Integrated Disease Surveillance Programme

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IDSP

- IDSP is a decentralized state based Surveillance system in the country.
- It is intended to detect early warning signals of impending outbreaks and help initiate an effective response in a timely manner
- It is also expected to provide essential data to monitor progress of on going disease control programme and help in allocating the resources optimally

Surveillance

Surveillance is defined as the ongoing systematic collection, collation, analysis and interpretation of data and dissemination of information to those who need to know in order that action be taken

Integration

- Sharing of surveillance information of disease surveillance programmes
- Developing effective partnership with health and non health sectors in Surveillance
- Effective partnership of private sector and NGOs in surveillance activities
- Bringing Academic institution and Medical Colleges into the primary health activity of diseases surveillance

Objectives of the Integrated Disease Surveillance Project

- To establish a decentralized district based system of surveillance for communicable and non-communicable diseases so that timely and effective public health actions can be initiated in response to health changes in the urban and rural areas

- To integrate existing surveillance activities to avoid duplication and facilitate sharing of information across all disease control programme's and other stake holders so that valid data is available for health decision making in the district, state and national levels

Important information in surveillance

- Who get the disease?
- How many get them?
- Where they get them?
- When they get them?
- Why they get them?
- What needs to be done as public health response?

Why do we need to do surveillance?

- Recognize cases or cluster of cases to trigger intervention to prevent transmission or reduce morbidity and mortality
- Assess the public health impact of health events or determine and measure trends
- Demonstrate the need for public health intervention programme and resources during public health planning

Key elements of a surveillance system

- Detection and notification of health events
- Investigation and confirmation
- Collection of data
- Analysis and interpretation of data
- Feedback and dissemination of results
- Response – Action for prevention and control

Disease surveillance

- Disease surveillance in India has always been practiced by the states (health being a state subject)
- Many gaps, differed in degree and quality of surveillance, different priorities in diseases
- Rapid Response Teams (RRTs) (depending on the epidemic potential of these diseases) were called : -
  - Malaria Response Teams
  - Cholera Combat Teams
  - Other disease specific Response Teams

Little / no information was made available at National level

Need for Surveillance

The Government of India realized the importance of Disease surveillance after the Cholera outbreak in Delhi and the Plague outbreak in Surat, which not only had significant mortality and morbidity but also significant **economic consequences**.

National Surveillance Programme for Communicable Diseases (NSPCD)

NSPCD was therefore launched by the Centre in 1997-98 in five pilot districts of the country (centrally sponsored scheme) and over the years extended to cover 101 Districts in the country in all 35 states and UTs in the country.

Main strategy

- To establish Early Warning System (EWS) so as to institute appropriate and timely response for prevention & control of outbreaks
- Every state/UT and all the 101 districts has a trained multi-disciplinary Rapid Response Team
- Rapid communications (through e-mails & fax)
- Strengthening of state and district laboratories for rapid confirmation of diagnosis
- Capacity development of health staff in the districts
- IEC (information, education and communication)

NSPCD

NSPCD has significantly improved the capacity of these districts and states to detect, investigate and respond to outbreaks, yet It was not case based reporting and did not give a complete picture of disease burden in the country especially in respect of epidemic prone diseases

GoI not convinced to expand this programme to all districts in the country

Surveillance strategy in the Integrated Disease Surveillance Project

- District level is the basic functional unit for integrating surveillance functions
- All surveillance activities are coordinated and streamlined
- Resources are combined to collect information from single focal point at each level
- Several activities are combined into one integrated activity to take advantage of similar surveillance functions, skills, resources and target populations

Surveillance strategy in the Integrated Disease Surveillance Project

- Integrates public and private sector by involving private practitioners and communities
- Addresses communicable and non communicable diseases
- Covers both rural and urban health systems
- Collaborates with private and public medical colleges

Role of Medical Officer

- Clinicians - Key staff around which the probable reporting under IDSP is based
- Clinicians should write provisional diagnosis either in the OPD register or the OPD chit that is collated at the Pharmacy before giving out drugs prescribed
- The impt. information generated in the OPD would serve to identify the impending outbreaks
- Hence clarity and legibility in writing is preferred
- Clustering of cases from the same locality on a given day or consecutive days one should suspect & alert the DSO over phone
- Clinicians should at least refer the Suspected outbreak associated cases to the laboratory for taking the appropriate samples of human cases

Role of Medical Officers

- Supervision and quality control of active surveillance by field staff
- Passive surveillance for diseases on the list
- Supervision of compilation and transmission of periodical reports
- Integration of sentinel private practitioners
- Emergency response to surveillance reports received
- Facilitation of outbreak investigation and response

Classification of surveillance in IDSP

- Syndromic
  Diagnosis made on the basis clinical pattern by paramedical Personnel, health workers and members of community

- Presumptive
  Diagnosis is made on typical history and clinical examination by medical officers

- Confirmed
  Clinical diagnosis by medical officer and or positive laboratory identification

