-	-	-	+	-	-
	MPW/HAs	++	++	-	+	++	-	-
	DEO/Pharmacist/Lab Assistant	-	+++	+	-	-	-	-
	MO (PHC/CHC)	+++	±	++	++	+++	+	+++
	Private Practitioner	++	++	-	-	±	±	-
District Level	MO (Hospitals)	+++	+++	-	+	+	-	++
	Private Hospitals	+++	+	-	-	+	-	-
	MOs under Municipal Corporation	+++	+	+	++	++	-	+
	DEO	-	+++	+	-	-	-	-
	District RRT	-	-	-	+++	+++	+	-
	DSO	-	-	+++	+++	+++	+++	+++
	Municipal Health Staff	+	-	++	+++	+++	++	+
	Lab Technician (CHC/Hospital/DPHL)	+++	+	-	++	-	+	-
	District Magistrates	-	-	±	-	-	-	+
	NGOs	+++	±					
	Medical Colleges	+++	+	+	++	+	+	+
State Level	State Surveillance Unit	-	-	+++	++	++	+++	+++
National Level	NCDC/MoHFW	-	-	+	+	+	+	++

Essential prerequisite for effective functioning under IDSP

- All reporting units are functional
- Reporting units are manned with trained manpower: All the relevant health manpower related to IDSP must get trained in IDSP.
- Availability of reporting formats: DSO must ensure of availability of formats and other logistics in each reporting units.
- Reporting units supported with computer facility.
- Availability of funds for incidental charges.
- Established Communication channel.
- Established effective Supervision system.
- Analysis of reports: The monitoring reports must be analyzed in terms of correctness and completeness Ensure about the following:
 - a. Data quality issues
 - b. Data entry errors.
 - c. Missing values.
 - d. “Nil / zero” reporting
 - e. Attraction to round figures.
 - f. Bias related to lack of representativeness

- i. Case more severe.
- ii. Urban > Rural
- iii. Source not represented (Private sector, GPs)

4. Evaluation

It is a systematic way of learning from experience and using the lessons learnt to improve current activities and promote better planning by careful selection of alternatives for future action

Reasons for carrying out an Evaluation under IDSP

- To review the implementation of the IDSP programmes so as to identify problems and recommend necessary revisions of the programme.
- To assess progress towards desired goal of effective surveillance system at district / state / national level and identify reasons for gap, if any
- To contribute towards better planning for IDSP implementation.
- To document results achieved.
- Allocation of resources in current and future during implementation of programme

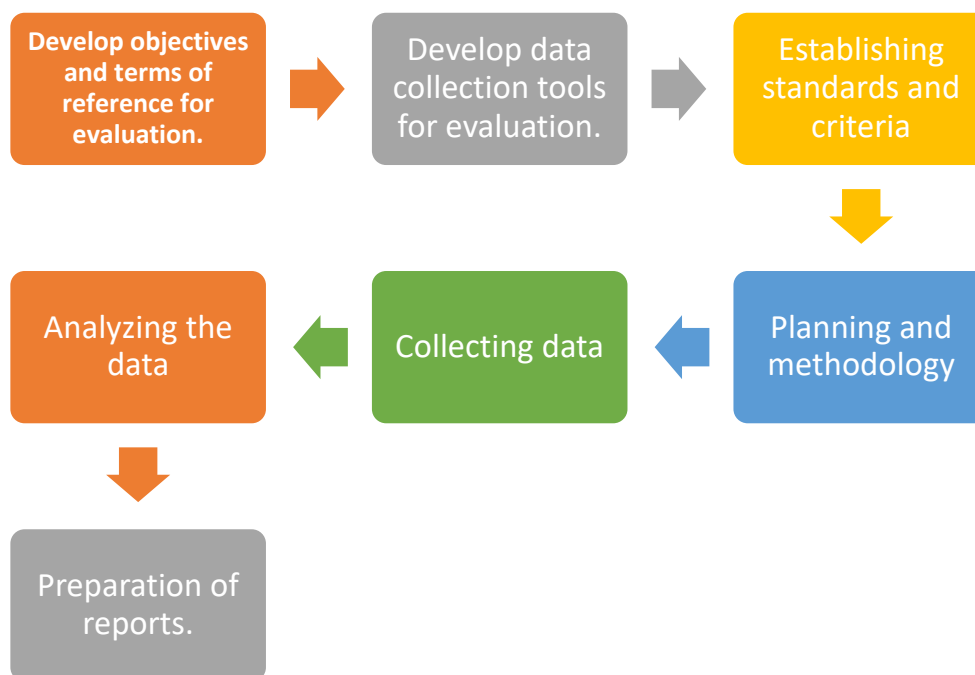
Who will do the evaluation?

Primary responsibility of the evaluation of IDSP programme lies with Central Surveillance Unit (CSU)/NCDC/MoHFW. Evaluation of a programme is conducted through National reviews, In-depth reviews, Common review missions of NHM and External/Internal evaluations

Periodicity for evaluation:

Ideally evaluation may be done once in three year. If not possible then should get done once in five year.

Basic steps of Evaluation



5. Conclusion

Good supervision helps health staff to perform their best. During supervision one must just observe and reinforce stipulated practices in surveillance. The crux of supervisory visits should be on education, coordination, motivation, facilitation and guidance with the overall objective of implementing corrective action. Monitoring is also a vital component of any surveillance Programme and would determine the efficacy and effectiveness of the surveillance mechanisms in place. The various indicators should be continuously and vigorously monitored at different levels. For overall effective implementation of the programme, periodic evaluation must be done.

6. Take home message

- Supervise regularly and supportively
- Follow Monitoring indicators.
- Look at all opportunities to improve quality of the surveillance.
- Performance indicators should be fed back to the local staff so that the quality of surveillance in areas performing poorly could be improved.

Module 8

FEEDBACK

Specific Learning Objective

1. Define feedback in the context of IDSP
2. Describe the need and importance of regular the feedback in disease surveillance
3. List the information and types of feedback submitted by
 - State Surveillance officer to District Surveillance Office
 - District Surveillance Officer to CHC /PHC
 - PHC/ CHC to community
 - CHC to Community
5. List the actions expected based on the feedback with regard to quality of data and Programme performance.

Introduction

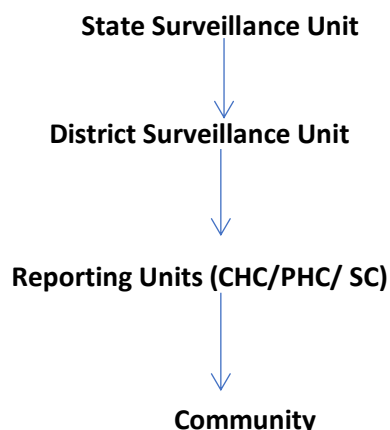
Definition: *It is a process in which the effect or output of an action is returned to modify the next action. In an organizational context, feedback is the information sent to an entity (individual or group) about its prior performance so that entity may adjust its current or future performance to achieve the desired result.*

Feedback is one of the essential components of IDSP surveillance. Surveillance by its nature is long term activity and feedback is the primary tool which helps to maintain integrity of surveillance system and validity of data. It is essential that feedback loops be in-built in the system. Without feedback the system will get demoralized as the effect of hard work is not discernible to the people who participate in collection, collation and analysis of data. Hence it is essential to improve motivation of personnel at different levels to have a high-quality surveillance programme.

Feedback occurs from higher levels where data collection is less but analysis and interpretation is more to lower level where collection of data is more.

Central Surveillance Unit





The frequency of these feedbacks will vary and is necessarily more frequent from the District Surveillance unit to the Peripheral reporting units both at private sector and public sector than from the center to state or state to district level. Feedback of information is primarily from Center to State, State to District, District to CHC/PHC and from CHC/PHC to the community. Nodal officer at each level will be responsible for providing feedback to the next level.

Need for Regular Feedback

If the data that originates from the peripheral health facility is compiled and forwarded to the next higher level, without any feedback being given to the originator, this will result in de-motivation of the reporting unit. If the feedback is not given they would not know whether the information they are providing is being utilized. This is one of the common reasons for poor quality of surveillance and can or may at times lead to unreliability, sluggishness/ falsification of data (non-reporting of suspect cases) etc. Feedback helps to inform the peripheral staff the value of the work that they have performed.

Routine Surveillance Activities involves 1). Data collection 2). Analysis 3). Response and 4). Feedback.

Feedback helps in:

- Correct reporting of information
- Timeliness of appropriate action
- Completeness of activities at all levels in surveillance system
- Increasing motivation of staff

Advantages of Effective Feedback

- **Keeps channels of communication open** – just the process of sending feedback opens up channels of communication between the various levels and is helpful in strengthening the working relationships between the levels.
- **Keeps the staff informed of the larger picture** – feedback allows the staff at peripheral levels to understand what is happening in their level and also at other levels. It also gives them an idea of their performance in comparison to other colleagues.
- **Gives them an idea of their performance** – Feedback helps the staff at the peripheral level identify their strengths and weaknesses.
- **Motivates them** – the fact that somebody is reviewing their work and sharing constructively is a great motivator for the staff.
- **Educational tool** – Feedback is an important educational tool to enhance the capacity of the staff

Feedback at all levels should be in the form of information and not as data. The presentation of this data should be easily assimilated and understandable. The best way is the formal feedback by presenting monthly graphs and charts on frequency of incidence of important diseases under surveillance. The feedback should be relevant to the groups that are performing the surveillance activity. The feedback could also include a short summary report on the implication of the data and patterns of disease over time found in the same region.

Template for Feedback

Template for the feedback

Name of the Reporting unit	
Name of the reporting officer	
Reporting period	
Name and Designation of the officer who has given the feedback	
Feedback on;	
a. Regularity Why marked as irregular? What Action required	Regular / Irregular
b. Completeness Why Marked as incomplete? What Action required	Complete / Incomplete
c. Timeliness	Maintained timeline / Not maintained

Why Marked as not maintained? What Action required	
d. Regarding response of the unit Why Marked as non-compliance? What Action required	Compliance on the action taken on previous feedback / non-compliance.
e. Validity of the data Why Marked as doubtful? What Action required	Doubtful / Beyond doubt
Name of the RU and officer who adjudged Best during the month.	
Any new information to be given to the RU	
Signature of the Officer given the feedback	

The content of the feedback should include:

- Information on the diseases under surveillance/data on the disease themselves
- Information on the quality of data that is collected

Information on the diseases under surveillance will include the following:

- Summary data tables
- Analyzed epidemiological information with regards to distribution in
 - Time (graphs with trends)
 - Place (maps)
 - Person (tables)

Information on the quality of data that is collected will include

- Regularity of reporting
- Timeliness of reporting
- Completeness of reporting
- Details of responses initiated by the unit
- Validity of data

Various Feedback Methods

Feedback may be given both formally and / or informally. The exact modality of giving formal feedback to the reporting units may be through

- Monthly review meetings
- Reports
- Newsletter
- Electronic communication
- Informal feedback

Monthly review meetings

District /Block monthly review meetings are an opportunity to give/receive feedback as the previous months' data is shared using information sheets, handout and presentation of data with explanation. Clarification and importance of various aspects of data collection can be emphasized. This also helps in peer review, as others in the district are able to share their opinion / comments. Specific good performances & those who need improvement need to be mentioned. However, Care must however be taken to concentrate on the strengths /positive aspects and not be too harsh on the weakness / negative aspects, otherwise feedback may be a demotivator. Based on the gaps identified hand holding /Supportive supervision can be undertaken.

Reports

Outbreak investigation reports (summary report) must be made available to all health personnel in the periphery so that they can remain alert to similar outbreaks from their areas also. Such reports are excellent tools for feedback and learning. Similarly, annual surveillance reports could be an important and a useful tool to inform the RU's about the disease trends and performance.

Newsletter

This may be through regular epidemiological bulletins with tables and graphs showing trends and progress towards targets and reports on the investigation and control of outbreaks on the lines of the feedback from CSUs and SSUs.

The bulletins usually contain:

- Summary tables showing the number of reported cases and deaths to date for each of the selected disease
- A commentary or message on a given disease or topic.
- The bulletin also serves as a useful educational tool to keep the doctors and other staff abreast about case definitions, disease profiles, management protocol of diseases, latest diagnostic aids available, new strategies, etc.

Electronic communication

Electronic methods of feedback can be through emails, websites, online transmissions and others. The advantages of this are speed and efficiency and action can be initiated in a short period of time.

A report (from a reporting unit) is said to be on time, if it reaches the designated level within the prescribed time period. If it reaches, later, then the report is considered to be late (and of lesser public health use). The timeliness of a reporting unit can be calculated by assessing how many of its expected reports have come on time.

A report is said to be Complete if all the reporting units within its catchments area has submitted the reports on time. If 8 out of 10 only have submitted, then the report is said to be incomplete (or 80% complete)

Informal feedback

This is a useful form of feedback especially when one has to point out the mistakes. This may be in form of oral feedback that points out what should have been done and how not to repeat the same mistake.

Feedback is essential to maintain and support the peripheral staff. Feedback report should be sent regularly once a month even when there are no outbreaks in the area. The feedback should represent trends over time in the district.

Feedback report should also be provided on the quality of data submitted to the district surveillance officer as given below

Merits and Demerits of Formal and informal methods

Formal methods

- Direct
- Can be reviewed
- Corrective action can be taken
- Can enlist cooperation
- Not to be confronting
- Be participatory and non-threatening

Informal methods

- Can understand situation
- Non-explanatory
- Can adhere to procedures
- Respect and value for information

Uses of Feedback

If regular feedback in the form of accuracy of formats, corrections if any, interpretation (if different) and also feedback about similar outbreaks from other reporting units, is received it would serve to keep the doctors in the periphery alert to the outbreak potential of particular diseases. Simple appreciation of the timeliness of reporting would energize the reporting unit to continue to report

suspected cases. It should be emphasized that feedback is to reinforce health staff efforts to continue to actively participate in the surveillance system

State Name: XXXXXXXX

Month of Feedback: June 2020

1. Quality of Reporting by the State through IDSP Portal for the Month of June

Table 1.1

Status of reporting for districts on S P& L forms: - Month June.

No. of Districts	Average Reporting			% Reporting		
	S Form	P Form	L Form	S Form	P Form	L Form
33	33	33	33	100%	100%	100%
No of Districts were same as in the Year 2020. Average reporting under SPL form districts wise in Last three years (2017-2019) in the Month of June are as given below						
33	33	33	33	100%	100%	100%

Table 1.2

Status of Reporting units for reporting on S P& L forms – Month June.

Total RUs - S Form	Total RUs P Form	Total RUs L Form	Average Reported			% Reported		
			S Form	P Form	L Form	S Form	P Form	L Form
9912	3079	2683	9687	3043	2641	98%	99%	98%
On an Average basis of the Total RUs & Districts Reporting in the Year 2017-2019 in the Month of June.								
9905	3020	2655	9520	2826	2529	96%	94%	95%

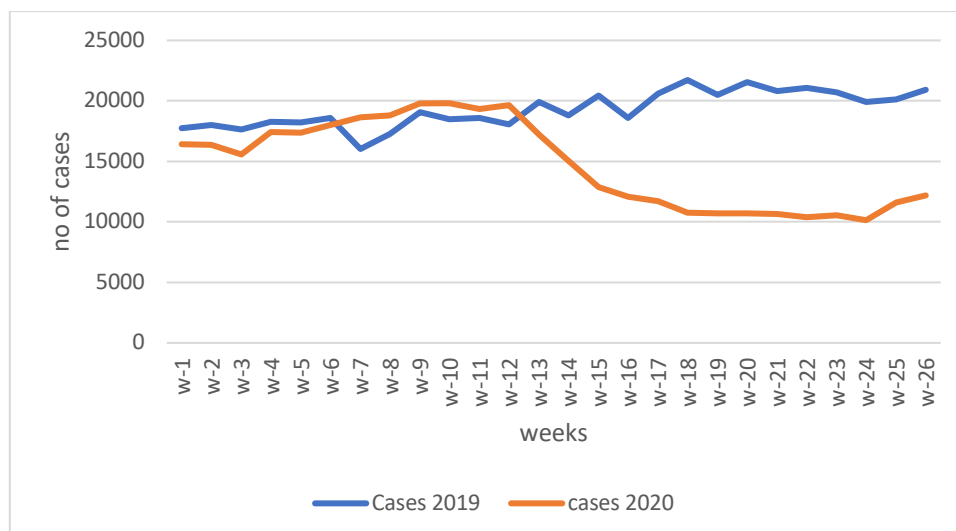
Interpretation

- State needs to ensure regular reporting of weekly surveillance data (S, P, L) by all districts and for all reporting units.
- Constant monitoring of quality of reporting will help to generate confidence in the data generated through the SPL forms, thereby helping in correct interpretation of surveillance data.

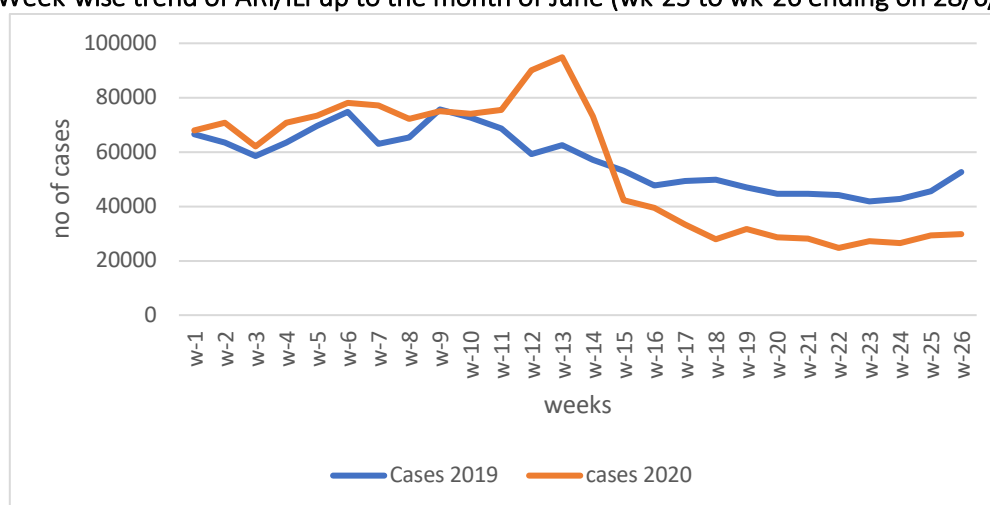
Week wise Disease Trends & Interpretation based on IDSP

Probable Cases Surveillance based on P Form data of IDSP.

