# SECTION 1

## GENERAL PRINCIPLES AND PRACTICES FOR DISEASE SURVEILLANCE

**This section deals with:**

- **Basic Concepts of Disease Surveillance**
- **Common elements in the Integrated Disease Surveillance Programme**

***There is no value to surveillance system unless the information is used for action that prevent or control diseases***

## 1.0 Introduction

Integrated Disease Surveillance Programme (IDSP) is a decentralized, state based surveillance programme 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 allocate health resources more efficiently.

All outbreaks cannot be predicted or prevented. However, precautionary measures can be taken within the existing health infrastructure and service delivery to reduce risks of outbreaks and to minimize the scale of the outbreak if it occurs. The effectiveness with which national programmes are implemented and monitored, the alertness for identification of early warning signals and the capacity for initiating recommended interventions in a timely manner are important to achieve the above objectives.

The course of an 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 can be expected to be significant only if these measures are applied in time. Scarce resources are often wasted in undertaking such measures after the outbreak has already peaked and the outcome of such measures in limiting the spread of the outbreak, and in reducing the number of cases and deaths, is negligible.

When outbreaks occur or when the risk of such outbreaks is high, the co-operation of other government departments, non-governmental agencies and the community often becomes necessary. Such help will be more forthcoming if mechanisms for interactions have been developed before the onset of an outbreak.

The frequency of the occurrence of epidemics is an indication of the inadequacy of the surveillance system and preparedness to identify and control outbreaks in a timely manner.

### 1.1 What is public health 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 is taken.

A more complete definition of surveillance is 'The ongoing systematic collection, analysis and interpretation of health data essential to planning, implementation, and evaluation of public health practice closely integrated with timely dissemination of these date to those who need to know.' The final link in the surveillance chain is the application of these data to prevention and control. A surveillance system includes a functional capacity for data collection, analysis and dissemination linked to public health programmes (CDC 1988).

Surveillance is the backbone of public health programme and provides information so that effective action can be taken in controlling and preventing diseases of public health importance. In some cases action must be immediate – within hours – in order to prevent large scale epidemics and deaths (Cholera, meningitis, food contamination).

In others, control and prevention activities are long term response to information about disease such as tuberculosis, HIV and Non Communicable Disease risk factors, for which action may be taken in weeks, months or even years.

### 1.2 What are the Key Elements of Surveillance System?

***All surveillance systems involve six key elements:***

- Detection and notification of health event
- Investigation and confirmation (Epidemiological, clinical, laboratory)
- Collection of data
- Analysis and interpretation of data
- Feed back and dissemination of results
- Response – a link to public health programme specially actions for prevention and control

### 1.3 What are the levels where surveillance activities are performed?

| Activities | Periphery | District | State |
|---|---|---|---|
| Detection and notification of cases | +++ | ++ | - |
| Collection and consolidation of data | + | +++ | +++ |
| Analysis and Interpretation | + | +++ | +++ |
| Investigation and confirmation | +++ | +++ | + |
| Feed Back | + | +++ | ++ |
| Dissemination | + | ++ | ++ |
| Action | ++ | +++ | + |

- Nil + Some Activity ++ Considerable Activity +++ Great Deal of Activity

### 1.4 Why do we need to do surveillance?

*Uses of Surveillance:*

- Recognize cases or cluster of cases to trigger interventions 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 programmes and resources and allocate resources during public health planning
- Monitor effectiveness of prevention and control measures
- Identify high-risk groups or geographical areas to target interventions and guide analytic studies
- Develop hypothesis that lead to analytic studies about risk factors for disease causation, propagation or progression.

## 1.5 Integrated Disease Surveillance Programme (IDSP)

The IDSP proposes a comprehensive strategy for improving disease surveillance and response through an integrated approach. This approach provides for a rational use of resources for disease control and prevention. 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, private labs, NGOs, etc and also emphasise on community participation.
- The IDSP integrates communicable and non-communicable diseases. Common to both of them are their purpose in describing the health problem, monitoring trends, estimating the health burden and evaluating programmes for prevention and control.
- 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. The gaps in receiving health information from the urban areas needs to be bridged urgently.
- Integration with the medical colleges (both private and public) would also qualitatively improve the disease surveillance especially through better coverage.

### 1.5.1 Objectives of the Integrated Disease Surveillance Programme

The overall general objective of the IDSP is to provide a rational basis for decision-making and implementing public health interventions that are efficacious in responding to priority diseases. Keeping this in mind the main objectives of the IDSP are:

- 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 challenges in the urban and rural areas
- To integrate existing surveillance activities (to the extent possible without having a negative impact on their activities) so as to avoid duplication and facilitate sharing of information across all disease control programmes and other stake holders, so that valid data are available for decision making at district, state and national levels.