Organizational structure

National surveillance committee
Central surveillance unit

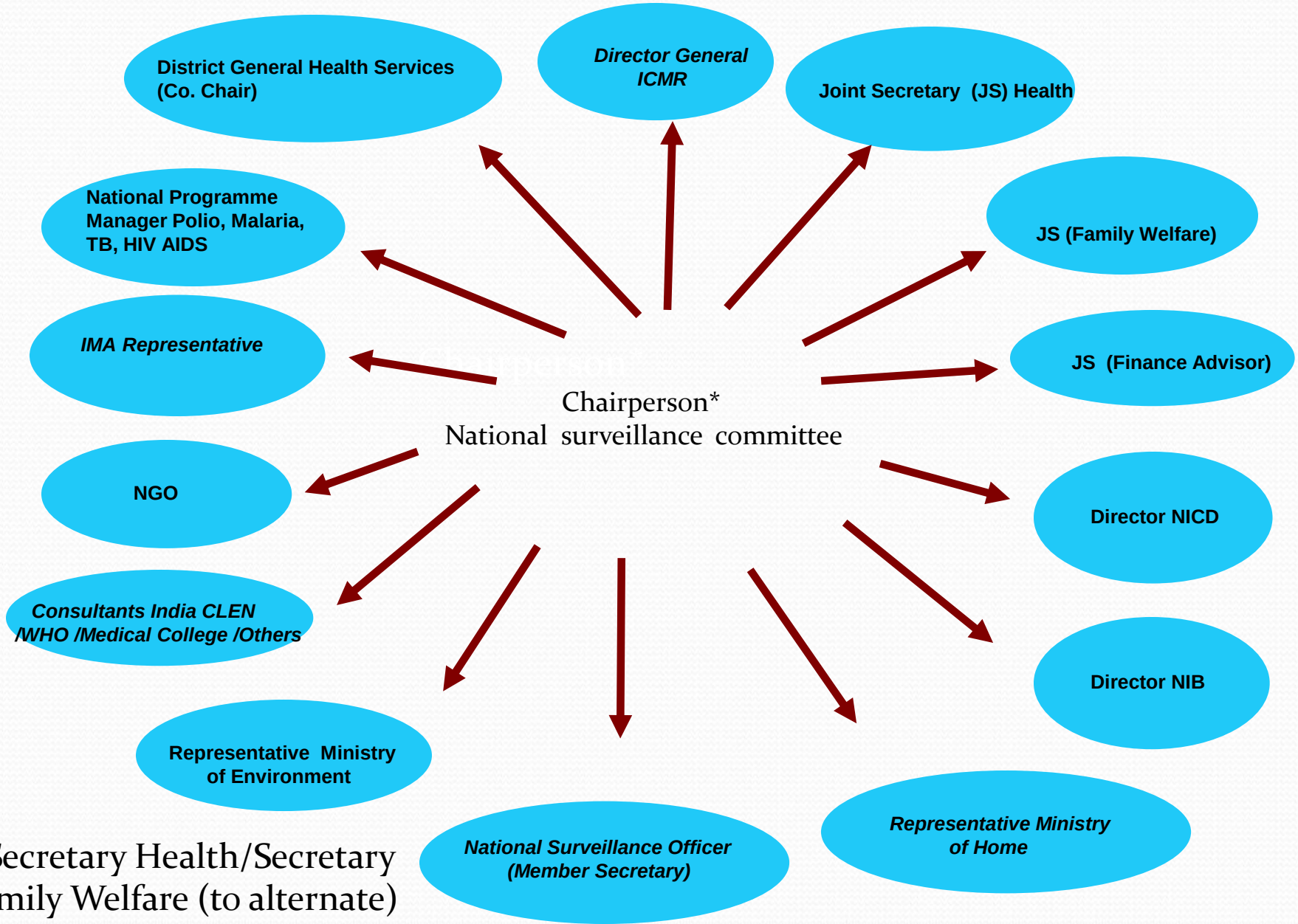


State surveillance committee
State surveillance unit



District surveillance committee
District surveillance unit

National Surveillance committee



* Secretary Health/Secretary Family Welfare (to alternate)

State Surveillance Committee



* State Health Secretary

District surveillance committee



* District collector or district magistrate

Central State & District Surveillance Unit

- Central Surveillance Unit is constituted in the Department of Health & Ministry of Health & Family Welfare
- National Project Officer is the Technical in charge of the Project. The unit has consultants and other supporting staff for the implementation activities
- State Surveillance Unit in the Dept. of Health & FW and the unit has the Technical and the Supporting staff
- District Surveillance Unit will have a District Surveillance Officer along with the technical and Supporting staff

Basic Epidemiology in Surveillance Communicable Diseases Under IDSP & Case Definitions

Definition of epidemiology

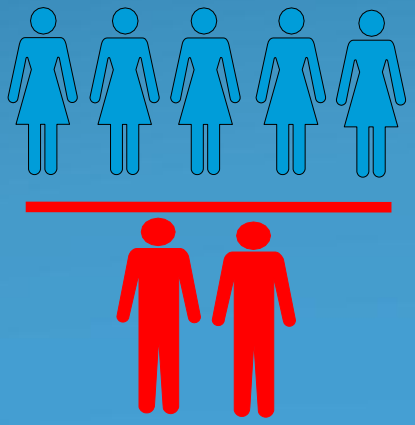
Epidemiology is the study of the distribution and determinants of health-related events or states in population groups and the application of this study to the control of health problems

Ratio

The quotient of two numbers

Numerator NOT necessarily INCLUDED in the denominator

Allows to compare quantities of different nature



= 5 / 2 = 2.5/1

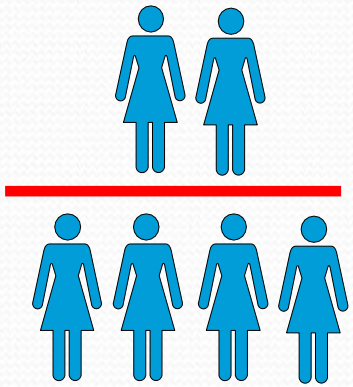
Examples of ratio

- Number of beds per doctor
  - 85 beds for 1 doctor
- Number of participants per facilitator
- Sex ratio:
  - Male / Female

A proportion measures a subset of a total quantity

- The quotient of two numbers
- Numerator Necessarily included in the denominator
- Quantities have to be of the same nature
- Proportion always ranges between 0 and 1
- Percentage = proportion x 100

=2/4 =0.5 = 50%

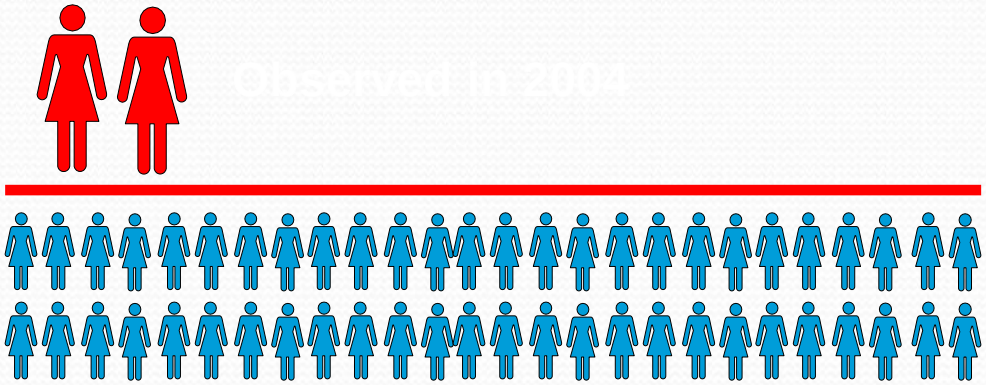


Example of proportion

- Tuberculosis cases in a district:
  - 400 male cases
  - 200 female cases
- Question
  - What is the proportion of male cases among all cases?
  - What is the proportion of female cases among all cases?