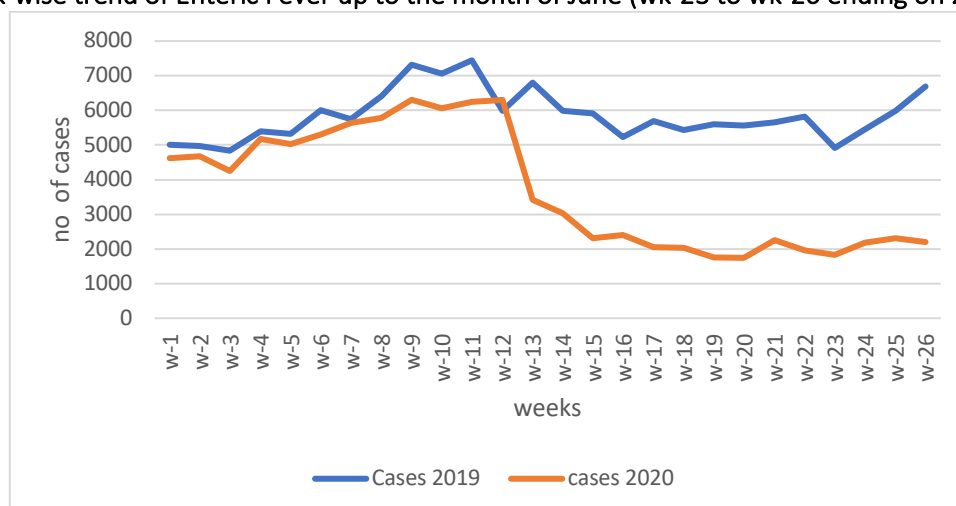
2.1 Week wise trends of ADD Diseases for the month of June (wk-23 to wk-26 ending on 28/6/2020)



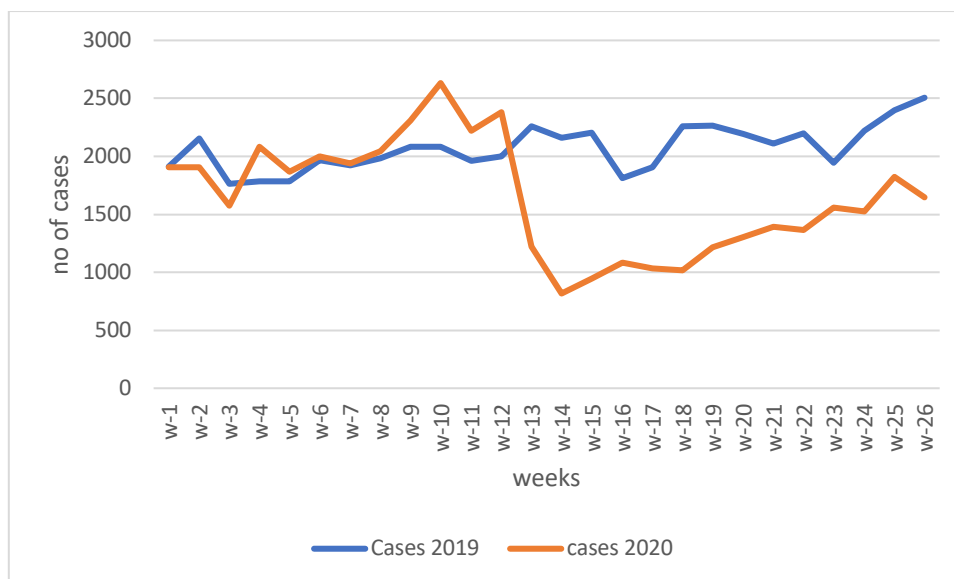
2.2 Week-wise trend of ARI/ILI up to the month of June (wk-23 to wk-26 ending on 28/6/2020)



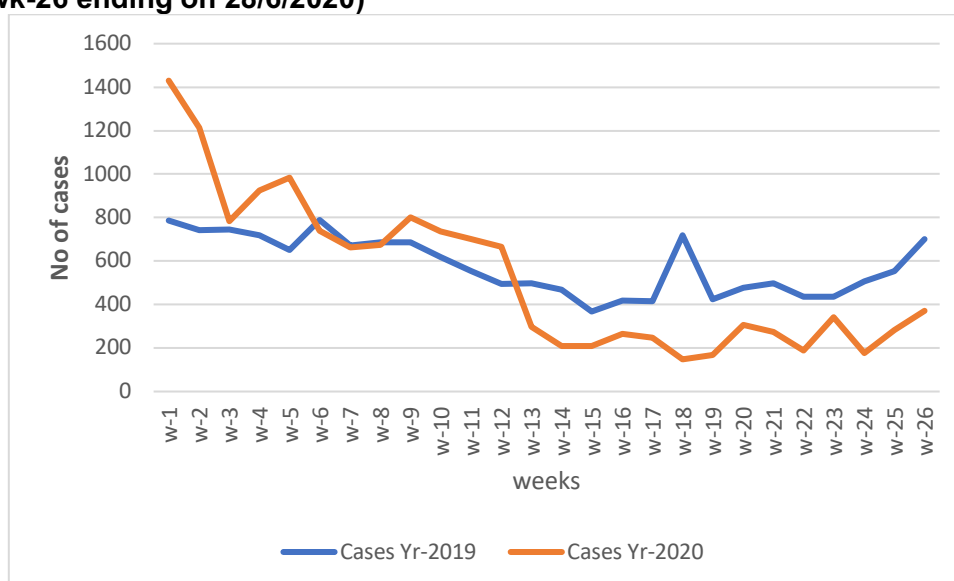
2.3 Week-wise trend of Enteric Fever up to the month of June (wk-23 to wk-26 ending on 28/6/2020)



2.4 Week-wise trend of Viral Hepatitis up to the month of June (wk-23 to wk-26 ending on 28/6/2020)



2.5 Week –wise trend of Dengue based on P form of IDSP up to the month of June - (wk-23 to wk-26 ending on 28/6/2020)



Interpretation

- Graph 2.1 of ADD is showing overall stable pattern. It is requested to take stool samples from ADD cases as and when required and send it for etiological confirmation of diarrhea.
- Graph 2.2: ARI/ILI shows an overall stable pattern. State needs to investigate the districts from where high numbers of cases are being reported.
- Graph 2.3: Enteric Fever is showing overall stable pattern. SSU and DSUs are requested to send blood culture to confirm diagnosis of enteric fever and it is reiterated that Widal test is not taken as confirmatory test for enteric fever.

- Graph 2.4: Viral Hepatitis (based on P form data of IDSP) is showing gently rising pattern with slight peaking in Week 25. This should be investigated by State for possibility of outbreak in one or more districts. Viral hepatitis is caused by a variety of viral agents with different epidemiological features therefore it is advised to collect some blood samples and send them for etiological confirmation of cause of hepatitis.
- Graph 2.5: Dengue (based on P form data of IDSP) is showing low number of cases with slight peaking in Week 23 and slight upswing thereafter. Dengue is an important Vector-Borne Disease (VBD), especially in post-Monsoon period, and State should undertake thorough surveillance for the same

Outbreak: -

State has reported following outbreaks this week: Dengue & Hepatitis. States has been requested to reports outbreaks/EWS every week. This is one of the indicators of surveillance function carried out by the District/State surveillance unit. Outbreak reported late by the state.

Conclusion:

Feedback is one of the essential components of IDSP surveillance. Surveillance by its nature is long term activity and feedback is the primary tool which helps to maintain integrity of surveillance system and validity of data. It improves the quality of the data generated and also keep the moral high of the people involved in the surveillance system. It is essential that feedback loops be in-built in the system. Without feedback the system will get demoralized as the effect of hard work is not discernible to the people who participate in collection, collation and analysis of data. Hence it is also essential to improve motivation of personnel at different levels to have a high-quality surveillance programme.

Take home message

- Feedback must be given to all RU.
- Feedback is for improvement of quality of surveillance system.
- Follow up action of the feedback must be ascertained.

Module 9

Inter-sectoral Co-ordination

Specific Learning Objectives

1. *Describe and define the institutional mechanisms already existing and those to be developed for ensuring intersectoral and intra-sectoral coordination at district/state level with respect to IDSP.*
2. *List sectors, departments and agencies operating in the district which need to work together for success of IDSP in your district/state.*
 - a. *Government*
 - i. *Health*
 - ii. *Non-Health*
 - b. *Private / NGO*
 - i. *Health*
 - ii. *Non-Health*
3. *Describe the strategies for mobilizing community participation in IDSP.*
4. *Describe activities related to data collection, consolidation, analysis and dissemination of information related to existing vertical disease control Programme at the district level to facilitate integration under IDSP.*

Inter Sectoral Coordination under IDSP

Concept

- **Coordination** means integration, synchronization or orderly patterning of group efforts towards the accomplishment of common goals. Coordination implies that all governmental and non-governmental agencies understand each other's roles, speak the same language, avoid overlap and add value to each other's work.
 - **There can be two types of coordination such as coordination within the department called intra-sector, and between the departments called inter-sector coordination.**
- **Cooperation** implies collective effort put in by a group willingly or voluntarily for accomplishing some task. The effort does not have any directional framework. It depends on people's willingness to help each other.
- **Collaboration** refers to sharing similar responsibility by a group of people or agencies based on agreements to carry out a project or programme.
- **Convergence** is a process that facilitates different functionaries and community to work together for efficient service delivery. Convergence leads to time saving, helps in

building rapport with others, reduces workload, and increases efficiency. Involvement and participation of a community is a necessary pre-requisite for convergence.

Convergence	Provision of joint delivery of services and/or governance structures or activities for achieving a common health objective/s
Integration	Refers to convergence within various components or health sector or intra-sectoral convergence in terms of organisational, administrative, and/or technical support
Coordination	An administrative process which brings unity in the purpose of achieving common objectives
Inter-sectoral Coordination	Functional linkages amongst various aspects of health and other related sectors that influence the health status

Addressing the major challenges related to Inter-sectoral Coordination

Challenges	Details	Addressing the Challenge
Lack of knowledge	• Lack of knowledge of the goals and programmes of other sectors • Each programme is implemented in isolation • Leads to repetitions, contradictions and misunderstandings	• Joint orientation at all levels • Common information sharing mechanisms • Updating everyone on any new developments
Attitudinal	• Power conflicts • Attitude for controlling major resources but very little ownership for accountability and deliverables • Lack of recognition of efforts in contributing towards the common goals • Blame game for poor achievement	• Development of clarity on the concept of coordination amongst the functionaries • Frequent participative consultations • Joint decision making • Building perspectives towards larger goals and benefits of programmes • Elements like organisational development need to be added and exercised

Practice	Poor skills to execute programmes at ground level in a concerted manner	Constitution of Advisory Committees, Coordination Committees, Task Forces and so on
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Scope of Inter sectoral coordination in IDSP

- Establish an inter-sectoral coordinating mechanism at National, State and District Level to detect early warning signals of impending outbreaks for timely and effective public health actions.
- Facilitate sharing of relevant information within stakeholders for taking appropriate actions.

Inter-sectoral coordination with other department / sectors towards IDSP.

1. Medical colleges

Medical Colleges are an integral part of the state and district health system. Districts are already mapped with medical colleges for primary laboratory support. Apart from the laboratory support, involvement of the medical colleges in the implementation of IDSP is very negligible so far. For the better implementation of IDSP involvement of medical colleges of the state is very much required.

Scope of Integration:

- Participation as member in the State and District Surveillance Committee.
- Involvement as member in the State / District Rapid Response Team for the outbreak investigation and control.
- As an expert member, mentoring District Surveillance Units (DSU) of allotted districts for effective implementation of IDSP.
- As one of the reporting unit, strengthening of reporting of diseases from their attached hospitals.
- As reference lab, help in confirmation of diagnosis of diseases during disease outbreaks.
- Ensure quality assurance of District Public Health Laboratories.
- Conduct capacity building of health care professional in IDSP.
- Provide master trainers to other identified training institutes for IDSP training.
- Research for the effective implementation of IDSP.

- Repository of documentation and literature related to IDSP
- Conduct evaluation as an external agency for IDSP

Expected Activities:

a. Institutional arrangements

- Dean / Principal of medical college may act as nodal officer.
- Nodal Officer may depute HOD Community Medicine / HOD Microbiology as deputy nodal officer to carry out the IDSP activities in the medical college.
- Department of Community Medicine, Microbiology, Pediatrics and Medicine will be the major departments in the medical college for IDSP activities.

b. Linking of Districts with Medical college for capacity building

- As per geographical location 4 – 5 nearby districts can be attached to each medical college for mentorship (the model for State Reference Lab can be replicated)
- Expert guidance in terms of collection, collation, analysis and interpretation of surveillance data, confirmation of diagnosis, trend analysis and control / preventive measure to be taken will be provided to these allotted districts whenever is required.
- Meeting once in a quarter will be held at medical college with DSOs of allotted districts.

c. State and District surveillance committee

At the inception of IDSP in 2004, State had entered into a MOU with IDSP regarding forming of state & district surveillance committee under the chairperson of Secretary Health & District Collector / District Magistrate respectively. Primary role of the committee is to oversee regular functioning & monitoring of IDSP at state and district level.

- The nodal officer or his nominee will represent medical college in such committee.
- Nodal officer will attend the zonal review and national review meeting once in a year.

d. Role in outbreak investigation.

- In the event of outbreak of disease as member of Rapid Response Team will take part in Investigation and Control of the outbreak.
- e. Act as Reporting Unit.**
- Will be responsible for the filling of “P” and “L” forms from their attached hospital.
 - Will report through Integrated Health Information Platform (IHIP).
- f. Mentoring DSU**
- Will help in analysis and interpretation of IDSP data
 - Will help in prediction of Early Warning Signal (EWS)
 - Will help in event-based surveillance.
- g. Role as reference laboratories.**
- Will provide Transport media to the lab of districts affected by outbreak
 - Will ensure confirmation of all outbreak for samples received.
- h. Quality assurance of DPHL.**
- SRL to monitor and initiate EQAS in DPHL
- i. Capacity Building of Health professional.**
- As Master trainer for State / District
 - Conduction of Epidemiologists, Microbiologists and any medical / paramedical profession training if required.
 - Minimum one topic related to the IDSP must be chosen for post-graduation research (MD) in the Community Medicine department.
 - Conduction of IHIP training.
 - Nodal officer will be responsible to orient the other faculty member of the medical college and medical professional of the allotted districts through CME.
 - CME for the Medical College faculty on IDSP will be done once in a year.

Prerequisite for the involvement of Medical College

- Must be reflected in the TOR of the National Medical Commission.

- Clear cut administrative decision from State Director of Medical Education to ensure the involvement of all major departments (Particularly Clinical).
- Provision of Data Entry Operator from State IDSP cell to the department of Community Medicine.

2. Coordination between Vaccine Preventable Disease (VPDs) surveillance & Vector Borne Diseases programme with IDSP.

Presently multiple surveillance and data systems exist in India such as CBHI (Central Bureau of Health Intelligence), IDSP and WHO supported AFP/measles surveillance systems that give information about various vaccine preventable diseases. Whereas, Vector borne diseases such as Malaria, Dengue, Chikungunya, Kala Azar & Filariasis are covered under National Vector Borne Disease Control Programme (NVBDP).

Existing system

- WHO-NPSP has successfully established AFP/measles/rubella surveillance in the country which is at par with global standards.
- The IDSP system is also generating surveillance data on VPDs & VBDs in an aggregated manner. This is an outbreak-based surveillance system and provides information about the number of cases/outbreaks occurring in a geographical unit. The system has limitations in providing data in time, place and person required for epidemiological analysis and interventions.
- Though both surveillance systems have been providing data on a regular basis but the data generated by both systems on VPDs and VBD has shown variations in the past.
- There is a need for regular meeting of all the stakeholders related to data generation.

Expected Mechanism for Coordination between Vaccine Preventable Disease (VPDs) surveillance & Vector Borne Diseases programme with IDSP

- Integration of weekly reporting data at the district level through sharing of data between both programme divisions
- Joint review meeting at district level between Immunization division, Vector borne division and IDSP officials on monthly basis.
- The information on results of lab confirmation of VPDs to be shared by Immunization division as soon as received by WHO personnel with IDSP unit at district level.

- The line listing of cases reported for diphtheria, pertussis, measles and AFP to be maintained at the facility/reporting unit reported under “P” form of IDSP and to be shared at District Surveillance Units for further compilation. Similarly, cases which have been informed to DSO directly may be intimated to District Immunization Officer or Immunization unit on a weekly basis.

Strategy

- Monthly joint review meetings of District Surveillance Unit and District Immunization Unit/District VBD unit at the District level so that the same information can be disseminated at each level.
- District Surveillance Officer to share the outbreak information with the immunization division/VBD division for joint investigation as soon as he receives the information which enables timely investigation of the cases.
- NPSP to share the confirmed laboratory reports of VPD samples sent for investigation with District Immunization Officer as well as District Surveillance Officer.