### 1.5.2 Core Conditions under surveillance in IDSP

***Regular Surveillance: ****

| | | | |
|---|---|---|---|
| Vector Borne Disease | : | 1. | Malaria |
| Water Borne Disease | : | 2. | Acute Diarrhoeal Disease (Cholera) |
| | : | 3. | Typhoid |
| Respiratory Diseases | : | 4. | Tuberculosis |
| Vaccine Preventable Diseases | : | 5. | Measles |
| Diseases under eradication | : | 6. | Polio |
| Other Conditions | : | 7. | Road Traffic Accidents (Linkup with police computers) |
| Other International commitments: | : | 8. | Plague, Yellow fever |
| Unusual clinical syndromes (Causing death / hospitalization) | : | 9. | Meningoencephalitis / Respiratory Distress Hemorragic fevers, other undiagnosed conditions |

***Sentinel Surveillance***

| | | | |
|---|---|---|---|
| Sexually transmitted diseases/Blood borne | : | 10 | HIV/HBV, HCV |
| Other Conditions | : | 11 | Water Quality |
| | : | 12 | Outdoor Air Quality (Large Urban centers) |

***Regular periodic surveys***:

| | | | |
|---|---|---|---|
| NCD Risk Factors | : | 13 | Anthropometry, Physical Activity, Blood Pressure, Tobacco, Nutrition |
| State specific diseases | : | | e.g. Dengue, Japanese Encephalitis, Leptospirosis |

***Surveillance for disease conditions is important for public health action:***

- The number of core diseases are limited to improve quality of surveillance and to reduce work load on the peripheral health worker.
- Diseases and other conditions of regional importance will be under surveillance in addition to the above core list in all states.
- The list will be reviewed and modified according to the needs of surveillance at least once in two years.

* Viral Hepatitis, ARI are also under active consideration at various levels and may be included subsequently.

### Criteria for Selection of Diseases for Surveillance

- Does the disease condition have high health impact (morbidity, mortality, disability)

  (Malaria, NCD risk factors, Road Traffic Accidents (RTA))
- Does it have significant epidemic potential? (Cholera, Measles)
- Is it a target of a specific national, regional or international disease control programme? (HIV, TB, Polio)
- Will the information collected lead to significant public health action?

To plan any disease control Programme and to identify and control outbreaks, it is important to know the following:

- **Who** get the diseases?
- **How many** get them?
- **Where** do they get them?
- **When** do they get them?
- **Why** do they get them?

There are five steps in the surveillance procedure, which must be carried out at each level, starting from the Primary Health Centre (PHC). Each level must have the capacity for analyzing and using surveillance data for early detection, prevention and control of outbreaks. The five recommended steps are:

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

## Pre-requisites for effective surveillance

Prerequisite for effective surveillance are:

- Use of standard case definitions
- Ensure regularity of the reports
- Action on the reports

For developing an effective disease surveillance system, the District Health Officer/ PHC Medical Officer must also be clear about:

- What information to gather?
- How often to compile and analyze the data?
- How often and to whom to report?
- What proforma or formats to use?
- What action to take?

The data collected should be uniform, regular and timely. Standard case definitions are important to ensure uniformity in reporting so that all reporting units use the same criteria for reporting cases. It is also important to have a list of all reporting units so that the regularity and timeliness of the reports is checked. If no cases are seen, a nil report should be submitted. All levels in the system must:

- Have the standard case definitions?
- Have a list of all reporting units?
- Monitor receipt of reports in time
- Monitor completeness of reports

The standard case definition of diseases is given in a separate manual. Depending on the level of expertise and specificity, disease surveillance in IDSP will be of following three categories:

### 1.5.3 Types of 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
- **Confirmed** – Clinical diagnosis confirmed by an appropriate laboratory test.

#### Syndromic Surveillance

The paramedical health staff will undertake disease surveillance based on broad categories of presentation. The clinical syndromes under surveillance are:

1. Fever
    i. Less than seven days duration without any localizing signs
    ii. with rash
    iii. with altered sensorium or convulsions
    iv. bleeding from skin or mucus membrane
    v. more than seven days with or without localizing signs
2. Cough more than three weeks duration
3. Acute Flaccid Paralysis
4. Diarrhoea
5. Jaundice
6. Unusual events causing death or hospitalization

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

#### Presumptive and Confirmed Disease Surveillance:

Though it is ideal to have all diseases under surveillance confirmed by laboratory tests, this is often not feasible. During routine surveillance, the diagnosis made by the Medical Officer is considered presumptive in nature. The validity of presumptive diagnosis of surveillance conditions will be higher than that of the syndromic one undertaken by the health worker.

Under IDSP the MOs of PHC, CHC, Medical Colleges and Sentinel Surveillance will conduct presumptive surveillance routinely. This will be supplemented by confirmation of diseases by laboratory reporting.