A rate measures the speed of occurrence of health events

- The quotient of two numbers
- Defined duration of observation
- Numerator
  - Number of EVENTS observed for a given time
- Denominator (includes time)
  - Population at risk in which the events occur



2/100= 0.02 / year

Example of rate

- Mortality rate of tetanus in country X in 1995
  - Tetanus deaths: 17
  - Population in 1995: 58 million
  - Mortality rate = 0.029/100,000/year
- Rate may be expressed in any power of 10
  - 100, 1,000, 10,00, 100,000

Measures of disease frequency

- Prevalence
  - Number of cases of a disease in a defined population at specified point of time
- Incidence
  - Number of new cases, episodes or events occurring over a defined period of time

Prevalence

$$P = \frac{\text{Number of people with the disease or condition at a specified time}}{\text{Total population at risk}} \times \text{X Factor}$$

Incidence rate

$$I = \frac{\text{Number of people who get the disease or condition in a specified time the disease or condition in a specified time}}{\text{Total population at risk}} \text{ X Factor}$$

Case fatality ratio

- Divide
  - Number of deaths
  - Number of cases

- Example: Measles outbreak
  - 3 deaths
  - 145 cases
  - Case fatality ratio: 2.1%

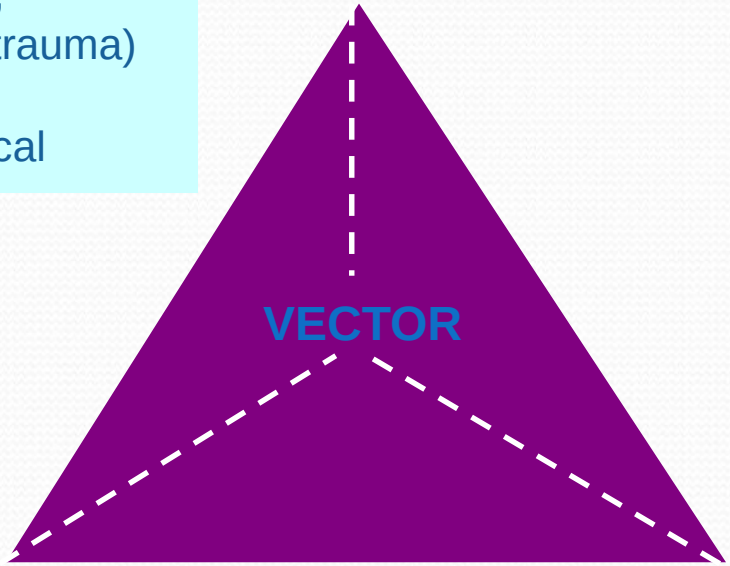
The basic principles of descriptive epidemiology

- Time
  - When did the event happen?
- Place
  - Where did the event happen?
- Person
  - Who was affected?

Role of the host, the agent and the environment in the occurrence of disease

Biologic,
Chemical,
Physical (injury, trauma)
Social
Psychological

AGENT



Sanitation
Weather
Pollution
Socio-Cultural
Political

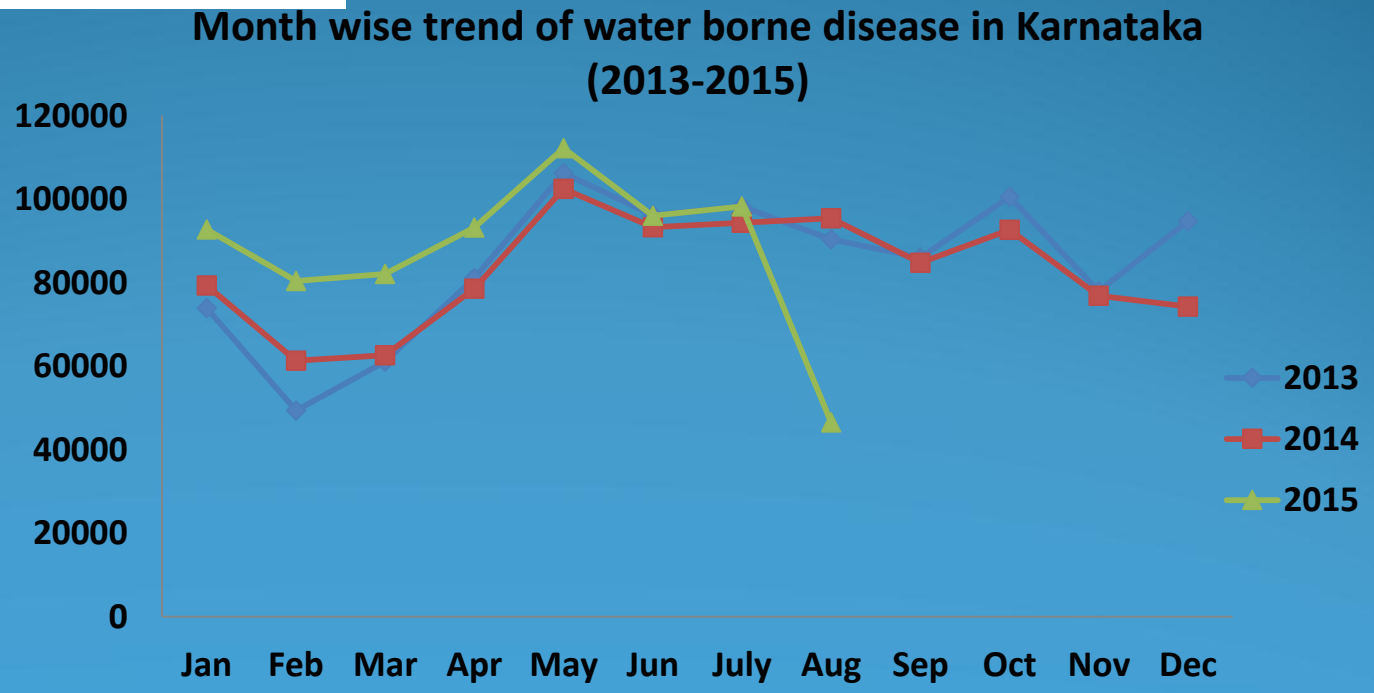
Genotype
Nutrition
Immunity
Behaviour

HOST

ENVIRONMENT

Spot maps & Graphic Representation of data





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- Spot maps generally are area maps
- These can be produced by hand or by using sophisticated geographical information systems
- Used for clusters or outbreaks with a limited number of cases
- On a spot map, you can reflect a water sources , supplying water distribution system, sanitation
- **Graph** is the representation of data. It represents the numerical data in the graphical structure and provides important information

Conditions under Surveillance

- Acute Diarrhoeal disease
- Bacillary Dysentery
- Viral Hepatitis
- Enteric fever
- Malaria
- Dengue/DHF/DHS
- Chikungunya
- Acute encephalitis syndrome
- Meningitis
- Measles
- Diphtheria
- Pertussis
- Chickenpox
- Fever of unknown origin
- Acute respiratory infection/Influenza like illness
- Pneumonia
- Leptospirosis
- Acute flaccid paralysis (< 15 years of age)
- Dog bite
- Snake bite
- Any other state specific disease
- Unusual syndromes not captured above