3. Animal Husbandry

Major public health zoonotic disease in India are Rabies, Brucellosis, Toxoplasmosis, Cysticercosis, Echinococcosis, JE, Plague, Leptospirosis, Scrub typhus, Nipah, Trypanosomiasis, Crimean Congo Hemorrhagic fever (CCHF) and Kyasanur Forest Disease (KFD). Around 75% of emerging and re-emerging infections are zoonotic. New pathogens (viruses) continue to emerge and spread across countries. For effective prevention and control of zoonotic diseases there is requirement of multi-sectoral integrated response among medical, veterinary and other related departments, highlighting the necessity for a One Health approach.

Mechanism of Integration between IDSP and Animal Husbandry department for Prevention and Control of Zoonosis.

- Animal Husbandry department may be encouraged to participate in the state surveillance committee meeting regularly.

- Regular data collection on priority/state specific Zoonosis to understand the trends/burden of Zoonosis in the state and sharing among IDSP and Animal Husbandry at State/ District level preferably on weekly basis.
- Strengthening of Existing Rapid Response Teams (RRTs) under State/District health and Animal Husbandry departments by incorporating both Public Health and Veterinary specialists in respective RRTs. Outbreak investigations of zoonotic diseases will be carried out jointly for effective prevention and control.
- Advisory/training to Rapid Response Teams (RRTs) regarding Zoonosis in order to improve the technical knowledge to tackle any emergency.
- Verification of alerts on suspected disease reported by Block Veterinary Officer. Coordination for sample collection, laboratory testing and lab test result delivery.
- Based on alert to provide preventive measures and advisory on disease control to the surrounding area of the outbreak occurrence place.
- Alerts to neighboring districts/states on outbreak.
- Share minimum data points particularly related to Anthrax and Rabies with IDSP and vice-versa.
- Establishment of linkages to utilize their facilities for prompt laboratory testing of outbreak samples at Veterinary Colleges/State & Central Government Institutions/Disease Diagnostic Laboratories.
- Veterinary lab may also test human sample for brucellosis in coordination with IDSP cell in the event of occurrence of disease in the animal.
- To conduct a Quarterly Review Meeting between Stake Holders at the State Level, for Prevention and Control of Zoonotic Diseases.

Expected outcome

- Unified information dissemination to all the stakeholders.
- Generation of Early Warning Signals, joint investigations, prevention & control of zoonotic diseases in both humans & animals.

At NCDC, a specific program “Inter-Sectoral coordination for Prevention and Control of Zoonotic Diseases” aims to operationalize “One Health” Mechanisms through strengthening of Intersectoral Coordination among all stakeholders at the National, State, and District and below district level.

4. Private sector.

More than 70% of primary health care delivery in our country is by private health providers (Private Practitioners- PPs) of traditional or modern medicine. Valid and timely information on disease patterns can be collected only if they are integrated into the Disease Surveillance Programme. It is logistically difficult to include all PPs and maintain the quality of data collection. The district surveillance officer will be responsible for integrating PPs in each district. The selection criteria will be:

- Private Nursing home / hospital with minimum 50 beds in the ward / IPD.
- Private lab / diagnostic center having sufficient load as identified by the CMOH / DSO
- Willingness to participate in the programme.
- Previous experience with collaboration on health program with the Public Health System will be given priority.

Mechanism for coordination.

- A. Recruitment of Private Practitioners by enlisting by DSO in consultation with CMOH.
- B. Approaching the private practitioner through professional bodies like IMA, IAP, API, etc.
- C. Organizing surveillance workshops for private organization at state and district levels to disseminate objectives, methods and outcome of proposed IDSP.
- D. Establishing direct dialogue with potential private bodies.
- E. Those who have access to computers may access the Web database of the IDSP and hence get regular reports on disease patterns. This will also allow them to see who has reported what diseases in the last quarter.
- F. Motivating participation through incentives such as
 1. Inclusion of name in the network directory.
 2. Certificate of recognition and participation.
 3. Opportunity may be given to good performer among Private bodies to participate in Regional and National IDSP review meeting.
 4. Good performer may be highlighted in the quarterly bulletins on health status of the region published by District Surveillance Officer
- G. If the particular unit is not a RU, then list of disease to be reported and contact details of the person to whom to be reported must be kept in the unit.

H. One CME for 1 to 2 hrs. on IDSP should be mandatory for all the private practitioners. This could be arranged through Indian Medical Association (IMA) local bodies.

Expected Output:

- Regular reporting in ‘P’ form from the identified private hospital.
- Regular reporting in ‘L’ form from identified private laboratories.
- Reporting in “S” and “P” form from the field during camp approach.
- Maintaining “consistency and timeliness” in the reporting.
- Participation during “CME” meeting in their district.
- Provide assistance during outbreak.

AYUSH Department:

AYUSH (Ayurveda, Yoga, Unani, Siddha and Homoeopathy) is the part of indigenous system of Medicine. Under National Health Mission, mainstreaming of AYUSH is one of the core components of Indian Health Care Delivery System. Within this component every peripheral health care unit will be manned from the AYUSH department and also, they will provide medicine related to their stream. In this context, it is essential to include them under IDSP network.

Steps to be followed for involvement of AYUSH

- Training of AYUSH personnel on IDSP
- Supply of Logistics (S & P) forms
- Monitoring and supervision of reporting Under IDSP
- Feedback for quality improvement.
- Encourage to participate IDSP coordination meeting.

Social mobilization and community participation:

Disease surveillance cannot be sustained unless the community stakeholders support the data collection and the health system recognizes them as true partners. Therefore, a well-planned social mobilization strategy will have to be put in place to obtain valid and reliable data with high sensitivity.

Involvement of community:

In areas where health workers enjoy a good relationship with their communities, people come forward and volunteer the desired information. Several health workers are in regular contact with village elders’ particularly ladies, Pradhan, panchayat members, chowkidar and other community members as well as informal health care providers who tell them about the occurrence of diseases. In addition, the community consistently expected to get feedback about the activities and data collected by health workers. The community members, press, and local leadership often give information about outbreaks. There are rumor registers kept in PHCs and

sub-centers. Thus, community is already contributing significantly in the current efforts of disease surveillance and detection of outbreaks.

Advantages of social mobilization campaign:

- Greater achievement at lower costs due to convergence of resources
- Hastens the process of further development
- Develops a sense of ownership and hence responsibility of health care services
- Facilitates self-reliance through the use of local indigenous expertise
- Results in sustainability of efforts.
- Urban population staying in high-rise buildings do not wish to utilize public health services and therefore are non-cooperative even for surveillance activities. Effective social mobilization may address these issues.

The other sectors that can be included and specify their responsibility in tabular form

- Water sanitation
- Food department
- WCD
- FSSAI
- Forest
- Pollution control
- Education department

Stakeholder who can be involved

All those individuals and organizations that operate as an interface between the health system and the community will be identified as community stakeholders. The stakeholders will be involved proactively during the planning and implementation phase of IDSP. To meet these objectives, the stakeholders will be made members of the district surveillance and block surveillance committee. The proposed list of stakeholders: -

(a) Rural areas: Panchayat and its members; school teachers; community-based organizations e.g. mahila mandals and youth clubs; NGOs working in health areas; elected representatives from the area.

(b) Urban areas Municipal councilors; representatives of professional bodies e.g. IAP, IMA, API; NGOs; chemists' organization; leading private practitioners and owners of hospitals / nursing homes; Residents' committee of housing complexes etc.

Aims of Social Mobilization:

- To create awareness among the partners regarding potential benefits of IDSP.
- To establish an institutional mechanism to involve community and their leaders
- To develop a system of providing regular feedback to the community about disease occurrence, the responses to surveillance and outbreak follow-ups for prevention of future similar outbreaks.

Conclusion:

Coordination among various department is an essential necessity for proper management. Need of the hour is to capture occurrence of each disease under IDSP through an effective surveillance system. Therefore, inter-sector coordination between all the stakeholders in terms reporting of diseases is one of the essential components of IDSP surveillance. The major departments in this regard are Medical College, Vaccine Preventable Disease programme division, Vector born Disease programme division, Animal Husbandry, AYUSH and Private Practitioners. Each department required specific terms of reference (TOR) for the coordination with IDSP.

Take home message

- Inter-Sector Coordination is an effective tool for management of IDSP.
- Ensure list of departments for the coordination.
- Department wise specific TOR for the coordination with IDSP must be prepared.
- Exercise Supervision, monitoring and feedback to each department during reporting of diseases under IDSP.

Module 10

Implementing International Health Regulations (IHR) in India

Specific Learning Objectives

- *Understand need and importance of IHR in the Global and National context.*
- *Able to use annexure 2 of IHR to perform risk assessment for potential PHEICs*

Background

The International Health Regulations were first adopted by the World Health Assembly (WHA) in 1969, amended in 1973 and again in 1981. With its focus on just three diseases (cholera, plague and yellow fever), the IHR (1969) were not equipped to address the growing and varied public health risks that resulted from increased travel & trade, along with the emergence, re-emergence and international spread of disease and other threats in the last quarter of the 20th century. The WHA called for a substantial revision in 1995, accelerated by SARS outbreak of 2003 the **revision** extended the scope of diseases and related health events covered by the IHR to consider all public health risks (**biological, chemical, radiological and nuclear**) that might affect human health, irrespective of the source. The revised regulations (2005) entered into force on 15th June 2007.

While disease outbreaks and other acute public health risks are often unpredictable and require a range of responses, the International Health Regulations (2005) (IHR) provide an overarching legal framework that defines countries' rights and obligations in handling public health events and emergencies that have the potential to cross borders. Presently, 196-member states of the World Health Organization (WHO) are obligated to follow these regulations. The core of IHR is based on the maximization of public health security by strengthening national public health infrastructure and connection to global alert and response system.

Need for IHR

The emergence of globalization in the recent decades has resulted in increased cross-border travel and trade among countries. This has also brought in the risk of rapid spread of new pathogens and the re-emergence of infectious diseases. The International Health Regulations counters these threats through the formation of National Focal Point in each Member State.

Purpose and Scope of IHR

The revision of IHR in 2005 led focus on the purpose "to prevent, protect against, control and provide a public health response to the international spread of disease in ways that are commensurate with and restricted to public health risks and which avoid unnecessary interference with international traffic and trade" as stated by the WHO.

Major changes were seen in IHR (2005) version which led to the broadening of the scope of these regulations:

- a) not limited to any specific disease or manner of transmission, but covering “illness or medical condition, irrespective of origin or source, that presents or could present significant harm to humans”
- b) State Party obligations to develop certain minimum core public health capacities.
- c) Obligations on States Parties to notify WHO of events that may constitute a public health emergency of international concern according to defined criteria
- d) provisions authorizing WHO to take into consideration unofficial reports of public health events and to obtain verification from States Parties concerning such events
- e) procedures for the determination by the Director-General of a “public health emergency of international concern” and issuance of corresponding temporary recommendations, after considering the views of an Emergency Committee
- f) protection of the human rights of persons and travelers; and
- g) the establishment of National IHR Focal Points and WHO IHR Contact Points for urgent communications between States Parties and WHO.

The revised regulations introduced the concept of a “public health emergency of international concern (PHEIC).” According to the IHR (2005) this refers to an extraordinary public health event which is determined, under specific procedures: (a) to constitute a public health risk to other States (countries) through the international spread of disease; and (b) to potentially require a coordinated international response. Under IHR, member countries have broader obligations to assess and build national capacity for surveillance and response in the event of a PHEIC and to share information about such emergencies. The regulations include a code of conduct for notification to WHO and response that has been initiated, and any assistance that may be required from International bodies. After adoption of the revised IHR in June 2007, all member countries were required to develop and implement a minimum of core public health capacities by June 2012, to ensure compliance with the IHR (2005).

One of the requirements for compliance with the regulations under IHR is the establishment of National Focal Point (NFP) responsible for organizing, coordinating, and communicating work of IHR implementation. NFP is a national centre, not individual persons, that occupy a critical role in conducting the communications aspects of the IHR, within the country and internationally.

IHR implementation in India

As per IHR 2005, the state parties have an obligation to:

- notify PHEIC to WHO
- To respond to requests for verification of information of such events.
- Support field investigations, provide early diagnosis and provide technical guidance to states for timely and effective response to PHEIC
- Co-ordination with state units and WHO



National Centre for Disease Control (NCDC), Delhi was designated the NFP for IHR implementation by Govt. of India in 2007. The functions of NFP include:

- Coordination and communication with WHO and states/districts
- Designation of nodal officers at state level
- Enhanced disease surveillance through Integrated Disease Surveillance Programme (IDSP)
- Strengthening laboratory network across the country
- Stakeholder meetings to review the progress of IHR implementation at all levels
- Interaction with nodal agencies for a coordinated response to public health event(s).
- Core capacity building in IHR through state surveillance officers
- Increased awareness about IHR among health administrators and professionals
- Surveillance & response capacity (rapid response teams)
- Entry screening at designated airports followed by community surveillance through IDSP

(H1N1, Ebola, Zika, Covid19 PHEIC)

Effective Implementation, however, requires support and shouldering of responsibilities across many ministries, sectors, and governmental levels.

India has shown its commitment towards IHR (2005) by adhering to regulations related to notification, verification, information [Article 6-12 of IHR 2005] etc. whenever requested by WHO/ countries NFP under various circumstances complying to the guidelines issued by WHO during various PHEICs e.g. H1N1, Ebola, Zika viral disease and ongoing Covid19 pandemic. NFP-IHR India has been instrumental in regular day to day surveillance, coordination with various stakeholders of IHR and regular strengthening of various core capacities for effective Health security during emergencies. It requires multi sectoral co-ordination involving various nodal ministries / departments [Figure 1]. Core capacity requirements for surveillance and response (Assessment, notification and public health response) are given in Annex 1A of the IHR 2005 document.

Figure 1: Core capacities and respective nodal ministries / departments.

National Legislation and Financing	• MoHFW, MoEF&CC, BARC, DADF(MoA), NDMA, EMR, ICMR
IHR Strategic Coordination	• NCDC
Zoonotic Events and Human-Animal Interface	• IDSP (NCDC), DADF (Animal Husbandry), Laboratory Division (NCDC)
Food Safety	• FSSAI & IDSP (NCDC)
Laboratory	• Laboratory Division of NCDC for Public Health Labs, ICMR for Research Labs
Surveillance	• Integrated Disease Surveillance Program
Human Resources	• MoHFW (Lab & IDSP(NCDC), IH(PH), ICMR, BARC, MoEF&CC, DADF)
Emergency Preparedness for Response	• Emergency Medical Relief (EMR) Division & National Disaster Management Authority (NDMA)
Resilient Health Services	• National Health Mission
Risk Communication	• IEC Division, MoHFW, NCDC
Points of Entry	• IH Division, DGHS
Chemical Events	• Hazardous Substance Management Division, MoEF&CC
Radiation Emergencies	• BARC (DAE)

ANNEX 1 - IHR

CORE CAPACITY REQUIREMENTS FOR SURVEILLANCE AND RESPONSE

1. States Parties shall utilize existing national structures and resources to meet their core capacity requirements under these Regulations, including about:
 - a. their surveillance, reporting, notification, verification, response and collaboration activities; and
2. At the local community level and/or primary public health response level

The capacities:

- a. to detect events involving disease or death above expected levels for the time and place in all areas within the territory of the State Party; and
 - b. to report all available essential information immediately to the appropriate level of healthcare response. At the community level, reporting shall be to local community health-care institutions or the appropriate health personnel. At the primary public health response level, reporting shall be to the intermediate or national response level, depending on organizational structures. For the purposes of this Annex, essential information includes the following: clinical descriptions, laboratory results, sources and type of risk, numbers of human cases and deaths, conditions affecting the spread of the disease and the health measures employed; and
 - c. to implement preliminary control measures immediately.
3. At the intermediate public health response levels

The capacities:

- a. to confirm the status of reported events and to support or implement additional control measures; and
 - b. to assess reported events immediately and, if found urgent, to report all essential information to the national level. For the purposes of this Annex, the criteria for urgent events include serious public health impact and/or unusual or unexpected nature with high potential for spread.
4. At the national level:

Assessment and notification. The capacities:

- a. to assess all reports of urgent events within 48 hours; and
- b. to notify WHO immediately through the National IHR Focal Point when the assessment indicates the event is notifiable.

Public health response. The capacities:

- a. to determine rapidly the control measures required to prevent domestic and international spread;
- b. to provide support through specialized staff, laboratory analysis of samples (domestically or through collaborating centres) and logistical assistance (e.g. equipment, supplies and transport);
- c. to provide on-site assistance as required to supplement local investigations;

- d. to provide a direct operational link with senior health and other officials to approve rapidly and implement containment and control measures;
- e. to provide direct liaison with other relevant government ministries;
- f. to provide, by the most efficient means of communication available, links with hospitals, clinics, airports, ports, ground crossings, laboratories and other key operational areas for the dissemination of information and recommendations received from WHO regarding events in the State Party's own territory and in the territories of other States Parties;
- g. to establish, operate and maintain a national public health emergency response plan, including the creation of multidisciplinary/multisectoral teams to respond to events that may constitute a public health emergency of international concern; and
- h. to provide the foregoing on a 24-hour basis.