### 1.5.4 Methods of data collection

Several methods can be used for collecting data. While routine reporting (passive surveillance) is universalized, other methods are need and area specific. These include:

i Sentinel surveillance

ii Active surveillance (active search for cases)

iii Vector surveillance

iv Laboratory surveillance

v Sample surveys

vi Outbreak investigations

vii Special studies

#### Routine reporting (institutional based or passive reporting)

All the national health Programmes require that the cases and deaths recorded in the out-patient or in-patient departments of hospitals, dispensaries, CHC, PHC and other health facilities manned by a medical officer are reported to the local health authority on a monthly basis. In the Integrated Disease Surveillance Programme the essential surveillance components will be identified and transfer of information to programme officers facilitated so that information for action is available on a weekly basis.

At each level in the system, the report is required to be analyzed and appropriate action taken as indicated. The reports should be checked for completeness and regularity as these factors can influence the analysis of the reports.

#### i) Sentinel surveillance

A sentinel surveillance system is developed to obtain more reliable and extensive disease related information than the one that is available through the routine reporting. 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. A sentinel center can provide information on one or more diseases. Since the sentinel centers are carefully selected and because the number of the reporting units is much smaller, it is easier to maintain the quality and regularity of the reports.

There should be a close liaison between the sentinel center and the local health office. The sentinel provider from the private sector can help in providing early warning signals, which should trigger action for outbreak investigation.

The sentinel center data will not include all cases in the area. However, if one or more sentinel centers have been carefully selected, it will include sufficiently large number of cases for epidemiological analysis. Data from sentinel centers are useful to determine

trends in the incidence of the reported disease.The district hospital, infectious diseases hospital, medical college hospital (if located in the district) and other large hospitals or laboratories should be included as sentinel centers and reports from these centers should be analyzed separately. These centers would also be submitting the routine monthly report under the passive surveillance system.

### Regularity of reports

Monitoring the regularity of surveillance reports is an important function of the surveillance system. A list of all reporting units in the area must be kept. The Chief Medical Officer of Health of the district must identify the reporting units. Besides the PHCs and CHCs, hospitals, large dispensaries and clinics should be included as reporting units.

### Frequency of reporting

A system of monthly reporting of diseases and Programme specific data already exists in the districts. Many epidemic prone communicable diseases have short incubation period. If a review of the data is made only on a monthly basis, it might delay the timely identification of an outbreak in the early phase. Reporting units need to move into weekly reporting of cases of epidemic-prone diseases seen in their institutions, if surveillance has to be action oriented. If pre-determined trigger levels are breached for a disease, it should serve as a warning signal for investigation. The area of residence of the patients should be checked and if these cases are clustered with respect to time and place, an immediate field visit is indicated. An epidemic can be averted by taking appropriate control measures in time. If an outbreak is suspected or identified, the next level should be notified immediately.

Some outbreaks may be explosive and become apparent in a short time. This should be investigated immediately. Cases of acute hemorrhagic fever or encephalopathy should be investigated and reported immediately.

Daily reports are necessary once an outbreak has been identified so that the situation can be monitored. Neighboring areas would also need to step up surveillance activities also to rule out the spread of the outbreak. After the outbreak has subsided, weekly reports should be continued for at least double the maximum incubation period of the disease.

Only data that is used should be collected, otherwise it will clutter and overburden the system. All the data collected at PHC or district is not required to be transmitted to the state or central levels unless a special request is received.

### ii) Active surveillance

However good the routine reporting system, there will still be cases that will not be recorded under this system. Patients with mild or moderate severity may not seek treatment and some may go to private practitioners. It is also possible that patients in severe condition are taken directly to a large hospital in another district for specialized care. Some cases may die within a short period of onset of symptoms without receiving care at a health facility such as cases of neonatal tetanus.

Active surveillance or active search for cases is resource intensive. The decision to start active surveillance depends on many factors and ground situations. Active search may be called for under the following circumstances.

- During outbreaks to determine the extent of the outbreak and keep mortality rates low by initiating early treatment. Active surveillance is carried out to know the magnitude of the problem which will help in planning logistics for control. In addition, it will give baseline data to evaluate control strategy. It also helps in understanding the genesis of the outbreak.
- To check if reports received by rumor registry are true
- As the number of cases of a disease decline to negligible levels and it becomes important to receive information on every single case as quickly as possible so that further transmission is interrupted by initiating outbreak control measures. For example, active surveillance is recommended for acute flaccid paralysis (AFP)
- To confirm the absence of even a single case. This is done during the pre-certification phase for disease eradication, as 'zero' incidence has to be maintained for a period of three years.

During field visits by the supervisors, absence of disease can be confirmed by contacting few key persons such as a school teacher, gram pradhan, anganwadi worker and others.