Levels of case definitions

- **Suspect case**

  A case that meets the clinical case definition

- **Probable case**

  A suspect case that is diagnosed by a medical officer

- **Confirmed case**

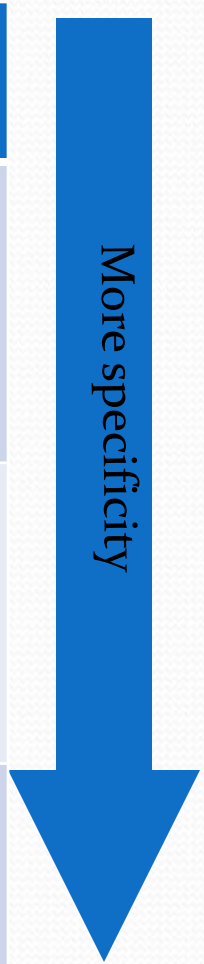
  A suspect case that is laboratory confirmed

Rationale for the use of case definitions

- Uniformity in case reporting at district, state and national level
- Use of the same criteria by reporting units to report cases
- Compatibility with the case definitions used in WHO recommended surveillance standards
- Allow international information exchanges

Types of case definitions in use

Case definition	criteria	Who uses it
Syndromic	Clinical pattern	Paramedical personnel and members of community
Presumptive	Typical history and clinical examination	Medical officers of primary and community health centres
Confirmed	Clinical diagnosis by a medical officer and positive laboratory identification	Medical officer and Laboratory staff



Acute Diarrhoeal disease (including acute gastroenteritis)

Acute watery diarrhea (passage of 3 or more loose or watery stools in the past 24 hours) with or without vomitting.

Dysentery

Acute diarrhoea with visible blood in the stool

Viral Hepatitis

Acute illness typically including acute jaundice, dark urine, anorexia, malaise, extreme fatigue, and right upper quadrant tenderness.

Enteric Fever

Any patient with fever for more than one week and with any two of the following:

- Toxic look
- Coated tongue
- Relative bradycardia
- Splenomegaly
- Exposure to confirmed case
- Clinical presentation with complications e.g. Gl bleedings, perforation, etc AND or

Positive Serodiagnosis (Widal test)

Malaria

A case of fever which may be accompanied with any of the following :

- Headache, Backache, Chills, Sweating, Chills, Myalgia, Nausea, and Vomiting
- Splenomegaly and Anaemia
- Generalised Convulsions, Coma, Shock, Spontaneous bleeding, Pulmonary edema, renal failure and death.

Dengue Fever

An acute febrile illness of 2-7 days duration with two or more of the following:

- Headache,
- Retro-orbital pain,
- Myalgia,
- Arthralgia,
- Rash
- Hemorrhagic manifestations
- Leucopenia

OR

Non Elisa based NS1 Antigen/IgM Positive

(A positive test by RDT will be considered as probable due to poor sensitivity and Specificity of currently available RDtS

Chikungunya

An Acute illness characterised by sudden onset of fever with any of the following symptoms

- Headache
- Backache
- Photophobia
- Severe arthralgia
- Rash

Acute Encephalitis Syndrome (AES)

A person of any age, at any time of year with the acute onset of fever and change in mental status (including symptoms such as confusion, disorientation, coma or inability to talk) AND/OR

New onset of seizures (excluding simple febrile seizures).

Simple febrile Seizure: a single seizure lasting < 15 minutes with recovery of consciousness within 60 min, in a child aged 6 months to 60 months

Meningitis

An illness with sudden onset of fever (>38.5°C rectal or >38.0° C axillary) neck stiffness and one or more of the following:

- Headache
- Vomiting
- Altered Conscious ness
- Other meningeal sign
- Petechial or purpural rash

In patients <2 year, suspect meningitis when fever accompanied by bulging fontanelle.

Measles

A suspected measles case is a any person in whom a health worker Clinician suspects measles or any other person with fever and maculopapular rash (Non vesicular) with cough or coryza or Conjunctivitis .

Diphtheria

An illness of the upper respiratory tract characterized by the following:

- Laryngitis or pharyngitis or tonsillitis,
- And adherent membranes of tonsils, pharynx and / or nose.

Pertussis-

A person meeting the clinical manifestation of Pertusis with history of contact with a laboratory confirmed case of pertusis

Clinical manifestation of Pertusis

A person with a cough lasting at least 2 weeks with at least one of the following:

- Paroxysms (i.e, fits)of coughing
- Inspiratory whooping
- Post tussive vomiting (i.e. vomiting immediately after coughing) without other apparent cause.

Chicken Pox

A febrile illness with acute onset of diffuse (generalized) maculopapulovesicular rash without other apparent cause.

Fever of unknown origin (PUO)

- Fever of more than 101° F (38.3°C). either continuous or intermittent, for at least two weeks, or
- Fever above 101° F with no known cause even after extensive diagnostic testing

Acute Respiratory infection (ARI)/Influenza Like illness(ILI)

ILI : An acute Respiratory infection with Measured fever of > 38°C with onset within the last 10 days and cough or sore throat in the absence of other diagnosis.

SARI (Severe Acute Respiratory Infection)

An acute Respiratory infection with

- History of fever or measured fever of more than or equal to 38°C
- AND Cough
- with onset within the last 10 days
- and requires hospitalisation

Pneumonia

Any case clinically diagnosed as pneumonia with symptoms of fever and cough and/or difficult breathing ±Chest X-ray confirmation

Or

In a child –

Pneumonia: Cough or difficult breathing and

- Breathing rate >50/minute for infant aged 2 months to < 1 year
- Breathing rate >40/minute for child aged 1 to 5 years and with or without chest in drawing stridor or danger signs

(General danger signs: For children aged 2 months to 5 years, the four general danger signs are unable to drink/breast feed, vomits everything, convulsions, and lethargic/unconscious)

Leptospirosis

Acute febrile illness with headache, myalgia and prostration associated with a history of exposure to infected animals or an environment contaminated with animal urine.

With one or more of the following:

- Calf muscle tenderness
- Conjunctival suffusion
- Oliguria or anuria and /or proteinuria
- Jaundice
- Hemorrhagic manifestations (intestines, lung)
- Meningeal Irritation
- GI Symptoms (Nausea/Vomiting/Abdominal pain /Diarrhoea) and one of the following
- A positive result in IgM based immune assays, Slide agglutination test or latex agglutination test or immunochromatographic test
- A microscopic agglutination test (MAT) titre of 100/200/400 or above in single sample based on endemicity
- Demonstration of leptospires directly or by staining methods

Acute Flaccid Paralysis < 15 years of age

A child under 15 years of age presenting with acute flaccid paralysis (AFP) OR

Any person at any age with paralytic illness if poliomyelitis is suspected

Dog bite

Snake bite

State specific disease

- Filariasis
- Kyasanur forest disease

Syndromes under surveillance

- Fever
- Cough
- Diarrhea
- Acute flaccid paralysis
- Jaundice
- Unusual syndrome causing death/ hospitalization