Risk Assessment for Public Health Emergency of International Concern (Annex 2 – Decision instrument)

The Annex 2 of IHR provides a decision instrument which helps in the assessment and evaluations of public health events. This instrument not only helps in categorizing an event as PHEIC but also acts as a single code for procedures and practices to be followed during public health events by all the Member States. Furthermore, the decision instrument also enables the Member States to assess the situation and notify WHO through NFP in a timely manner in case a PHEIC occurs. The decision instrument depicted in Figure 2 is mainly based on four questions which are as follows:

- **Is the public health impact of the event serious?**
- **Is the event unusual or unexpected?**
- **Is there a significant risk of international spread?**
- **Is there a risk for international trade restrictions?**

A yes to any of the two questions leads to the classification of the event into public health emergency of international concern.

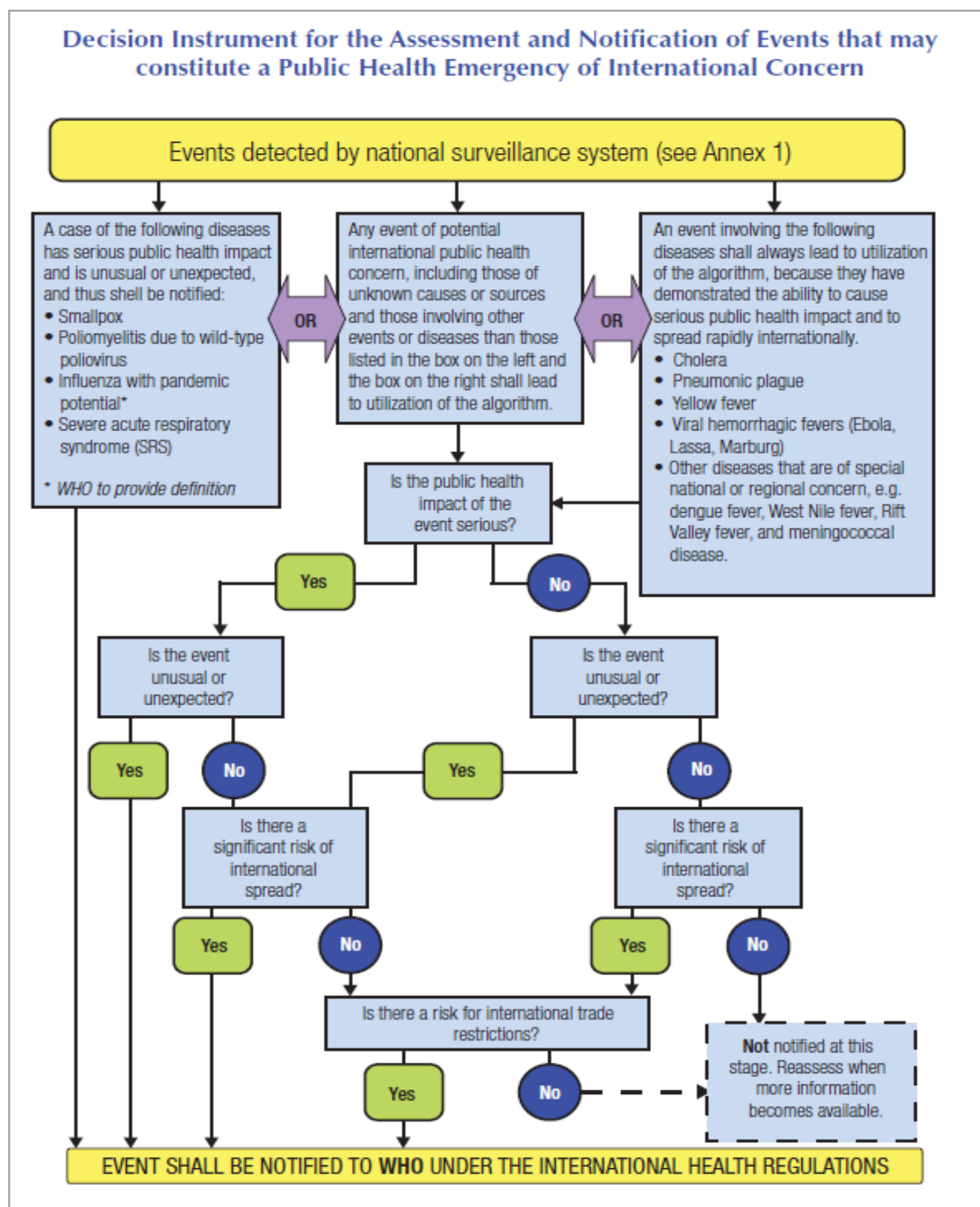


Figure 2: Decision instrument for the public health emergency of international concern

EXAMPLES FOR THE APPLICATION OF THE DECISION INSTRUMENT FOR THE ASSESSMENT AND NOTIFICATION OF EVENTS THAT MAY CONSTITUTE A PUBLIC HEALTH EMERGENCY OF INTERNATIONAL CONCERN

The examples appearing in this Annex are not binding and are for indicative guidance purposes to assist in the interpretation of the decision instrument criteria.

DOES THE EVENT MEET AT LEAST TWO OF THE FOLLOWING CRITERIA?

I. Is the public health impact of the event serious?

1. *Is the number of cases and/ or number of deaths for this type of event large for the given place, time or population?*
2. *Has the event the potential to have a high public health impact?*

THE FOLLOWING ARE EXAMPLES OF CIRCUMSTANCES THAT CONTRIBUTE TO HIGH PUBLIC HEALTH IMPACT:

- ✓ Event caused by a pathogen with high potential to cause epidemic (infectiousness of the agent, high case fatality, multiple transmission routes or healthy carrier).
- ✓ Indication of treatment failure (new or emerging antibiotic resistance, vaccine failure, antidote resistance or failure).
- ✓ Event represents a significant public health risk even if no or very few human cases have yet been identified.
- ✓ Cases reported among health staff.
- ✓ The population at risk is especially vulnerable (refugees, low level of immunization, children, elderly, low immunity, undernourished.).
- ✓ Concomitant factors that may hinder or delay the public health response (natural catastrophes, armed conflicts, unfavorable weather conditions, multiple foci in the State Party)
- ✓ Event in an area with high population density.
- ✓ Spread of toxic, infectious or otherwise hazardous materials that may be occurring naturally or otherwise that has contaminated or has the potential to contaminate

population and/or a large geographical area.

3. *Is external assistance needed to detect, investigate, respond and control the current event, or prevent new cases?*

THE FOLLOWING ARE EXAMPLES OF WHEN ASSISTANCE MAY BE REQUIRED:

- Inadequate human, financial, material or technical resources — in particular:
- insufficient laboratory or epidemiological capacity to investigate the event (equipment, personnel, financial resources);
- insufficient antidotes, drugs and/or vaccine and/or protective equipment, decontamination equipment, or supportive equipment to cover estimated needs;
- existing surveillance system is inadequate to detect new cases in a timely manner.

IS THE PUBLIC HEALTH IMPACT OF THE EVENT SERIOUS?

Answer “yes” if you have answered “yes” to questions 1, 2 or 3 above.

II. Is the event unusual or unexpected?

4. *Is the event unusual?*

THE FOLLOWING ARE EXAMPLES OF UNUSUAL EVENTS:

- ✓ The event is caused by an unknown agent or the source, vehicle, route of transmission is unusual or unknown.
- ✓ Evolution of cases more severe than expected (including morbidity or case-fatality) or with unusual symptoms.
- ✓ Occurrence of the event itself unusual for the area, season or population.

5. *Is the event unexpected from a public health perspective?*

THE FOLLOWING ARE EXAMPLES OF UNEXPECTED EVENTS:

- ✓ Event caused by a disease/agent that had already been eliminated or eradicated from the State Party or not previously reported.

IS THE EVENT UNUSUAL OR UNEXPECTED?

Answer “yes” if you have answered “yes” to questions 4 or 5 above.

III. Is there a significant risk of international spread?

6. *Is there evidence of an epidemiological link to similar events in other States?*
7. *Is there any factor that should alert us to the potential for cross border movement of the agent, vehicle or host?*

THE FOLLOWING ARE EXAMPLES OF CIRCUMSTANCES THAT MAY PREDISPOSE TO INTERNATIONAL SPREAD:

- ✓ Where there is evidence of local spread, an index case (or other linked cases) with a history within the previous month of:
 - participation in an international gathering (pilgrimage, sports event, conference, with international etc.);
 - close contact with an international traveller or a highly mobile population.
- ✓ Event caused by an environmental contamination that has the potential to spread across international borders.
- ✓ Event in an area of intense international traffic with limited capacity for sanitary control or environmental detection or decontamination.

IS THERE A SIGNIFICANT RISK OF INTERNATIONAL SPREAD?

Answer “yes” if you have answered “yes” to questions 6 or 7 above.

IV. Is there a significant risk of international travel or trade restrictions?

8. *Have similar events in the past resulted in international restriction on trade and/or travel?*
9. *Is the source suspected or known to be a food product, water or any other goods that might be contaminated that has been exported/imported to/from other States?*
10. *Has the event occurred in association with an international gathering or in an area of intense international tourism?*
11. *Has the event caused requests for more information by foreign officials or international media?*

IS THERE A SIGNIFICANT RISK OF INTERNATIONAL TRADE OR TRAVEL RESTRICTIONS?

Answer “yes” if you have answered “yes” to questions 8, 9, 10 or 11 above.

States Parties that answer “yes” to the question whether the event meets any two of the four **criteria** (I-IV) above, shall notify WHO under Article 6 of the International Health Regulations.

Appendix 18 - Scenarios for Risk Assessment using PHEIC Decision Instrument

The following scenarios illustrate the application of decision model to identify a PHEIC:

Scenario 1

You received a report from the National Influenza Centre regarding a case of human infection with swine-origin triple reassortant Influenza A(H3N2). According to the report, a 16-year-old male became ill with fever, headache, cough, rhinorrhoea, sore throat, body aches and lethargy. The patient was seen by an outpatient care provider, where he tested positive for influenza A by rapid test. He did not require hospitalization and has since fully recovered. As part of a routine surveillance program, the clinical specimen was sent to the National Influenza Centre for further testing. The National Influenza Centre determined yesterday that the virus was a novel swine-origin influenza A(H3N2)v virus. Humans are periodically infected with zoonotic influenza viruses from swine. Public health officials conducted an initial investigation which showed that the adolescent boy had exposure to pigs three days before illness onset. Illness among family members or close contacts was not reported.

► Now, please use Annex 2 to assess this event and answer each of the 5 following questions, taking into account the context of the scenario.

	Yes	No	Don't know
1. Is the public health impact of the event serious?	☐	☐	☐
2. Is the event unusual or unexpected?	☐	☐	☐
3. Is there a significant risk of international spread?	☐	☐	☐
4. Is there a significant risk of international travel or trade restrictions?	☐	☐	☐
5. Does this event need to be notified to WHO under Article 6 of the IHR (2005)?	☐	☐	☐

Scenario 2

You are informed by a national surveillance officer about the detection of 15 cases of haemorrhagic fever during the last two weeks, including 7 deaths of which 2 were health care workers who attended the patients. The country is periodically affected by outbreaks of haemorrhagic fever. A team of infectious disease epidemiologists is currently in the field for investigation. Blood samples have been received by the National Laboratory and found negative for Yellow Fever, Dengue Fever, Crimean-Congo Haemorrhagic Fever (CCHF) and Rift Valley Fever. Otherwise, no unusual deaths or disease in animals have been reported from the affected district.

► Now, please use Annex 2 to assess this event and answer each of the 5 following questions, taking into account the context of the scenario.	Yes	No	Don't know
1. Is the public health impact of the event serious?	☐	☐	☐
2. Is the event unusual or unexpected?	☐	☐	☐
3. Is there a significant risk of international spread?	☐	☐	☐
4. Is there a significant risk of international travel or trade restrictions?	☐	☐	☐
5. Does this event need to be notified to WHO under Article 6 of the IHR (2005)?	☐	☐	☐

Scenario 3

Two hundred persons are reported to have been killed and a further 800 people have sought medical assistance following a chemical plant explosion. The site of the disaster is at the edge of a town of 230,000 inhabitants located in a densely populated region. As a consequence of the accident, more than 150 tons of a mix of organic solvents, including toluene, benzene and xylene were released into a fast-flowing major river. The solvents can cause neurological effects as well as damage to the liver and kidneys. Benzene is a known human carcinogen. The river is used for recreational purposes (e.g. boating, swimming and fishing). It is also a main source of drinking water for a city in a neighbouring country 20 km downstream from the site of the event. Water extraction points downstream of the chemical release show benzene and xylene levels in the polluted water exceeding the national safety standards 20 times. Reliable meteorological forecasts are not available for the next days.

► Now, please use Annex 2 to assess this event and answer each of the 5 following questions, taking into account the context of the scenario.	Yes	No	Don't know
1. Is the public health impact of the event serious?	☐	☐	☐
2. Is the event unusual or unexpected?	☐	☐	☐
3. Is there a significant risk of international spread?	☐	☐	☐
4. Is there a significant risk of international travel or trade restrictions?	☐	☐	☐
5. Does this event need to be notified to WHO under Article 6 of the IHR (2005)?	☐	☐	☐

The examples appearing in this Annex are not binding and are for indicative guidance purposes to assist in the interpretation of the decision instrument criteria.

Take home messages:

- India is a signatory to IHR and is obliged to develop certain minimum core public health capacities
- For surveillance core capacity: Country should be able to
 - Detect events above expected levels for the time and place
 - Assess reported events immediately within 48 hours & report all available essential information immediately to the appropriate level of healthcare response.

- Put in place the control measures required to prevent domestic and international spread rapidly.
- Use Annex 2 of IHR in the assessment and evaluations of public health events.

Module 11

FINANCE

&

PROGRAMME

IMPLEMENTATION

PLANS

Specific Learning Objectives

- *Understand the process of preparing PIPs*
- *Enlist budget heads under IDSP*
- *Understand flow of funds under NHM*

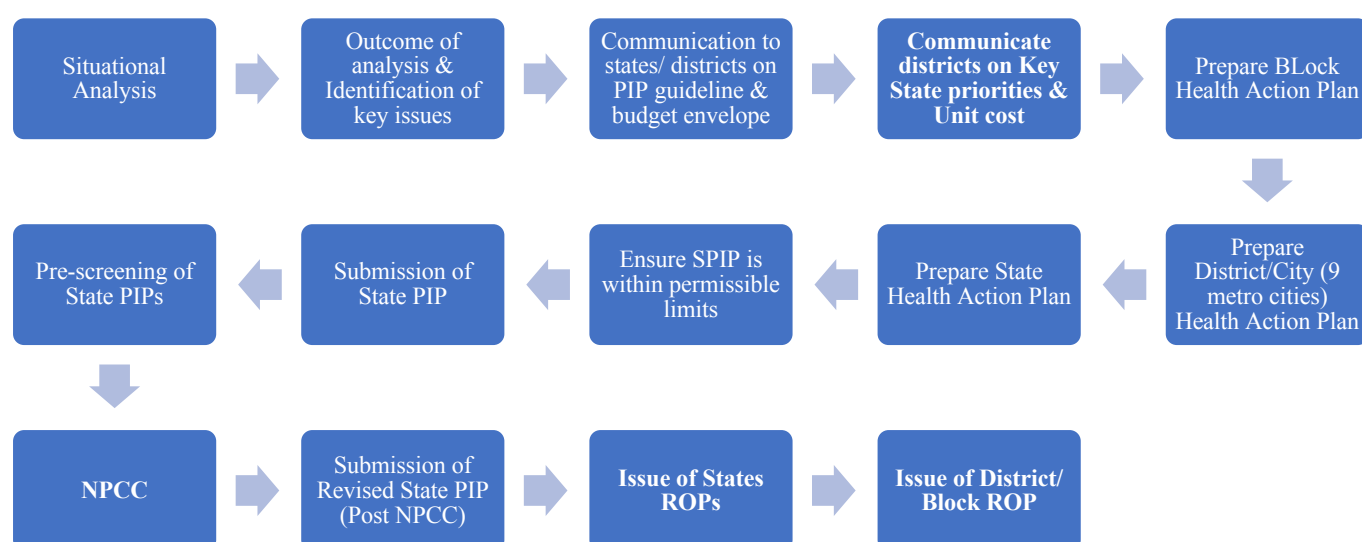
Programme implementation plans

Program Implementation Plans (PIPs) are the most crucial activity in NHM through which the States/UTs plan, prioritize and propose strategies and activities to address the challenges in public health. Ideally the PIP should reflect the followings:

- Should ideally be part of the Annual State Health Plan (not only NHM)
- Aggregate of the District/ City Health Action Plans
- Should consider different sources of fund available to the state, e.g. District Mineral Fund, fund from Ministry of Tribal Affairs, fund from development partners, CSR fund etc.
- Should take into consideration the actual need of the state based on disease burden, epidemiological transition, available resources etc.

Based on the PIP submitted by the states/ UTs, and available resource envelope, the discussions are carried out in National Program Co-ordination Committee (NPCC) meeting. Accordingly, the PIPs are appraised by the respective programme divisions and approvals are accorded through the Record of Proceedings (RoP).

NHM Planning and Budgeting Process:



Source: NHSRC HRH/ HPIP Division

The format for PIPs is revised every year based on new strategies or programmes added under NHM. Irrespective of the changes in the budgeting format (which is only a means of conveying the budget demand to GOI), the PIP for IDSP should provide the following details:

- a. A detailed situation analysis of the state for IDSP including district realities and requirements
- b. Key priorities, objectives and target of the state/ UT under IDSP. The objectives and target set by the state can be short (within a year), medium (2-3 years) or long-term (3-5 years) which the state/ UT intend to achieve. These may be depicted in phases.
- c. Key challenges
- d. Strategies to be adopted by the state/ UT for meeting the state priorities
- e. Activities along with budget break-up in the budget format shared by GOI. The activities planned by the state/ UT should be in line with the priorities and strategies to be adopted by the state
- f. Output for the planned financial year

The PIP prepared by the states/ UTs should be such that it focuses more on output of the programme to be achieved by the end of financial year rather than input.

Parts of PIP

The PIP is divided into the following five pools and under each pool, the following programmes are covered:

1. NRHM + RCH/RMNCH+A (including Immunization) flexipool
 - a. **RCH Flexipool** includes
 - i. **RMNCH+ A** - Reproductive, Maternal, Neonatal, Child & Adolescent Health.
 - ii. **Immunization**- Routine Immunization & Pulse Polio Immunization.
 - b. **Health System Strengthening** – Infrastructure, Human Resources, ASHAs, Mobile Medical Units, Referral Transport, Drugs, equipment & Diagnostics, Biomedical Equipment Management, Quality Assurance Untied funds to RKS, CPHC etc.
 - c. National Iodine Deficiency Disorders Control Programme (NIDDCP)
2. NUHM flexipool: This includes **Health System strengthening** as above, for primary health care in urban areas with focus on health needs of urban poor
3. Flexible pool for Communicable disease
 - a. Revised National TB Control Prog (**RNTCP**)
 - b. National Vector Borne Disease Control Prog (**NVBDCP**)
 - c. National Leprosy Elimination Prog (**NLEP**)
 - d. Integrated Disease Surveillance Programme (**IDSP**)
 - e. National Viral Hepatitis Control Programme (**NVHCP**)
4. Flexible pool for Non communicable disease including Injury and Trauma

- a. National Prog. For Prevention & Control of Cancer, Diabetes, Cardiovascular Diseases & Stroke **(NPCDCS)**
 - b. National Program for Control of Blindness and Vision Impairment **(NPCB+VI)**
 - c. National Mental Health Prog. **(NMHP)**
 - d. National Tobacco Control Prog. **(NTCP)**
 - e. National Prog. for Health Care of Elderly **(NPHCE)**
 - f. National Programme for Prevention & Control of Deafness **(NPPCD)**
 - g. National Oral Health Programme **(NOHP)**
 - h. National programme for Prevention and Management of Burn & Injuries
 - i. National Programme for Palliative care **(NPPC)**
 - j. National Programme for prevention and Control of Fluorosis **(NPPCF)**
 - k. National Program for Climate Change and Human Health **(NPCCHH)**
 - l. Pradhan Mantri National Dialysis Programme **(PMNDP)**
5. Infrastructure Maintenance: This primarily goes towards salary of HR and institutions under Family Welfare Programme. The actual release depends on the audited accounts of Infrastructure Maintenance as MoHFW reimburses the amount spent under this pool.

The state can shift funds from one head to another head subject to the maximum limit of approvals. If there is fund crunch in a particular pool, temporary loan can be taken from other pools, wherever the funds are available.

The funding pattern between Centre and State/UTs with legislature is 60:40; except for the eight North Eastern States and two hilly States (Uttarakhand and Himachal Pradesh) where 90:10 would apply. For UTs without legislature, it would be 100% funded by NHM.

Total Resource Envelope (RE): Central share + State share + Unspent balance (only uncommitted)

The main PIP is made for the RE for that financial year, whereas the supplementary PIPs are for the unspent uncommitted balance available with the states/ UTs.

The approvals are generally given up to 25% above the resource envelope. While this does not lead to increase in resource envelope of the State, this is to help the States to fully utilize their resource envelope and enhances flexibility. Hence while the floor is set by the GoI share, within the approval limits, State is free to propose activities on areas which it considers more important.

Out of the total RE of the state/ UT, 80% is assuredly available to carry out the activities approved in the PIP; whereas the remaining 20% budget depends on state's performance on conditionalities agreed

in the NPCC. The conditionalities give an opportunity to the states/ UTs to earn up to 120% of the RE based on their performance.

Overall Budget Ceilings:

- ❖ Capacity Building: Up to 5% of RE
- ❖ Programme Management and M&E: 14% for NE States and UTs and 9% of RE for remaining States
- ❖ Innovation: 10% of RE
- ❖ Infrastructure: 33% of RE for the EAG states and 25% of RE for remaining states and UTs

Budgeting for IDSP Programme

The annual plan for IDSP prepared by the States and UTs must take into consideration the following components and budgeting principles:

Major Activities	Available Budget heads under NHM	Heads/ Type	Planning and Budgeting Principles
Establishment of integrated surveillance units, strengthening of Public Health Laboratories and ensuring routine surveillance	Establishment of DSU in newly formed districts	Establishment cost for Surveillance Unit	Fund to be proposed for establishment of DSUs in newly formed District. Pre-requisite – Already approved District Health Society. Budget to be calculated for computers and IT equipment (printer, web camera microphone etc.)
	Non-recurring costs on account of equipment for District Public Health Labs requiring strengthening	Procurement	One time approval for strengthening microbiology labs at District hospitals@ not more than 17.9 Lakhs after state has done a gap analysis. Also, DPLs to upgrade as DPHL and propose under this head for
	Procurement of any other equipment at DPHL	Procurement	

Major Activities	Available Budget heads under NHM	Heads/ Type	Planning and Budgeting Principles
			deficiencies as seen in the Gap analysis.
	Maintenance of equipment/ AMC cost of equipment at DPHL	Recurring cost for equipment maintenance	Ideally all equipment AMC cost should be covered under Biomedical equipment maintenance Programme (BEMP) under NHM. Only if the BEMP is not functional in the State, fund to be proposed here.
	Recurring costs on account of Consumables, kits, communication, misc. expenses etc. at each district public health lab (applicable only for functional labs having requisite manpower)	Recurring cost for surveillance activities	To be proposed for functional DPHLs in the state based on the workload. Maximum amount of Rs 4 lakhs may be approved.
	Referral Network of laboratories (Govt. Medical College labs) Reimbursement based payment for laboratory tests (to be calculated for already approved labs in previous PIPs of States for corresponding next years)	Recurring cost for surveillance activities	Not more than Rs 3,00,000/-per referral lab per annum

Major Activities	Available Budget heads under NHM	Heads/ Type	Planning and Budgeting Principles
	Expenses on account of consumables, operating expenses, office expenses, transport of samples, miscellaneous etc.	Recurring cost for surveillance activities	Not more than Rs 2,00,000/-per referral lab per annum
	Printing of forms and registers		As per NHM norms
	Operational cost for surveillance activities in the Infectious Disease hospitals		State may propose fund for IDH. Fund to not exceed Rs 3,00,000/- per annum for following purpose: • Office expenses, broadband expenses. • DEO salary
Availability of Human Resource at the surveillance units	State Surveillance Unit • State Surveillance Officer (Joint Director level regular officer of State health services) • Consultant Epidemiologist • Consultant Microbiologist • Consultant Veterinary • Consultant entomologist • Consultant Finance • Consultant Training	Programme Management Human Resource	All HR including HR for programme management have been brought together under Health Systems Approach. While planning for HR, consider the available health workforce from regular cadre and NHM or any other state specific contractual positions, especially

Major Activities	Available Budget heads under NHM	Heads/ Type	Planning and Budgeting Principles
	- Data Manager - Lump sum budget for Data Entry Operation		for posts wherein similar functions are performed by staff under different programme such as finance, data entry, training etc. Responsibilities including recruitment and management of all HR under NHM should ideally be done by the HR Cell in the states/ UTs. The programme division must inform the HR cell regarding the vacancies on time to time basis to ensure availability. The monthly remuneration of HR under NHM to be as per qualification, experience and tasks performed, irrespective of the nomenclature provided in different programme guidelines. State/ UTs to follow NHM
	District Surveillance Unit - District Surveillance Officer - District Epidemiologist - Data Manager - Lump sum budget for Data entry Operation at Government Medical college to assist them in reporting		
HR at District Public Health Lab (DPHL)	- Microbiologist - Lab Technician - Lab Assistant/Lab Attendant	Service Delivery - Human Resource	

Major Activities	Available Budget heads under NHM	Heads/ Type	Planning and Budgeting Principles
			norms for deciding/ increasing the remuneration of NHM staff.
Programme Management: Reporting and data analysis	Activities to be budgeted under programme management includes: • Meetings • Mobility cost including POL • Hiring of vehicle for outbreak investigations, Supervisory & Monitoring visits. • Transport of Laboratory samples during outbreaks to Lab other than referral Labs. • Office expenses such as expenses related to telephone, fax, Broadband Expenses & Other Miscellaneous Expenditures • Maintenance and repair of office equipment such as IT related equipment • Procurement of office equipment such as computer for PMU	Programme Management Activities	The maximum limit available for programme management cost (including HR for programme management) is 14% for smaller NE states and UTs and 9% for remaining states. Total not to exceed Rs 5,00,000 per district per annum and Rs 7,00,000 per State HQ/SSU per annum. The programme division should try to limit the overall expenditure under programme management within 9%/ 14%.
Training of staff	Training of: • Medical Officers: 1 day • Medical College Doctors: 1 day • CME for Medical Colleges: 1 day	Training	State level trainings to be planned and budgeted by the states/ UTs.

Major Activities	Available Budget heads under NHM	Heads/ Type	Planning and Budgeting Principles
	• Hospital Pharmacists/ Nurses: 1 day • District RRT: 2 days • Lab. Technicians: 3 days • Data Managers: 2days • Date Entry Operators cum Accountant: 2 days • ASHA & MPWs, AWW and Community volunteers: 1 day • Block Health Team including Block Programme Manager: 1 day • IDSP-IHIP Trainings – ○ State level trainings for DSU staff/Medical colleges/RRT member – 2 days hands-on training/1 day re-orientation training. ○ District level training for Block Medical officers/ANMs/ASHA/MPHW/MPHS/LT/Pharmacist/any other - 1 days hands-on training/ half day re-orientation training.		The State may decide about the type of training as per need assessment and the number of batches that could be trained in one year. Trainings under IDSP are generally conducted for 20 participants per batch and the budget may be calculated as per State NHM guidelines. State may also plan for any other training on IDSP as per need and budget it under NHM IDSP – IHIP Trainings – to be conducted for a batch of 40 participants. Pre-requisite: Training should be conducted in a computer lab with a functional internet connection.

Major Activities	Available Budget heads under NHM	Heads/ Type	Planning and Budgeting Principles
Inter-sectoral coordination	One day sensitization for PRIs	Community level interventions	For sensitizing the PRIs on reporting of suspected outbreaks & long term follow-up of ongoing outbreaks

To ensure timely release of fund from GoI level, the states and UTs must ensure timely submission of Statement of Expenditure (SoE).

Approved State wise and year wise approved RoPs (record of proceedings) can be obtained from www.nhm.gov.in

Take home messages:

- IDSP budgeting is done under umbrella of NHM
- State should plan, prioritize and propose strategies and activities to improve the functioning of IDSP.

Module12

SPECIAL

SURVEILLANCE

Specific Learning Objectives

- *Implement & operationalize surveillance during disaster/PHEICs/Mass gatherings.*

Introduction

In an emergency situation with health related consequences, the availability of accurate and near real time information assumes special significance as it becomes crucial for planning and execution of appropriate public health response. The situation is even more complex in disaster settings where the existing public health mechanism for surveillance may be adversely affected thereby restricting the critical information flow.

Public Health Emergencies of International Concern (PHEIC) such as Influenza A/(H1N1) pdm2009, Ebola Virus Disease (EVD), Zika Virus Disease (ZVD) and most recently COVID-19 have stressed the need for a robust, flexible and scalable disease surveillance mechanism that is able to cater to the disease surveillance needs of emerging diseases.

Similarly, India witnesses large number of natural disasters and mass gatherings throughout the year. Surveillance of communicable disease is of utmost importance post disaster (such as earthquake, floods) and during mass gatherings (Kumbh mela, Amarnath Yatra) where conditions are suitable for occurrence of outbreak.

Need for Special Surveillance System than the routine surveillance system:

1. Standardized & timely: The time frame for data collection, periodicity, the data entry officials, and specified data elements differ from the routine IDSP surveillance system.
2. Coordinated: Involvement of multiple agencies requiring coordinated efforts for control and management.
3. Interoperability: Situation overwhelms the capacity of State/Central IDSP unit to tackle it efficiently and needs support from other departments.
4. Avoid duplication of efforts
5. Improves effective communication

Setting up of a Control room (Public Health Emergency Operations Centre/EOC) for Special surveillance:

Special Surveillance scenarios require mobilisation of Human resource, logistics in the affected are and issuance of technical & administrative guidelines and formats in a short duration of time. Similarly, timely reports from the area regarding affected population, health care facilities etc are needed to multiple agencies for e.g. health, revenue, police etc for gaining insight into the magnitude of the problem. For the proper management of various administrative and technical aspects, a control room is set up at State and District level to coordinate the surveillance and response.

A Public Health Emergency Operations Center (PHEOC) is a physical location for the coordination of **information** and **resources** to support incident management activities.

Goal: To provide single point contact facility for emergency management of Public Health emergencies.

Objectives:

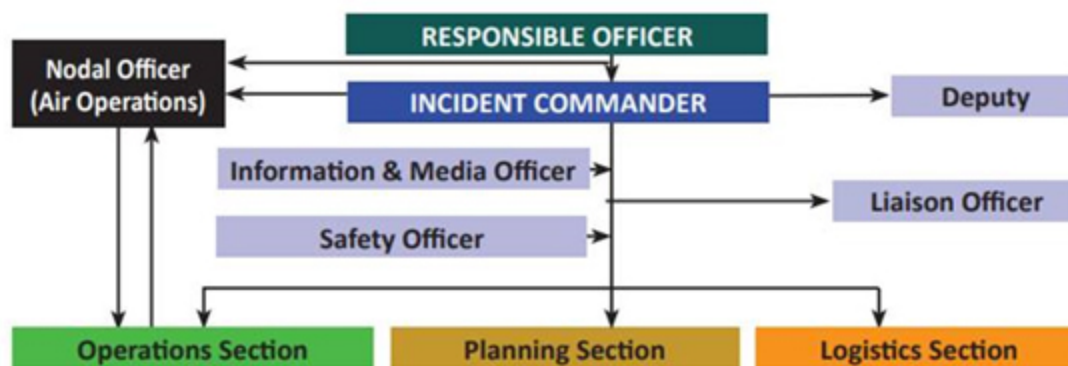
1. Act as a command Centre to manage disease outbreaks, public health emergencies or any disaster situation.
2. Strengthening disease surveillance & response using the latest information & communication technology

Incident Response System (IRS):

The Incident Response System (IRS) is an effective mechanism for reducing ad-hoc measures in response. It envisages a composite team with various Sections to attend to all the possible response requirements. The IRS designates officers to perform various duties and get them trained in their respective roles. It also emphasizes the need for proper documentation of various activities for better planning, accountability and analysis. This will greatly help in reducing chaos and confusion during the response phase. *Everyone will know what needs to be done, who will do it and who is in command.*

IRS Organization

The broad organization of IRS is as under:



In line with our administrative structure and DM Act 2005, Responsible Officers (ROs) have been designated at the State and District level as overall in charge of the incident response management. The Responsible Officer may delegate responsibilities to the Incident Commander (IC), who in turn will manage the incident through Incident Response Teams (IRTs).

The Operations Section helps to prepare and execute different tactical operations required in response to the disaster. The Planning Section helps in obtaining information and preparing plans as required. The Logistics Section assesses the availability and requirement of resources and acts for obtaining them.

*Further reading: National Disaster Management Guidelines – Incident Response System

Online Courses: Incident Management System (Tier 1) <https://openwho.org/courses/incident-management-system>

Incident Management System (Tier 2): Working in WHO's Incident Management System <https://openwho.org/courses/incident-management-system-tier2>

Surveillance in post disaster settings

Post any natural Disaster, there are possibilities of health related events both of immediate and gradual nature. Most immediate ones are related to trauma, burns, drowning etc., but gradually health events of infectious nature and epidemic prone diseases start increasing.

Why do we need special surveillance post disaster:

- Under routine circumstances, these health events may be easily detected and managed, but during post disaster situation routine services (communication, roads, water supply and electricity) are thrown into disarray.

- Health care facilities are damaged leading to disruption in routine health care services like immunization.
- Post disaster, relief camps are set up in and around the area till the situation normalizes. Hence provision of basic public health care like safe water, sanitation and preventive and curative services is essential.
- Establishment of routine surveillance system with special focus on infectious disease prone to emerge and spread after disaster is utmost necessary. For e.g., cases of leptospirosis have been observed to rise after floods due to mixing of cattle & rat urine with water coming in contact with people.