Fever

1. Fever less than 7 days with:
   - Rash and coryza or conjunctivitis (suspected measles)
   - Altered sensorium (suspected Japanese encephalitis or malaria)
   - Convulsions (suspected Japanese encephalitis)
   - Bleeding from skin, mucus membrane, vomiting blood or passing fresh blood or black motion (suspected Dengue)
   - With none of the above (suspected malaria)
2. Fever > 7 days
   - Suspected typhoid

- Triggers
  - More than 2 similar case in the village (1000 Population)

Cough

- Short duration (Cough < 3 weeks)
  - Suspected acute respiratory tract infection
- Longer duration (Cough of > 3 weeks)
  - Suspected tuberculosis

Diarrhea

- Any new case of watery diarrhea
  - Passage of 3 or more loose / watery stools in 24 hours
  - With or without dehydration
  - Total duration of illness < 14 days
- Trigger
  - More than 10 houses with diarrhea in a village or urban ward or a single case of severe dehydration or death in a patient > than 5 years with diarrhea

Jaundice

- A new patient with an acute illness (<4 weeks) and following symptoms:
  - Jaundice, dark urine
  - Anorexia, malaise, fatigue
  - Pain in abdomen (right upper quadrant)
- Trigger
  - More than two cases of jaundice in different houses irrespective of age in a village or 1000 population

Acute flaccid paralysis

- A case of acute flaccid paralysis is defined as any child:
  - Aged <15 years
  - Has acute onset of flaccid paralysis for which no obvious cause is found
- Trigger
  - Single case of AFP

Points to remember

- The list of diseases under surveillance must always be remembered
- The diseases for which vertical programmes are operative should be clearly known
- Case definitions are crucial in accurately identifying the epidemic at the earliest
- Trigger levels are important in initiating response activities

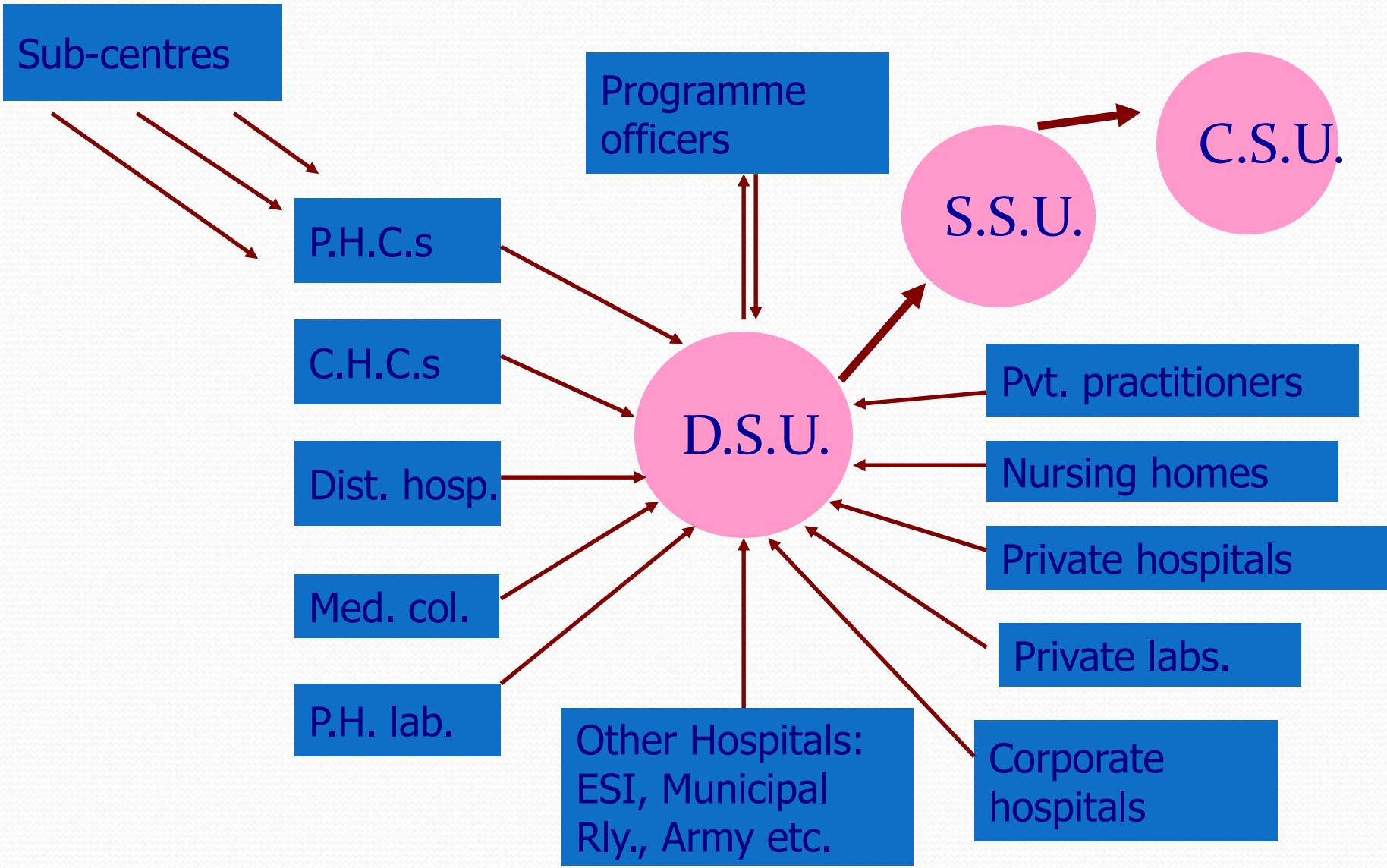
Points to remember

- Laboratory confirmation is not mandatory to initiate rapid response measures but specimens should be collected as soon as possible
- Clinical syndromes should be identified
- Method of transmission of diseases should be identified
- Different surveillance methods for the different conditions should be clearly understood

Surveillance activities at each level

Activities	Periphery	District	State
Detection and notification of cases	+++	++	-
Consolidation of data	+	+++	+++
Analysis and interpretation	+	+++	+++
Investigation and confirmation	+++	+++	+
Feedback	+	+++	++
Dissemination	+	++	++
Action	++	+++	+

Information flow of the weekly surveillance system



Reporting Units and Formats Collection, Compilation and Transmission of the Data.