Table A.3.1: Syndromes and Diseases that may be covered in post-disaster settings

Syndromes		Presumptive diagnoses	
1	Loose watery stool	1	Acute diarrheal disease
2	Loose stool with visible blood	2	Cholera
3	Fever	3	Dysentery
4	Fever with bleeding	4	Malaria
5	Fever with rash	5	Dengue
6	Fever with cough	6	Chikungunya
7	Fever with semi-consciousness/confusion	7	Acute Haemorrhagic Fever
8	Fever with neck stiffness	8	Measles
9	Difficulty in breathing and wheezing	9	Chickenpox
10	Jaundice (< 4 weeks)	10	ARI
11	Isolated redness of eyes with or without discharge	11	Acute encephalitis syndrome
12	Open wounds and bruises	12	Meningitis
13	Fracture	13	Acute Asthma
14	Burns	14	Acute Hepatitis
15	Animal Bites	15	Leptospirosis
16	Drowning	16	Conjunctivitis
18	Other (to be specified depending on the unusual syndrome/event)	17	Open wounds and bruises
		18	Fracture
		19	Burns
		20	Snake bites
		21	Dog bite
		22	Drowning
		24	Other (to be specified depending on the unusual syndrome/event)

*These are not exhaustive or compulsory list. State may add or remove the disease for

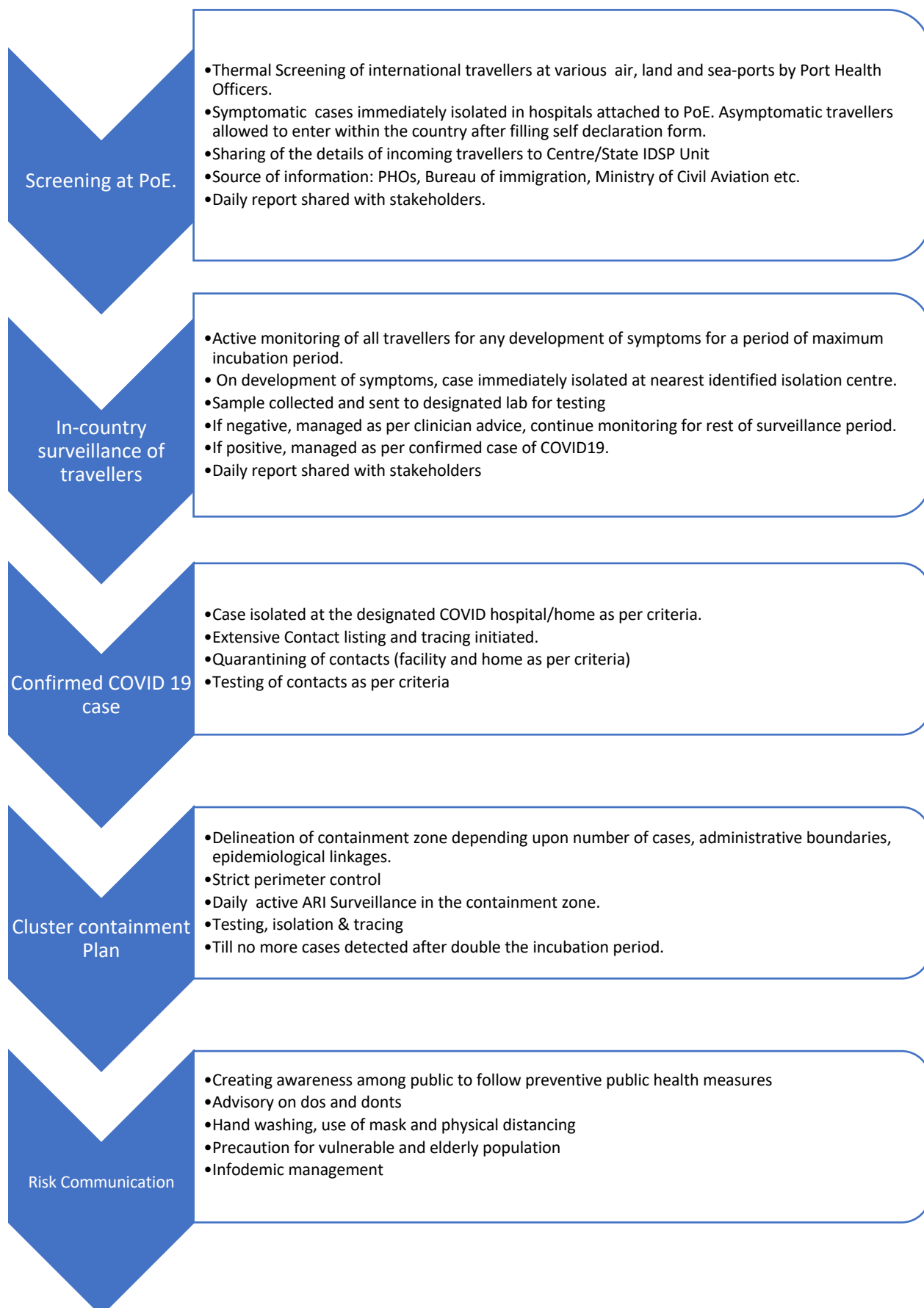
surveillance based on their risk assessment/priority/emergency setting.

Surveillance for potential public health emergencies

A potential public health emergency (PHE) may arise due to a new/emerging pathogen either outside the country or within country. The existing routine surveillance system should be geared to pick up the early warning signs for the early detection of PHE

- Setting up of surveillance at Point of entry &Community for people arriving from affected nations, as per norms provided by the Government.
- Strengthening of syndromic& Lab surveillance within the country.
- Capturing case-based morbidity and mortality data of PHE within the country **on daily basis.**
- Sharing of data & information in the prescribed formats designed as per the emergency.
- Data analysis & feedback pertinent to evolving situation so as to formulate action plans.
- Coordination & collaboration with the relevant sectors for surveillance.

For e.g. Special Surveillance for COVID 19: -



Surveillance for mass gatherings

The Special Surveillance Committee recommends the following syndromes/diseases to be included in the surveillance for mass gatherings

Table A.3.4: Syndromes and Diseases to be covered in surveillance for mass gatherings

Syndromes		Presumptive diagnoses	
1	Loose watery stool	1	Acute diarrheal disease
		2	Cholera
		3	Food poisoning
2	Loose stool with visible blood	4	Dysentery
3	Fever	5	Malaria
		6	Dengue
		7	Chikungunya
4	Fever with bleeding	8	Acute Haemorrhagic Fever
5	Fever with rash	9	Measles
		10	Chickenpox
6	Fever with cough	11	ARI
7	Fever with semi-consciousness/confusion	12	Acute encephalitis syndrome
8	Fever with neck stiffness	13	Meningitis
9	Difficulty in breathing and wheezing	14	Acute Asthma
10	Jaundice (< 4 weeks)	15	Acute Hepatitis
		16	Leptospirosis
11	Other (to be specified depending on the unusual syndrome/event)	17	Open wounds and bruises
		18	Fracture
		19	Burns
		20	Drowning
		21	Other (to be specified depending on the unusual syndrome/event)

***These are not exhaustive or compulsory list. State may add or remove the disease for surveillance based on their risk assessment/priority/emergency setting.**

Further reading: V Aggarwal. Disease Surveillance during a Large Religious Mass Gathering in India – The Prayagraj Kumbh 2019 Experience. International Journal of Infectious Diseases. September

23, 2020

Surveillance for Heat wave

Disease surveillance for heat wave is conducted under a separate programme National Programme on climate change and human health.

Data collection and analysis

During Special surveillance scenarios, efforts will be made to capture morbidity and mortality data of various disease conditions likely to be encountered in such scenarios on **daily basis**. The routine weekly IDSP reporting will continue as usual during activation of post-disaster surveillance module.

The data would be entered by field workers - ANMs and ASHAs for syndromic surveillance on daily basis. Additional data inputs may have to be gathered from temporary camps/shelters. The medical officers in health facilities (PHCs, CHCs and District Hospitals) in the affected area would provide data input on presumptive surveillance on daily basis. Line listing would be required for reported deaths capturing name, age, sex, residence, suspect/probable diagnosis.

The aggregate data, wherever collected, would undergo simple descriptive analysis on daily basis represented either in absolute numbers (cases and deaths) and wherever possible in terms of morbidity and mortality indicators. The analysed data will be area specific for the affected village, block, and districts.

Take home messages:

- Every surveillance system should be able to adapt to the prevailing situation.
- Special surveillance provides the health system flexibility to continue surveillance uninterrupted during emergency situations.

Appendix - 5

Exercise – 1

4. There is a measles outbreak in your District. Form a District RRT for outbreak investigation.
5. Who will be the members of District RRT, in case of an outbreak of Vector borne disease origin for eg Dengue.
6. The District has requested State to investigate an outbreak of fever with haemorrhagic symptoms. Form a State RRT for this unknown etiology outbreak on the lines of DRRT.

Appendix - 6

Form S
Reporting Format for Syndromic Surveillance
(To be filled by Health Worker, Village Volunteer, Non-formal Practitioners)

[illegible]

Date: _____ Signature _____

FORM P
(Weekly Reporting Format –IDSP)

Name of Reporting Institution:		I.D. No.:	
State:	District:	Block/Town/City:	
Officer-In-Charge	Name:	Signature:	
IDSP Reporting Week:-	Start Date:-	End Date:-	Date of Reporting:-
	__/__/__	__/__/__	__/__/__

S.no	Diseases/Syndromes	No. of cases
1	Acute Diarrhoeal Disease (Including acute gastroenteritis)	
2	Bacillary Dysentery	
3	Viral Hepatitis	
4	Enteric Fever	
5	Malaria	
6	Dengue / DHF / DSS	
7	Chikungunya	
8	Acute Encephalitis Syndrome	
9	Meningitis	
10	Measles	
11	Diphtheria	
12	Pertussis	
13	Chicken Pox	
14	Fever of Unknown Origin (PUO)	
15	Acute Respiratory Infection (ARI) / Influenza Like Illness (ILI)	
16	Pneumonia	
17	Leptospirosis	
18	Acute Flaccid Paralysis < 15 Years of Age	
19	Dog bite	
20	Snake bite	
21	Any other State Specific Disease (Specify)	
22	Unusual Syndromes NOT Captured Above (Specify clinical diagnoses)	
Total New OPD attendance (Not to be filled up when data collected for Indoor cases)		
Action taken in brief if unusual increase noticed in cases/deaths for any of the above diseases		

FORM L
(Weekly Reporting Format – IDSP)

Name of the Laboratory:		Institution:	
State:	District:	Block/Town/City:	
Officer-in-Charge:	Name:	Signature:	
IDSP Reporting Week:-	Start Date:-	End Date:-	Date of Reporting:-
	___/___/___	___/___/___	___/___/___

Diseases	No. Samples Tested	No. found Positive	
Dengue / DHF / DSS			
Chikungunya			
JE			
Meningococcal Meningitis			
Typhoid Fever			
Diphtheria			
Cholera			
Shigella Dysentery			
Viral Hepatitis A			
Viral Hepatitis E			
Leptospirosis			
Malaria		PV:	PF:
Other (Specify)			
Other (Specify)			

Line List of Positive Cases (Except Malaria cases):

[illegible]

Appendix - 7

Sample Tally sheet for P form

The Tally sheet is to be completed daily by the paramedical staff (nurses, pharmacist or record technician etc) for recording the IDSP diseases in the health facility. Record the week in the space provided. Record a tick mark for each infectious disease condition reported by clinician and indicate under the relevant rows as per the list of IDSP diseases. At the end of work, add tick marks and update the record. Place a new copy of the tally sheet for use every week.

Date: to Week no. -

S. No.	IDSP Disease	No. of cases in the week							Total
		Mon	Tues	Wed	Thurs	Fri	Sat	Sun	
1.	Acute Diarrheal Disease (including acute gastroenteritis)								
2.	Bacillary Dysentery								
3.	Viral Hepatitis								
4.	Enteric fever								
5.	Malaria								
6.	Dengue/DHF/DSS								
7.	Chikungunya								
8.	Acute encephalitis syndrome								
9.	Measles								
10.	Meningitis								
11.	Diphtheria								
12.	Pertussis								
13.	Chickenpox								
14.	Fever of unknown origin (PUO)								
15.	Acute Respiratory Infection (ARI)/ Influenza like illnesses (ILI)								
16.	Pneumonia								
17.	Leptospirosis								
18.	Acute Flaccid Paralysis <15 yrs of age								
19.	Dog bite								
20.	Snake bite								
21.	Other								

Appendix – 8

Case Definitions of P and L form (refer supplementary material) or IDSP website:

www.idsp.nic.in

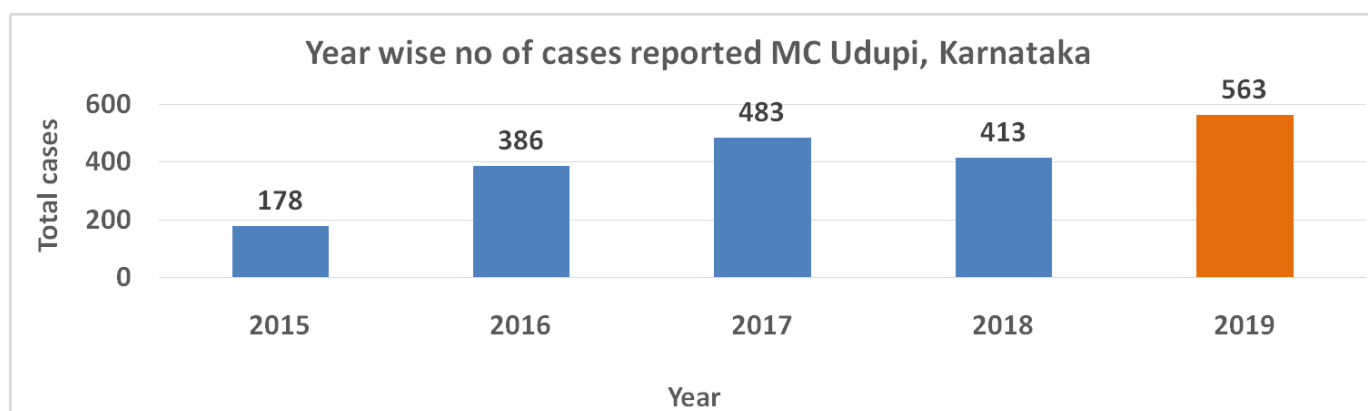
Appendix – 9

Exercise – 1: Weekly Leptospirosis data of Udupi District, Karnataka is provided below for five years.

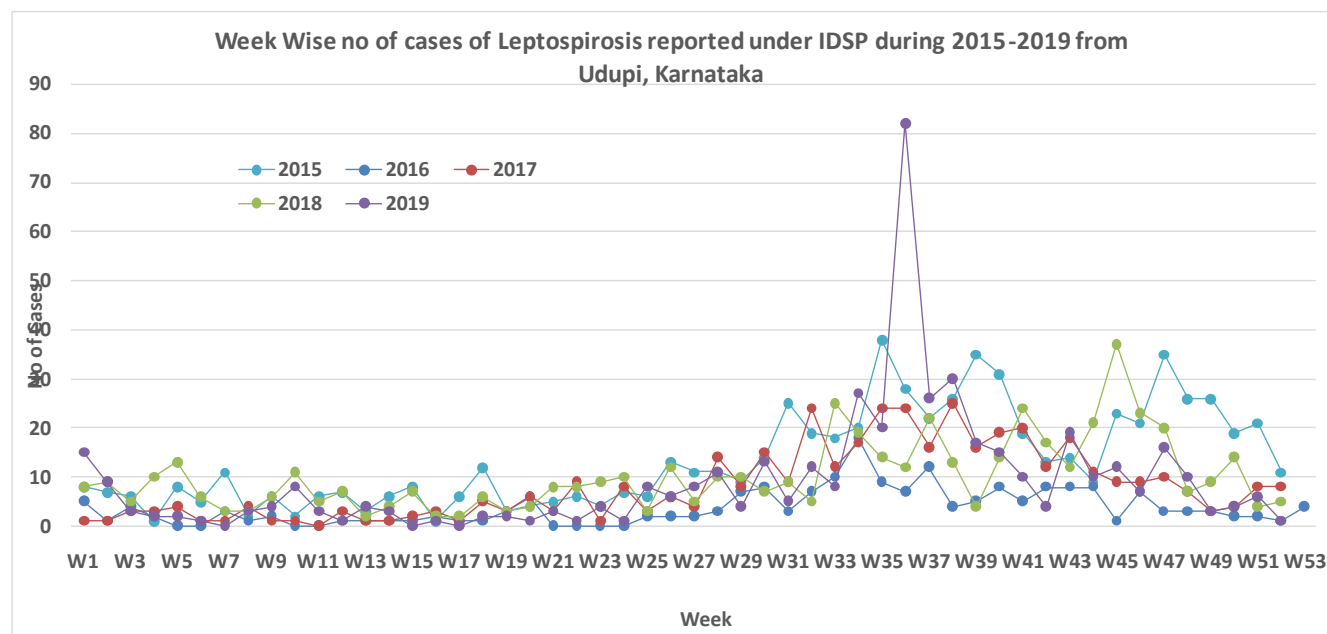
Year	W1	W2	W3	W4	W5	W6	W7	W8	W9	W10	W11	W12	W13	W14	W15	W16	W17	W18	W19	W20	W21	W22	W23	W24	W25	W26	W27
2015	8	7	6	1	8	5	11	2	6	2	6	7	3	6	8	1	6	12	3	4	5	6	4	7	6	13	11
2016	5	1	4	2	0	0	3	1	2	0	0	1	1	1	1	2	1	1	3	6	0	0	0	0	2	2	2
2017	1	1	3	3	4	1	1	4	1	1	0	3	1	1	2	3	1	5	3	6	3	9	1	8	3	6	4
2018	8	9	5	10	13	6	3	3	6	11	5	7	2	4	7	2	2	6	3	4	8	8	9	10	3	12	5
2019	15	9	3	2	2	1	0	3	4	8	3	1	4	3	0	1	0	2	2	1	3	1	4	1	8	6	8
W28	W29	W30	W31	W32	W33	W34	W35	W36	W37	W38	W39	W40	W41	W42	W43	W44	W45	W46	W47	W48	W49	W50	W51	W52	W53		
11	9	14	25	19	18	20	38	28	22	26	35	31	19	13	14	9	23	21	35	26	26	19	21	11			
3	7	8	3	7	10	18	9	7	12	4	5	8	5	8	8	8	1	7	3	3	3	2	2	1	4		
14	8	15	9	24	12	17	24	24	16	25	16	19	20	12	18	11	9	9	10	7	3	4	8	8			
10	10	7	9	5	25	19	14	12	22	13	4	14	24	17	12	21	37	23	20	7	9	14	4	5			
11	4	13	5	12	8	27	20	82	26	30	17	15	10	4	19	10	12	7	16	10	3	4	6	1			

You are District Surveillance Officer of Udupi District, Karnataka. The District data manager has analysed confirmed cases of Leptospirosis reported from a Medical College Lab of District Udupi, Karnataka from 2015 – 2019.

a) Look into the graph and provide your comments on the data analysed.