SPL Format Demonstration

Reporting unit

- **Nature**
  Health facility / individual in private/ public sector
  Located in rural or urban area

- **Function**
  Collects information of health conditions identified in specified formats
  Transmits these in pre-specified timely manner to the next higher level

Other sentinel reporting sites

- Antenatal clinic
  HIV, HBV, HCV
- Water board
- Pollution control board
- District police
  Road traffic injuries

Active and passive reporting

- **Active reporting**

  Health workers

  House visits

- **Passive reporting**

  All other reporting units

Reportable diseases for multi-purpose health workers and health assistants

- Diarrhea
- Jaundice
- Fever
- Cough
- Acute flaccid paralysis
- Unusual events (Death, hospitalization)

Reportable diseases for Medical officers

- Diarrhoea
- Jaundice
- Fever
- Malaria
- Typhoid
- Japanese encephalitis
- Dengue
- Measles
- Acute flaccid paralysis
- Unusual events (Death, hospitalization)

Zero reporting

- Do not mix up:

  Zero

  Missing information
- Zero reporting is important to confirm that the condition was looked for and not found

Unusual clustering of cases OR health event causing death in a short span of time

- Report immediately
  - Telephone
  - Fax
  - Email
  - Special messenger
  - Police wireless
- Follow with written report

Quality check before reporting

- Filling of forms by health care workers
- Review by senior staff
- Transmission to the higher level
- Copy kept in the facility

Points to remember

- A reporting unit is a health facility / individual collecting the information and transmitting it to the next higher level
- Reporting health facilities will be from both rural and urban settings in public and private sectors
- All public health facilities in rural and urban areas will report
- Only sentinel sites will report in the private sector
- Other sites from where sentinel surveillance data will be used will consist of ANC Sites NACO, the water board, the pollution control board and the police (Road traffic accidents)

Contd..

- All reporting centres are required to provide zero reporting
- All medical officers will report presumptive diagnosis in the absence of confirmation by the laboratory
- Any unusual clustering of cases or any health event causing death must be reported immediately
  Verbal reports must be followed by a written report
- All reporting units are required to send the regular surveillance data in pre-specified formats every week to the district surveillance unit

Form S

Reporting Format for Syndromic Surveillance

(To be filled by Health Worker, Village Volunteer, Non-formal Practitioners)

State_____District_____Block_____ Year_____

Name of the Health Worker/Volunteer/Practitioner	Name of the Supervisor	Name of the Reporting Unit
ID No./Unique Identifier (To be filled by DSU)	Reporting week From dd mm yy To	

	a	b	c	d	e	f	g	h	i	j	k	l	m	n
	Cases							Deaths						
	Male			Female			Total	Male			Female			Total
	< 5 yr	≥ 5 yr	Total	< 5 yr	≥ 5 yr	Total		< 5 yr	≥ 5 yr	Total	< 5 yr	≥ 5 yr	Total	
1. Fever														
Fever < 7 days														
1 Only Fever														
2 With Rash														
3 With Bleeding														
4 With Daze/Semiconsciousness/ Unconsciousness														
Fever > 7 days														
2. Cough with or without fever														
< 3 weeks														
> 3 weeks														
3. Loose Watery Stools of Less Than 2 Weeks Duration														
With Some/Much Dehydration														
With no Dehydration														
With Blood in Stool														
4. Jaundice cases of Less Than 4 Weeks Duration														
Cases of acute Jaundice														
5. Acute Flacid Paralysis Cases in Less Than 15 Years of Age														
Cases of Acute Flacid Paralysis														
6. Unusual Symptoms Leading to Death or Hospitalization that do not fit into the above.														

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 diagnosis)	
	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):

Name	Age (Yrs)	Sex (M/F)	Address: Village/Town	Name of Test Done	Diagnosis (Lab confirmed)

Data analysis at what level

Data analysis should be done at each level

Health workers at Sub centres

Simply compilation of numbers and seeing the trend **of** cases/ deaths

Medical officers in PHCs/ BPHCs/ Urban Wards

MO need to analyze data to detect outbreaks by villages/ward and also to anticipate seasonal trends

DSO/ DM/ Epidemiologist at District

Doing all of the above including recognition of outbreaks by PHC/ Sub centre

Informing all concerned to initiate action, responding to these outbreaks, monitoring trends, compilation of total information etc. It is important for the Epidemiologist to get involved in in-depth analysis of EWS/ outbreak data

Periodicity of Analysis

- Daily
- Weekly
- Monthly
- Annual

Comparison of disease cases with previous weeks/ months/ years

- Weekly analysis should compare with previous weeks (at least 3 weeks) as well as previous years' corresponding period. – It alerts authorities for immediate action.
- Monthly and yearly analyses examine :
  - Seasonal patterns
  - Long term trends
  - Cyclic pattern
  - *During outbreaks, trend has to be seen on daily basis*

Outbreak detection and Response to an Outbreak

Definition of an outbreak

Occurrence in a community of cases of an illness clearly in excess of expected numbers

The occurrence of two or more epidemiologically linked cases of a disease of outbreak potential constitutes an outbreak

(e.g., Measles, Cholera, Dengue, Japanese encephalitis, or plague)

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Outline the appropriate control measures to be taken when the nature of the outbreak is established:

- Water borne diseases
- Vector borne diseases
- Vaccine preventable disease outbreaks
- Outbreaks of unknown etiology

Outbreak and epidemic: A question of scale

- Outbreaks
  - Outbreaks are usually limited to a small area
  - Outbreaks are usually within one district or few blocks
- Epidemics
  - An epidemic covers larger geographic areas
  - Epidemics usually linked to control measures on a district/state wide basis

Use a word or the other according to whether you want to generate or deflect attention

Sources of information to detect outbreaks

- Rumour register
  - To be kept in standardized format in each institution
  - Rumours need to be investigated
- Community informants
  - Private and public sector
- Media
  - Important source of information, not to neglect
- Review of routine data
  - Triggers

Early warning signals for an outbreak

- Clustering of cases or deaths
- Increases in cases or deaths
- Single case of disease of epidemic potential
- Acute febrile illness of an unknown etiology
- Two or more linked cases of meningitis, measles
- Unusual isolate
- Shifting in age distribution of cases
- High vector density
- Natural disasters

Outbreak preparedness: A summary of preparatory action

- Formation of Rapid Response Team
- Training of the rapid response team
- Regular review of the data
- Identification of outbreak seasons'
- Identification of outbreak regions'
- Provision of necessary drugs and materials
- Identification and strengthening appropriate laboratories
- Designation of vehicles for outbreak investigation
- Establishment of communication channels in working conditions (e.g., Telephone)

10 Steps of an Outbreak Investigation

1. Identify investigation team and resources
2. Establish existence of an outbreak
3. Verify the diagnosis
4. Construct case definition
5. Find cases systematically and develop line listing
6. Perform descriptive epidemiology/develop hypotheses
7. Evaluate hypotheses/perform additional studies as necessary
8. Implement control measures
9. Communicate findings
10. Maintain surveillance

10 Steps of an Outbreak Investigation

1.Identify investigation team and resources

RAPID RESPONSE TEAM

- **Composition**
  Epidemiologist, clinician and microbiologist
  Gathered on ad hoc basis when needed
- **Role**
  Confirm and investigate outbreaks
- **Responsibility**
  Assist in the investigation and response
  Primary responsibility rests with local health staff

10 Steps of an Outbreak Investigation

1. Identify investigation team and resources
2. **Establish existence of an outbreak**

What is an Outbreak?