- b) On further analysing week wise data, following information was provided by the Data manager. Provide your comments.



- c) Calculate baseline values of Leptospirosis for week no. 36 for year 2019.
- d) What further action will you take?

Appendix 10

Exercise – Investigation of an outbreak

Case Study: Investigating an Outbreak of Unusual Disease in Cuddalore, Tamil Nadu*

National Centre for Disease Control
Epidemiology Division

Case Studies in Applied Epidemiology

Instructor Guide

Learning Objectives

After completing this case study, the participant should be able to:

- Define an outbreak
- Enlist steps in an outbreak investigation
- Examine line list and use descriptive information to generate hypothesis regarding potential risk factors
- Hypothesis generation for rare exposures
- Evaluate hypothesis epidemiologically
- Compare food specific attack rate to identify possible food vehicle.

Acknowledgement

This case study is based on an investigation of an actual outbreak that occurred in Cuddalore, Tamilnadu in 2015. The investigation was conducted by Dr Janardhan Nayak, EIS Officer Batch 2014.

This case study was written by Dr. Tanzin Dikid, NCDC, with review by Dr. Richard Dicker, US CDC.

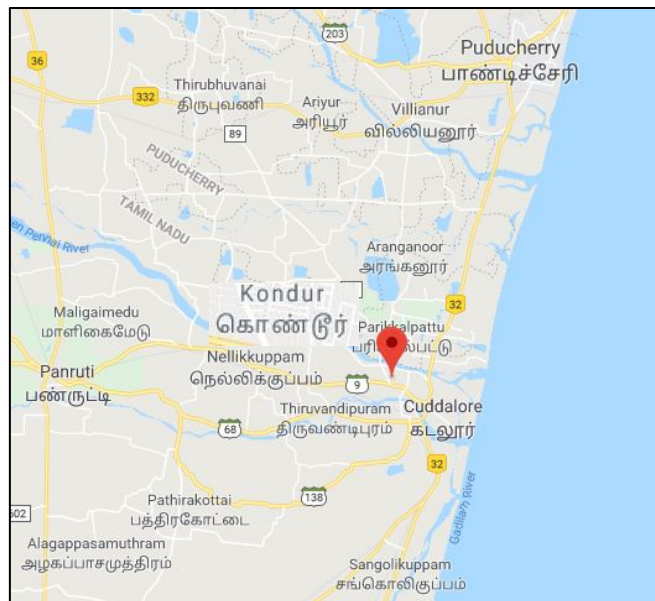
Section 1. Early information

At 8:00 pm on 4 April 2015, the District Surveillance Unit, Cuddalore learned that 64 persons of Kondur village had been admitted at the Government District Hospital, Cuddalore with complaints of vomiting and giddiness. The Central Surveillance Unit was informed the same night.

The District Rapid Response Team (RRT) investigated and coordinated case management with treating physicians. Two EIS Officers joined the RRT on 5 April. The RRT quickly determined that all the affected persons were residents of Kondur village and were suffering from vomiting, giddiness and parasthesias. The physicians were managing the cases symptomatically.

Question 1. Is this an outbreak?

Kondur Village is in Cuddalore District, Tamilnadu. According to Census India 2011, Kondur Village had a population of 12,506 residents, of whom 1,087 were children 0-6 years old.



Question 2. What factors play a role in deciding whether to investigate a possible outbreak?

Section 2. Developing a case definition and finding cases

The District Rapid Response Team conducted a house-to-house survey of the areas from 6 to 8 April. Results of the survey showed that, on 4 April 2015, 199 persons reported onset of nausea, vomiting, giddiness, abdominal pain/ cramp,

diarrhoea, paraesthesia of lip, gum and mouth, fever, dizziness and headache.

The RRT decided to develop a working case definition before they began to look for cases.

Question 3.1. What is a case definition?

Question 3.2. Formulate a case definition for this phase of the investigation.

Question 4. What case-finding strategy would you use?

Question 5. Which variables would you include in a data collection tool? Limit your list to no more than 10 variables.

The District RRT planned to collect the data on paper data collection forms.

Question 6. After data collection has occurred, what are options for organizing the data for review and analysis?

Section 3. Finding Cases

The RRT formulated an operational case definition of

“nausea or vomiting or giddiness in a person of any age in Kondur village on 4th April 2015”.

The RRT conducted a house-to-house survey of 303 households that included 1410 village residents.

Question 7. Are all four symptoms required to be considered a case?

The survey identified 199 persons with signs and symptoms consistent with the

case definition. The RRT put the data into a line list, similar to the following:

Table 1. Example of line list of first 2 cases, Cuddalore outbreak, April 2015

Case No.	Onset date	Onset time	Address	Age	Gender	Occupation	S/S reported	Exposure A (Y/N)	Hospitalization status (Y/N)
1	4 th April	5.00 PM	Gali No.4, Kondur village	35	M	Fisherman	Nausea, vomiting	Y	Y
2	4 th April	3.30 PM	Gali No. 6, Kondur village	19	F	Housewife	Giddiness, vomiting	Y	Y

Of the 199 cases, 150 (75%) were farmers by occupation. No recent common feasts or party had occurred in the village. 56 of 199 cases gave history of drinking *toddy* (local beer). None had a history of using any recreational drugs. Only 2 of 199 had a

history of exposure to any pesticides while spraying their fields. Symptom onset began between 4.45 -11.00 pm. The RRT analysed the data by time, place and person.

Fig 1. Distribution of cases according to time of illness, N=199

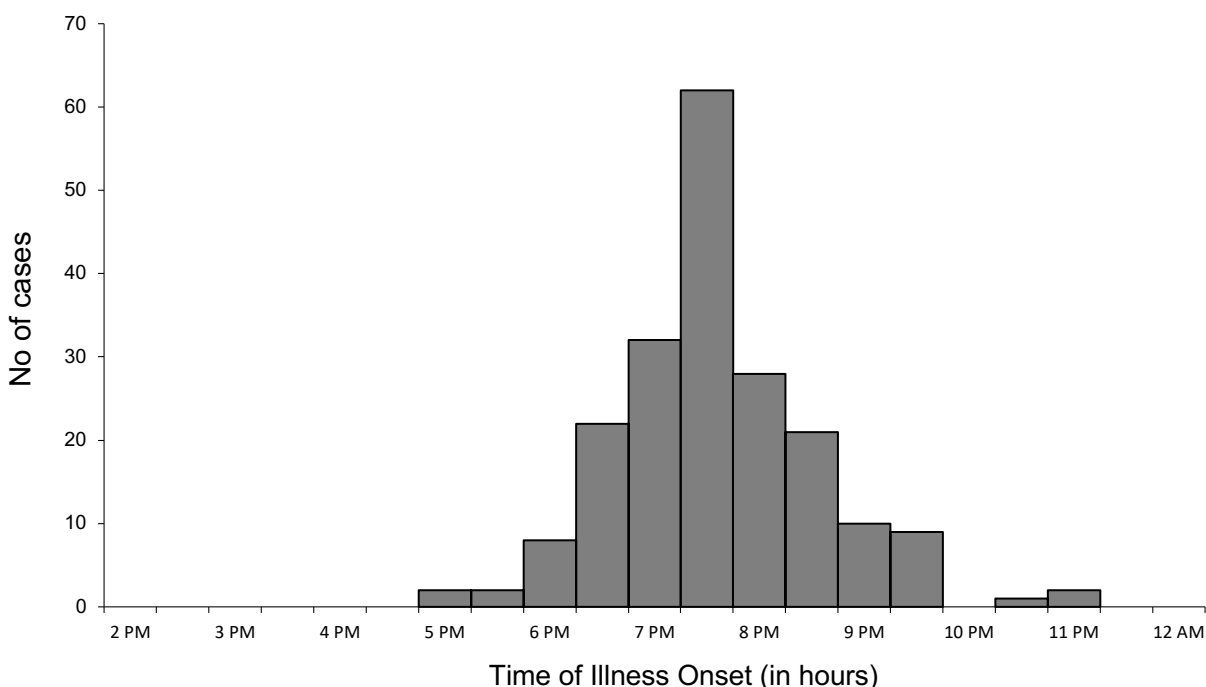
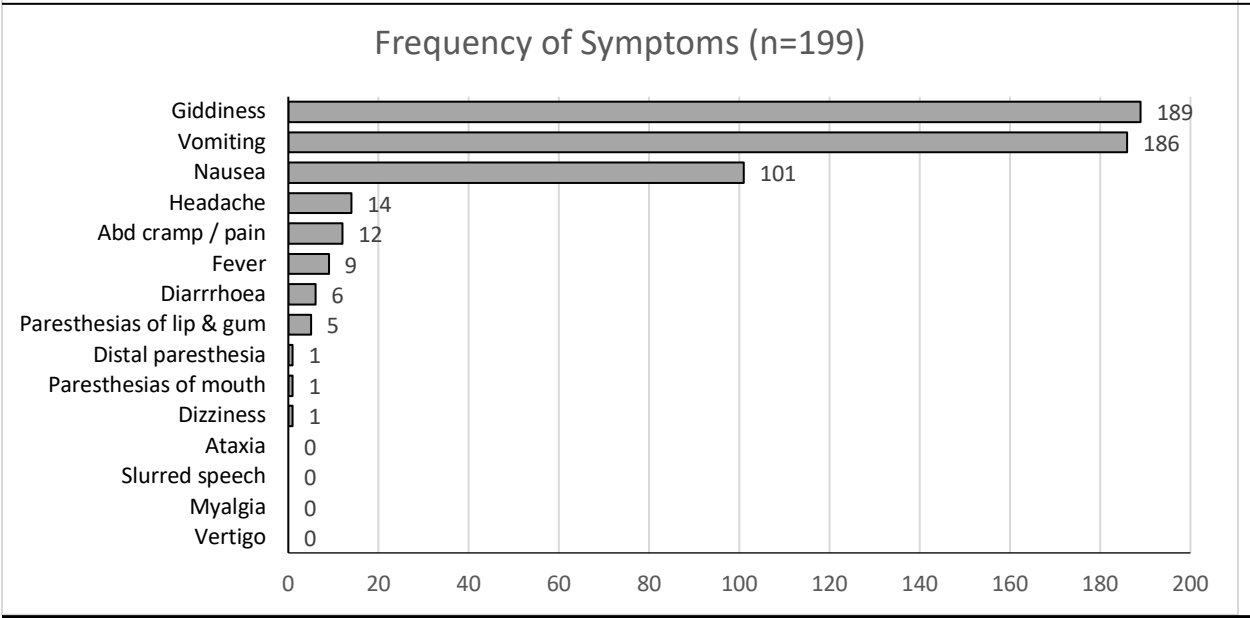


Table 2. Distribution of cases on the basis of age group and gender

Age group (years)	Population, n=1410	Cases, n=199	Attack Rate %
0–5	123	21	17
6–15	286	50	17
16–45	767	103	13
46–60	173	21	12
>60	61	4	7
Female	700	105	15
Male	710	94	13

Figure 2. Distribution of cases on the basis of clinical profile



Question 8. Summarize the descriptive epidemiology.

Section 4. Hypothesis generation

The RRT's next step was to generate one or more plausible hypotheses.

Question 9. Which parameters should a plausible hypothesis address?

Question 10. In an outbreak situation, what methods does an epidemiologist use to generate a robust hypothesis?

Question 11. In what type of outbreak situations would you consider using less common ways of obtaining information for hypothesis generation?

The RRT's review of descriptive data suggested a point source outbreak with short incubation period. A close examination of the reported symptom profile showed that nausea, vomiting and giddiness, and upper GI symptoms were predominant complaints. Some neurological symptoms, including parasthesia of lip and gums, were also reported.

The RRT decided to conduct in-depth interviews with patients and local authorities. They also decided to limit the reference period for possible exposures to within 3 days. They divided themselves into teams. One team did in-depth interviews with 27 affected residents. The other team spoke with health department officials, food department officials, and private practitioners.

Health department officials and private practitioners noted that cases with similar symptoms were reported from this area in the past and were possibly linked to dietary exposure. The affected village has an adjoining coastline. Commercial ships dock at a nearby area. There were no major industries around. Results of in-depth interviews with 27 cases were summarized as follows:

Table 3. Frequency of some common exposures among cases

	N=27	%
Occupation		
Farmer/ Farm labour	9	(33)
Fisherman	19	(70)
Semiskilled (plumber/ electrician)	1	(3.7)
Factory/ Shipyard worker	1	(3.7)
Drinking water		
Bore well # 1	5	(18.5)
Bore well #2	7	(26)
Unprotected well	4	(15)
Private underground water	10	(37)
Water from overhead tank # 1	1	(3.7)
Water from overhead tank # 2	0	(0)
Milk		
Cold milk	2	(7.4)
Hot milk	21	(77)
Untreated milk	4	(15)
Phirni (ice cream)	3	(11)
Sea food		
Fresh fish	18	(66.6)
Dried fish	8	(30)
Lobster	3	(11.1)
Crab	9	(33.3)
Clam	25	(92.5)
Pesticide handling		
Yes	12	(44.4)
H/o substance use or toddy use		
Yes	09	(33)
H/O attending a feast or party		
Yes	06	(22)

Question 12. Summarize the descriptive epidemiology you have learned so far.

Question 13. Develop a hypothesis based on this evidence.

Section 5. Hypothesis testing

After analysing results of the descriptive data and hypothesis generating interviews in the previous section, the RRT hypothesized that *“eating clams was associated with the reported illness”*.

Typically hypothesis in a field investigation are evaluated using a combination of environmental evidence, laboratory science, and epidemiology. Clam samples were collected from local vendors and their source of clam harvesting was traced back.

Environmental testing by marine biologists identified the clams as *Meretrixmeretrix* species. They were not able to isolate any toxin from the clams or the sand and water collected from the clam-harvesting site. The water was found to be heavily contaminated with *E.coli* and *Bacillus* sp.

Results of the stool sample collected were negative for *Vibrio cholera*, *Salmonellasp* and *Shigella* sp.

Question 14. How would you evaluate the hypothesis epidemiologically?

Question 15. Apart from an epidemiologic stud, what other lines of inquiry can contribute meaningfully to this investigation?

Epilogue:

In addition to the epidemiological investigation, the investigator also conducted in-depth interviews with the local women. They reported that consumption of clams is very common in this coastal village as it is a readily available source of nutrition. For some, it is also considered therapeutic for common ailments. The usual practice is to consume scooped flesh and soup after heating in oil and discard the shell. Clams are purchased fresh from local vendors on the day of preparation itself.

In this instance local women recalled the clams “*smelling weird*” when they purchased it on 4th April. When local vendors were interviewed, they noted that clams are commonly harvested from nearby Pennai River. However, on this fateful day clams were harvested from a different site in the hope of getting larger sized clams.

Marine biologists from the nearby University revealed that dumping of anthropogenic wastes, run off from agricultural lands and rivers, coastal upwelling are the major factors resulting in blooming of microalgae that produce toxins. These marine toxins are heat-stable and water-soluble. Shellfish, being filter feeders, tend to accumulate these toxins. Blooming of microalgae is seasonal in nature and some water bodies with high anthropogenic activity around it are more susceptible to it.

Of 10 health practitioners interviewed, 7 (70%) reported that they had seen patients in their practices with some sort of seafood-origin food poisoning. But they were not aware of neurological symptoms being associated with food poisoning or of its fatal nature.

The investigator recommended the following to the local health authorities:

- **Creating awareness among the local population regarding safe clam harvesting sites and avoiding the practice of eating of clams (shellfish) during the season of algal bloom.**
- **Training for all level service providers to strengthen their knowledge on early identification and management of shellfish poisoning.**
- **Initiation of surveillance for seafood (shellfish) poisoning.**

Although laboratory results were indeterminate for any microbial or toxic aetiology, confirmation of the etiology of the outbreak was not possible. The systematic epidemiological and environmental investigation provided a scientific basis for recommendations and appropriate public health action.

This investigation also underscores the importance of a coordinated and timely effort by a multidisciplinary team of epidemiologists, marine biologists and the food safety department led to containment of this outbreak of shellfish and prevention of new ones.