- Increase in cases above what is expected in that population in that area
- Four kids with cough and runny nose in a child care center in January?
- Woman vomiting after eating at Restaurant A?
- 10 members of the swim team vomiting after eating at Restaurant A?
- One case of smallpox?

10 Steps of an Outbreak Investigation

1. Identify investigation team and resources
2. Establish existence of an outbreak
3. **Verify the diagnosis**

Verify the Diagnosis

Obtain medical records and lab investigations and Epidemiological Investigations.

10 Steps of an Outbreak Investigation

1. Identify investigation team and resources
2. Establish existence of an outbreak
3. Verify the diagnosis
4. **Construct case definition**

Components of Case Definition

- **Person**.....Type of illness
  (e.g., “a person with...”)
- **Place**.....Location of suspected exposure
- **Time**.....Based on incubation (if known)

Sample Outbreak Case Definition

Hepatitis A outbreak:

- ***Person****:* An acute illness involving jaundice or elevated liver function tests
- ***Place****:* Occurring after visiting or residing on Property A
- ***Time****:* During May–August 2006

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5. **Find cases systematically and develop line listing**

What to Put on a Line List

1. Clinical information
   - Symptoms (type, duration)
   - Onset dates and/or times
2. Demographic information
3. Exposure information

Use line list to summarize information

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Descriptive Epidemiology

- Person, place and time
- Line lists and epi curves useful in developing hypotheses

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7. **Evaluate hypotheses/perform additional studies as necessary**

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8. **Implement control measures**

Control measures for an outbreak

- General measures

  Till source and route of transmission identified
- Specific measures, based upon the results of the investigation
  - Agent
    - Removing the source
  - Environment
    - Interrupting transmission
  - Host
    - Protection (e.g., immunization)
    - Case management

Specific outbreak control measures

- Waterborne outbreaks
  - Access to safe drinking water
  - Sanitary disposal of human waste
  - Frequent hand washing with soap
  - Adopting safe practices in food handling
- Vector borne outbreaks
  - Vector control
  - Personal protective measures
- Vaccine preventable outbreaks
  - Case Management
  - Surveillance and communicating the information to the higher authority
  - Supplies vaccines, syringes and injection equipment
  - Human resources to administer vaccine

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Inform Public and Media

- **Public & press are not aware of most outbreak investigations**
- **Media attention desirable if public action needed**
- **Response to media attention important to address public concerns about outbreak**
- **Results of investigations public information**

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10. Maintain surveillance

Maintain Surveillance

- Deciding if outbreak is over
- Documenting effectiveness of control measures

Declaring the outbreak as over

Role of the district surveillance officer / Medical health officer

Criteria

- No new case during two incubation periods since onset of last case
- Implies careful case search to make sure no case is missed

Managerial aspects of outbreak response

- Logistics
  - Human resources
  - Medicines
  - Equipment and supplies
  - Vehicle and mobility
  - Communication channels
- Information, education and communication
- Media
  - Daily update

Review of the final report

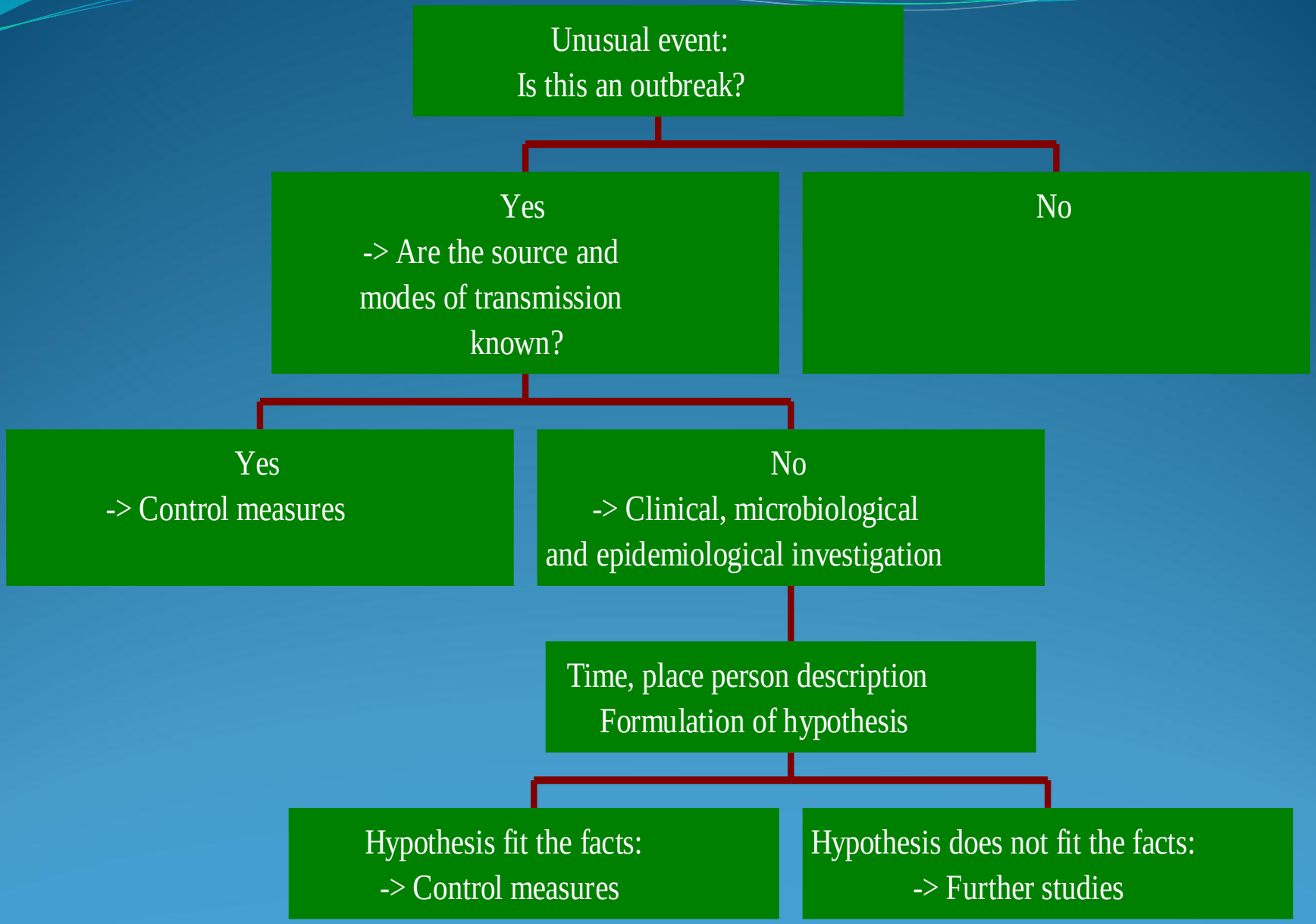
Sent by medical officer of the primary health centre to the district surveillance officer / medical and health officer within 10 days of the outbreak being declared over

Review by the technical committee

- Identification of system failures
- Longer term recommendations

Role of laboratories in disease surveillance

- Early diagnosis of diseases under surveillance
- Epidemiological investigation
- Rapid laboratory confirmation of diagnosis
- Implementation of effective control measures


Unusual event:
Is this an outbreak?
Yes
-> Are the source and modes of transmission known?
No
Yes
-> Control measures
No
-> Clinical, microbiological and epidemiological investigation
Time, place person description
Formulation of hypothesis
Hypothesis fit the facts:
-> Control measures
Hypothesis does not fit the facts:
-> Further studies

Step 3 - Monitoring the situation

- Trends in cases and deaths
- Implementation of containment measures
- Stocks of vaccines and drugs
- Logistics
  - Communication
  - Vehicles
- Community involvement
- Media response
- daily submission of follow up of outbreak reports

Factors influencing laboratory confirmation in surveillance

- Advance planning
- Collection of appropriate and adequate specimens
- Correct packaging
- Rapid transport
- Ability of laboratory to accurately perform tests
- Bio-safety and decontamination procedure

Method of laboratory surveillance

- Routine passive surveillance
  - Selected diseases
- Outbreak situations

Collection and Transportation of Clinical Specimens

- the right sample
- collected at the right time and in a right manner
- transported in the right way to
- the right laboratory

Some general principles

Effective diagnostic microbiology depends upon the correct collection and timing of clinical specimens and their proper transport to the laboratory under optimal conditions.

- Specimen should be in adequate quantity.
- Must be collected before the administration of antimicrobial agents.
- Contamination of specimen with externally present
- Organisms of normal flora of body must be prevented.
- Specimen must be collected at appropriate stage of the diseases.
- Specimen should not get contaminated during storage.
- Specimen handling should not be risky to individual.

Sample Collection & Transportation Guidelines

Disease	Name of Test	Sample	Collection	Transportation
Dengue	NS1 Ag Test	Serum	First Week of illness within 5 days	in Cold Chain
	IgM Elisa	Serum	After 5-6 days of illness	in Cold Chain
Chikungunya	IgM Elisa	Serum	After 5-6 days of illness	in Cold Chain
Japanese encephalitis (JE)	IgM Elisa	Serum	After 5-6 days of illness	in Cold Chain
Leptospirosis	IgM Capture Elisa	Serum	After 5-6 days of illness	in Cold Chain
Hepatitis-A	IgM Elisa	Serum	After 5-6 days of illness	in Cold Chain

Sample Collection & Transportation Guidelines

Disease	Name of Test	Sample	Collection	Transportation
Hepatitis-E	IgM Elisa	Serum	After 5-6 days of illness	in Cold Chain
Measles	IgM Elisa	Serum	After 5-6 days of illness	in Cold Chain
Enteric Fever	Blood Culture and Sensitivity (Before administration of antibiotic)	Blood (5-10ml for adults, 1-2ml for Children)	First Week of illness	in Blood Culture Medium (Brain Heart Infusion Broth) at Room temperature.
	Widal Test	Serum	First sample-after 1st week . Second sample- after 10-14 days to demonstrate four fold rise in antibody titre.	in Cold Chain

Sample Collection & Transportation Guidelines

Disease	Name of Test	Sample	Collection	Transportation
Cholera & other enteropathogen	Culture & Sensitivity , Serotyping	Stool/Rectal swab in Transport medium -Cary Blair Or Alkaline Peptone Water.(Before administration of antibiotic)	Acute Stage of illness	Stool in cold chain and if transport media is used, at room temperature.
Diphtheria	Albert stain & Culture & Sensitivity	Throat Swab / throat swab in Amies Media.	Acute Stage of illness	in Cold Chain
Meningococcal Meningitis	Gram Stain	CSF	Acute Stage of illness	at room temperature
	Culture & Sensitivity			
	Latex Agglutination Test			

Reports

- Preliminary report by the Nodal medical officer (First information report)
- Daily situation update
- Interim report by the rapid response team
- Final report

Points to remember

- Outbreaks cause suffering, bad publicity and cost resources
- Constant vigil is needed
- Prompt timely action limits damage
- Emphasis is on saving lives
- Don't diagnose every case once the etiology is clear
- Management of linked cases does not require confirmation
- The development of an outbreak is followed on a daily basis
- Effective communication prevents rumours
- Use one single designated spoke person
- Learn lessons after the outbreak is over

Laboratory data management

- Recoding
  - Details of specimens received
  - Tracking of samples
  - Results of tests performed
- Analysis and interpretation of tests
- Timely and accurate communication of results

Information to be recorded on each specimen/ accompanied with each specimen

Name, age, sex

Address in detail

Reporting unit referring the sample

Syndromic diagnosis

Date of onset of illness

Nature of sample, date of collection, date of receipt and condition of sample

Investigation requested

Whether convalescent specimen or not

Supervision and monitoring

- Good supervision helps health staff to perform their best
- Monitoring is also a vital component of any surveillance programme

Steps in Supervision

- Prepare supervisory plan
- Visit each reporting unit at least quarterly
- Make a check list to help the team review most of the important activities
- Review the previous supervisory visit report, so that supervisory team is apprised about field situation

Steps in supervision

- Activities during the visit
  - Use checklist
  - Observe
  - Review records
  - Conduct focus group discussions with staff
- Provide feedback
  - Positive and negative
- Recommend specific actions
  - Specific time frame

Steps in supervision

- Monitor all surveillance activities using standard performance indicators
- District surveillance office monitor indicators of reporting on a regular basis

Integrated disease surveillance programme activities to be monitored

- Collection of data
- Compilation of data
- Analysis and interpretation
- Follow-up action
- Feedback

Weekly indicators of collection and compilation of data

- Timeliness of reports
- Completeness of reports
  - Number of reporting units providing regular/timely/complete reports
  - Number of sentinel private practitioners providing regular/timely/complete reports

Follow-up action indicators

- Percentage of outbreaks detected within one incubation period
- Percentage of outbreaks that have been investigated
- Percentage of outbreaks investigated within 48 hours of detection

Feedback indicators

- Number of monthly meetings at PHC with SC staff regarding the surveillance over last 6 months .
- Number of village health committee meetings attended by primary health centre staff every 3 months.

Thank You