Appendix 11

REQUIREMENTS OF DPHL LABS**1) Tests to be performed by DPHL**

- a) Gram stain smears of clinical specimens like throat swab, sputum, CSF etc.
- b) Peripheral blood smear examination for malaria
- c) WIDAL (Slide/Tube)
- d) Blood culture for Typhoid*
- e) Stool culture for Cholera* (Vibrio cholera) and other common Enteropathogens
- f) Diphtheria – smear examination and culture
- g) Viral Hepatitis A & E: IgM ELISA
- h) Dengue: NS1 Ag & IgM ELISA
- i) Chikungunya: IgM ELISA
- j) Measles: IgM ELISA
- k) Japanese encephalitis (JE): IgM ELISA
- l) Leptospirosis (in endemic areas): IgM ELISA / rapid test
- m) Scrub typhus: IgM ELISA
- n) Bacterial meningitis: Rapid latex agglutination test for meningococci (during suspected outbreaks), CSF examination-wet mount, gram stain and culture & antimicrobial sensitivity
- o) Any other tests for locally prevalent outbreak prone disease (to be identified by the State) like KFD, etc

2) *Additional Tests to be done by State Referral Lab (SRL)

- a) Blood culture & antimicrobial sensitivity (including isolate confirmation with specific antiserum)
- b) Stool culture for Cholera and other Enteropathogens: culture and sensitivity and serotyping
- c) Diphtheria-Smear examination, culture and toxigenicity testing

Services to be provided by SRL to all the identified attached districts:

- Sample testing referred by districts for confirmation of outbreak investigations (not for clinical cases)
- Receipt of outbreak related samples.
- Provide logistic support for transport of microbiological samples (e.g. provide stool transport media etc.)
- Mentoring of microbiologist / lab technicians towards adequate sample collection and transport
- Report routine laboratory surveillance data weekly on IDSP format ('L' form)
- Report the lab results of outbreak related samples expeditiously to SSO / DSO, maintaining confidentiality

- Report the details of outbreak samples tested from the linked districts on a quarterly basis on prescribed format to SSU and CSU

Appendix 12

II Equipment Required for Testing

Infra-Structure	Space for microscopy, work table for test procedures, space for washing, sterilization and decontamination, Safety cabinets, culture facility, ELISA, other serology and office
Equipment	Number required
Microscope, binocular with oil immersion objective	2 nos
Bio safety Cabinet (class II A)	1 no
Autoclave for sterilization	1 no
Autoclave for decontamination	1 no
Hot Air Oven	1 no
Incubator	1 no
Micropipettes: (0.2 – 10 µl, 20-200 µl, 100–1000µ l)	One each
Centrifuge (bench top)	1 no
Refrigerator (285 liters capacity)	1 no
Deep Freezer (-20°C)	1 no
Water Bath	1 no
Weighing scale & Mixer (Electronic analytical balance)	1 no
ELISA reader and washer	1 no
Computer with printer, scanner, UPS	1 no
Consumable Items	Approx. quantity required per year
Screw capped round bottom 5 ml vials externally Threaded	500 nos
Screw capped round bottom 12 ml vials	500
2ml screw capped Storage containers externally Threaded	1000
Test tube racks	4 nos
TT racks for 5 ml tubes	2 nos
Micropipette tips 50-200 microliters, 1ml	1000 nos
Slide boxes for 25 slides	5 nos
Wash bottles	2 nos
Stool collection bottles (presterilized)	200 nos
Urine collection bottles (presterilized)	50 nos
Sputum collection containers	100 nos
Gloves autoclavable	200 nos

Vaccine carrier with ice packs	4
Pasteur pipettes (disposable, presterilized,	1000nos
2ml, 5ml and 10ml serology pipettes	Each 10 nos
Autoclavable Glass items	
Measuring cylinders – 100 ml, 50 ml	2 nos each
Conical flask –100 ml	5 nos
Conical flask –200 ml	5 nos
Others	
Fine tips forceps	2 nos
Lancet	50 nos
Autoclave labels	Quantity would depend on number of tests and would vary. The lab in charge / MO could give the annual requirements to the DSO who would procure it through the identified modalities.
Autoclavable BMW bags	
Glass marking pens	
Adhesive tape	
Scissors	

Enteric fever

Guide to volumes of blood to be collected for blood culture according to age of the patient

PATIENT AGE	BLOOD VOLUME FOR CULTURE BOTTLES CONTAINING 40 ML OF BROTH (PAEDIATRIC)	BLOOD VOLUME FOR CULTURE BOTTLES CONTAINING 80 ML OF BROTH (ADULT)
3 MONTHS–< 2 YEARS	1–2 mL	
2 YEARS–< 5 YEARS	2–3 mL	
5–< 15 YEARS	5–10 mL	
ADULT (> 15 YEARS)		8–10 mL

Appendix 13

A. Outbreak Response Trigger Event: Specimens to be collected

Probable diagnosis	Trigger event	Sample collection / storage / transport
Acute watery diarrhoea	A single case of cholera or epidemiologically linked case of diarrhoea / a case of severe dehydration or death due to diarrhoea in a patient >5 yrs old Clustering of cases particularly village or ward where >10 houses having at least 1 case of loose stools irrespective of age	Ideally collect within 48 hours of onset of diarrhoea Transport stool specimen quickly to the laboratory, in case of delay store at 4-8° C for 48 hrs and transport in Cary Blair medium. In case of delay beyond 2 days store in freezer at -20° C
Typhoid	More than 30 cases of prolonged fever a week from the entire PHC or 5 or more cases per week from 1 sub centre OR More than 2 cases from a single village/urban ward with 1000 population	Blood sample is collected for culture & serology For blood culture collect the required volume of venous blood aseptically (5-10 ml for adults, 1-2 ml for children) and transfer carefully to blood culture bottle containing TSB broth. Transfer immediately to lab, taking care to avoid spillage. In case of delay store in an incubator at 37°C for up to 24 hrs For serology collect a paired serum sample - first sample early in the disease preferably within 3 days & second sample 10-15 days later
Jaundice	Clustering of cases from a particular village/urban ward where more than 2 cases of jaundice in different households or more than 10 cases per PHC per week	Collect blood sample for etiologic diagnosis of the causative agent of jaundice Separate serum sample for detection of antibodies to HAV & HEV
Measles	A single case of probable measles from a tribal or remote area, or two or more cases with fever with rash	The virus can be isolated in the early stages of the disease from upper respiratory tract specimens like nasopharyngeal aspirate Blood is collected for detection of specific IgM antibodies
Dengue DF/DHF	Even a single case of suspected DHF from a community Rising number of fever cases for previous 3 weeks	Paired serum samples are collected to demonstrate rising levels of anti-dengue antibodies
Meningitis	2 cases with fever with altered consciousness / seizures	CSF is to be collected by a trained physician or a medical officer. Collect about 1-2 ml CSF in each of the 3 collection vials for cell counts, biochemical & microbiological investigations Do Gram staining, culture and antigen detection from the microbiological specimen CSF for

		bacteriology should never be frozen, transport or store at room temperature - store in an incubator, if available CSF for virus detection can be stored at 4-8°C Collect blood sample for culture
--	--	---

Appendix 14

Rapid Response Kit

The following items should be included in the Rapid Response Kit

1. Stationery (Notebooks, pens, sharpeners, rubbers, etc.)
2. Basic protective wear (Gloves, Aprons, Masks, Caps, Goggles, Gowns, Towels, etc.)
3. Transport (Convenient mode of transport, fuel, etc.)
4. Disinfectants (Hand Sanitizers, pieces of bar soap)
5. Manual/Guideline (Case Definition Booklet, Laboratory Guideline, IPC Guideline, etc.)
6. **Sanitation tools**, Disposable bags, Water Container, Flashlight, Cotton wool, etc
7. Appropriate bags for packing
8. Basic clinical equipment, disposable syringes and needles, stethoscope, thermometer, etc.
9. Sample collection and transport containers (triple package and refrigerant for sample transportation) and media
10. Safety boxes for collecting and disposing of contaminated supplies
11. Basic laboratory equipment as required

For detailed content of emergency kit, kindly refer to WHO guidelines

Appendix 15

Sample Referral Form

Referring lab:**Lab No:****Name / unique identifier:****Address of patient:****Age:****Sex:****Provisional Diagnosis:****Nature of the specimen****Lab tests ordered:****Date/Time of Collection:****Date of dispatch:****Remarks**

Appendix 16

INCIDENT/ ACCIDENT REPORTING FORMAT

INCIDENT/ ACCIDENT REPORTING FORM								
Date:								
Department:								
Person Involved:								
Category of Accident /Incident-Please “✓” on relevant category								
Needle Stick Injury	Spills & Splashes	Falls & Slip	Fire	Electrical	Chemical	Infrastructure	Physical	Others
Details of Accident/ Incident								
Root Cause								
Corrective Action Taken								
Responsibility								
Action Verified By/ Date								

Appendix – 17

Supervisory Checklist - Supervision Checklist for Sub-centre:

(To be used when visiting Sub-centre or S form Reporting unit)

1. Name of the Supervisor:	2. Designation:	3. Level of Supervisor: - Block / District / State / National / Other
4. Facility name:	5. Date of Visit:	6. Name of MPHWS:

S. No.	Information desired	Response
1.	Number of sanctioned position of MPHWS:	MPHWS (F): MPHWS (M):
2.	Number of filled position of MPHWS:	MPHWS (F): MPHWS (M):
3.	Number of MPHWS trained in IDSP:	MPHWS (F): MPHWS (M):
4.	'S' register available at the Sub-centre	Yes/No
5.	'S' forms available at the Sub-centre	Yes/No
6.	Is 'S' form sent regularly to District	Yes/No
7.	On which day of week filled 'S' form is sent to District	Mon/Tues/Wed/Thurs/Fri/Sat/Sun
8.	Cross-verify data reported in S form for any of the week during the visit. Does the data match with the 'S' form report?	Yes/No
9.	Presence of rumour register at the facility	Yes/No
10.	Number of EWS/suspected outbreaks detected by the worker in the last three months	
11.	IS MPHWS adequately aware of the actions to be taken in case of suspected outbreak	Yes/No
12.	Availability of IDSP Health Workers' manual with ANM.	Yes/No

Plan of Action:

Major findings and reasons thereof from this visit	Intervention identified	Level of intervention	Responsibility	Timeline

Facility In-charge Signature Supervisor Signature

Supervision Checklist for P form Reporting Unit:

(To be used when visiting PHC/CHC/SDH/DH/MC)

1. Name of the Supervisor:	2. Designation:	3. Level of Supervisor: - Block / District / State / National / Other
4. Facility name:	5. Date of Visit:	6. Name of facility I/C:

Staff Position:

Category of Staff	Permanent Positions at the facility: sanctioned / filled	Contractual Positions at the facility: sanctioned / filled	Total number of positions trained in IDSP
Medical Officers			
Pharmacists			
Nurses			
Data entry Operators			
MPHW (F)			
MPHW (M)			

S. No.	Information desired from IDSP nodal person	Response
1.	'P' tally sheet register available at the facility	Yes/No
2.	'P' forms available at the facility	Yes/No
3.	Is 'P' form sent regularly to District	Yes/No
4.	On which day of week filled 'P' form is sent to District	Mon/Tues/Wed/Thurs/Fri/Sat/Sun
5.	Cross-verify data reported in P form for any of the week during the visit. Does the data match with the 'P' form report?	Yes/No
6.	Availability of 'P' form case definitions at the OPDs	Yes/No
7.	Number of EWS/suspected outbreaks reported by the Health worker in the last three months	
8.	Any data analysis done by the facility by looking into 'P' form?	Yes/No
9.	Is MO I/C adequately aware of the actions to be taken in case of suspected outbreak	Yes/No
10.	Where do the facility send human samples for diagnosis of infectious diseases? (Promote the use of DPHLs under IDSP)	Name of the Lab: IS it a Public/Private lab:

Plan of Action:

Major findings and reasons thereof from this visit	Intervention identified	Responsibility	Timeline

Facility In-charge Signature Supervisor Signature

Supervision Checklist for L form Reporting Unit:

(To be used when visiting Labs at PHC/CHC/SDH/DH/MC)

1. Name of the Supervisor:	2. Designation:	3. Level of Supervisor: - Block / District / State / National / Other
4. Facility name:	5. Date of Visit:	6. Name of Lab I/C:

Staff Position:

Category of Staff	Permanent Positions at the facility: sanctioned / filled	Contractual Positions at the facility: sanctioned / filled	Total number of positions trained in IDSP
Microbiologists			
Pathologists			
Biochemists			
Lab technicians			
Lab assistants/attendants			
Others			

S. No.	Information desired from IDSP nodal person	Response
1.	'L' tally sheet register available at the facility	Yes/No
2.	'L' forms available at the facility	Yes/No
3.	Is 'L' form sent regularly to District	Yes/No
4.	Is line list is correctly entered in the 'L' form	
5.	On which day of week filled 'L' form is sent to District	Mon/Tues/Wed/Thurs/Fri/Sat/Sun
6.	Cross-verify data reported in 'L' form for any of the week during the visit. Does the data match with the 'P' form report?	Yes/No
7.	Availability of 'L' form case definitions in the Lab	Yes/No
8.	Number of EWS/suspected outbreaks reported by the Lab in the last three months	
9.	Any data analysis done by the facility by looking into 'L' form?	Yes/No

Plan of Action:

Major findings and reasons thereof from this visit	Intervention identified	Responsibility	Timeline

Lab In-charge Signature Supervisor Signature

Supervision Checklist for visiting DSU:

7. Name of the Supervisor & Designation:	8. Level of Supervisor: - State / National / Other	9. Name of DSO (Is DSO trained in IDSP?):
	10. Date of Visit:	

- **District HR:**

	Sanctioned/Filled	Trained (T)/Not trained (NT)/Requires retraining (RT)
District Epidemiologist		
Data Manager		
Data Entry Operator		

- **Surveillance checklist:**

- **IBS:** Assess following points under IBS
 - Analyse S, P & L form wise reporting % of District and its Block and assess reason for non-reporting and poor reporting.
 - Any S, P & L data analysis done by district.
 - Use of data analysis for outbreak prediction.
- **EBS:** Assess following points under EBS
 - Presence of media scanning cell at the District.
 - Registration/Record of event detected through EBS.
 - Number of events registered or recorded:
 - Use of EBS for outbreak prediction.
- **Number of outbreaks detected by the District in a defined time period (Previous quarter/Year, if outbreaks are less):**
 - Number of outbreaks detected through IBS in that defined period:
 - Number of outbreaks detected through EBS in that defined period:
 - No of outbreaks in which appropriate human samples sent for lab confirmation:
 - No of outbreaks where Lab confirmation was done:
 - Number of final investigation reports of the outbreaks reported in that defined period submitted by District to SSU and CSU:
 - Quality of Final Investigation report (in terms of outbreak investigation):

- **Others:**

- Availability of forms and registers at the facility/facilities visited:
- Facility for hiring vehicle for outbreak investigation available (operational cost). If not, assess reason:
- Review of IDSP during monthly meetings:
- No of field visits done by DSO/ Epidemiologist in last three months for IDSP implementation, if not then assess reason:

Plan of Action:

2000419/2020/O/O IDSP-NCDC

Major findings and reasons thereof from this visit	Intervention identified	Responsibility	Timeline

Facility In-charge Signature Supervisor Signature

Appendix – 18

Scenarios for Risk Assessment using PHEIC Decision Instrument

The following scenarios illustrate the application of decision model to identify a PHEIC:

Scenario 1

You received a report from the National Influenza Centre regarding a case of human infection with swine-origin triple reassortant Influenza A(H3N2). According to the report, a 16-year-old male became ill with fever, headache, cough, rhinorrhoea, sore throat, body aches and lethargy. The patient was seen by an outpatient care provider, where he tested positive for influenza A by rapid test. He did not require hospitalization and has since fully recovered. As part of a routine surveillance program, the clinical specimen was sent to the National Influenza Centre for further testing. The National Influenza Center determined yesterday that the virus was a novel swine-origin influenza A(H3N2)v virus. Humans are periodically infected with zoonotic influenza viruses from swine. Public health officials conducted an initial investigation which showed that the adolescent boy had exposure to pigs three days before illness onset. Illness among family members or close contacts was not reported.

► Now, please use Annex 2 to assess this event and answer each of the 5 following questions, taking into account the context of the scenario.			
	Yes	No	Don't know
1. Is the public health impact of the event serious?	☐	☐	☐
2. Is the event unusual or unexpected?	☐	☐	☐
3. Is there a significant risk of international spread?	☐	☐	☐
4. Is there a significant risk of international travel or trade restrictions?	☐	☐	☐
5. Does this event need to be notified to WHO under Article 6 of the IHR (2005)?	☐	☐	☐

Scenario 2

You are informed by a national surveillance officer about the detection of 15 cases of haemorrhagic fever during the last two weeks, including 7 deaths of which 2 were health care workers who attended the patients. The country is periodically affected by outbreaks of haemorrhagic fever. A team of infectious disease epidemiologists is currently in the field for investigation. Blood samples have been received by the National Laboratory and found negative for Yellow Fever, Dengue Fever, Crimean-Congo Haemorrhagic Fever (CCHF) and Rift Valley Fever. Otherwise, no unusual deaths or disease in animals have been reported from the affected district.

► Now, please use Annex 2 to assess this event and answer each of the 5 following questions, taking into account the context of the scenario.			
	Yes	No	Don't know
1. Is the public health impact of the event serious?	☐	☐	☐
2. Is the event unusual or unexpected?	☐	☐	☐
3. Is there a significant risk of international spread?	☐	☐	☐
4. Is there a significant risk of international travel or trade restrictions?	☐	☐	☐
5. Does this event need to be notified to WHO under Article 6 of the IHR (2005)?	☐	☐	☐

Scenario 3

Two hundred persons are reported to have been killed and a further 800 people have sought medical assistance following a chemical plant explosion. The site of the disaster is at the edge of a town of 230,000 inhabitants located in a densely populated region. As a consequence of the accident, more than 150 tons of a mix of organic solvents, including toluene, benzene and xylene were released into a fast flowing major river. The solvents can cause neurological effects as well as damage to the liver and kidneys. Benzene is a known human carcinogen. The river is used for recreational purposes (e.g. boating, swimming and fishing). It is also a main source of drinking water for a city in a neighbouring country 20 km downstream from the site of the event. Water extraction points downstream of the chemical release show benzene and xylene levels in the polluted water exceeding the national safety standards 20 times. Reliable meteorological forecasts are not available for the next days.

► Now, please use Annex 2 to assess this event and answer each of the 5 following questions, taking into account the context of the scenario.	Yes	No	Don't know
1. Is the public health impact of the event serious?	☐	☐	☐
2. Is the event unusual or unexpected?	☐	☐	☐
3. Is there a significant risk of international spread?	☐	☐	☐
4. Is there a significant risk of international travel or trade restrictions?	☐	☐	☐
5. Does this event need to be notified to WHO under Article 6 of the IHR (2005)?	☐	☐	☐