The health personnel, outreach personnel of other government departments, non-governmental organizations, panchayats and the members of the community must be encouraged to report cases. The lay case definition of the disease should be widely circulated for this purpose. **The health personnel should not be punished or discouraged in any way from reporting cases as this will lead to suppression of vital information.**

### iv) Laboratory surveillance

Laboratory surveillance plays an important part in confirming diseases since regular summary data can at best be presumptive. The validity of changing trends in suspect cases (syndromes) and presumed cases made by Medical Officers can be confirmed only by laboratory testing.

Under IDSP the laboratory network will report independently all confirmed cases in a prescribed format. This will allow to understand and validate the changes in pattern of syndromes and probable cases seen at the reporting centers.

Laboratories also help in diagnosis of cases for case management and this function will be facilitated by quick feed back of laboratory reports on a case based format back to the reporting units.

Clinical samples should be collected and transported properly to the identified laboratories for appropriate tests. The samples should be labeled properly and accompanied with requisite epidemiological information.

Testing water samples for coliform organisms is a measure to determine the risk of water borne outbreaks. Water quality monitoring is recommended in vulnerable pockets and from sources supplying drinking water to a large population.

Checking the chlorination levels of the water is also important, especially during the monsoon and post-monsoon periods. These measures by the health department are precautionary measures in addition to the mandatory requirements of the concerned department.

Laboratory surveillance must be stepped up in anticipation or in the event of an outbreak. Serological and other laboratory based surveys are sometimes conducted as research projects to collect baseline prevalence rates or to identify high risk factors, age-groups or population sub-groups.

The identification of new agents and changes in the behavior of micro-organisms especially in relation to susceptibility to anti-microbial are also important components of laboratory surveillance.

### v) Sample surveys

Surveys give reliable epidemiological information. These are particularly useful to collect baseline data prior to the launch of a large control programme, especially if such data are lacking through other sources. In IDSP Non communicable diseases (NCD risk factors) will be collected through regular surveys.

Surveys are, however, difficult to conduct and are relatively expensive. The sample size, sampling procedure, methodology, questionnaires and forms must be well designed to avoid bias and misinterpretation of data. Details of this is provided in the chapter under Non communicable Diseases Surveillance. These surveys can be conducted after a period of 3 to 5 years cyclically.

### vi) Special studies

Special studies are sometimes required to study problems that are not addressed through the methods of data collection listed above. Some districts, for example, may have a high prevalence of cases linked to or suspected to be due to environmental pollution; other districts may have problems related to multi-drug resistant micro-organisms.

### vii) Outbreak investigations

Outbreak investigations is the primary method of confirming emerging infections. Changes in trends observed and suspected outbreaks are confirmed by Outbreak investigations.

Outbreaks investigations provide a rich source of epidemiological information. The outbreaks should be investigated to ascertain its etiology and understand why they occurred as well as to identify high risk areas and groups. Laboratory help should be utilized in establishing the diagnosis of early cases only. Once the cause of outbreak is confirmed, laboratory support should not be wasted for each and every case. The data collected as a result of outbreak investigations must be utilized for improving

Programme activities and the surveillance system as well as for filling gaps identified as a result of these investigations.

The results should be shared with other district officers and other states so that the experience gained could be effectively used for preventing such outbreaks in these areas.

### Setting for Case Based Active Surveillance

Active case based surveillance is initiated by the health staff of the CHC and PHC in response to a suspected epidemic.

1. A community member reports a clinical cases with high fever and epidemic investigation is initiated
2. The MPW detects cases during his/her routine home visit
3. The Mobile team identifies cases during village visits
4. The media report clustering of cases in a community or area e.g. outbreak of severe illness suggesting Malaria in a village and epidemic investigation is initiated

In addition the Peripheral Health Staff of CHC will identify syndromes by Active Surveillance during their field visit and report to the MO of PHC/CHC for transmission.

Other than the reporting units mentioned below, efforts must also be made to identify ***key informants*** in each village / ward so that prompt information of any outbreak can be passed onto the health authorities.

> An outbreak or epidemic is defined as the occurrence in a community of cases of an illness clearly in excess of expected numbers. While an outbreak is usually limited to a small focal area, an epidemic covers large geographic areas and has more than one focal point.
>
> There is yet another definition of an outbreak – occurrence of two or more Epidemiologically linked cases of a disease of outbreak potential (e.g. measles, cholera, dengue, JE, AFP or plague).

## 1.5.5 Laboratory Issues

Standardized commercial kits as recommended by the State / National reference lab will be used. In Outbreaks it is not necessary to collect samples of ALL the cases for confirmation. Optimally, samples from the initial 10 cases need to be taken. Once this is confirmed, it should be enough for action to be taken.

### A. Biosafety issues

#### *i) Collection*

1. Blood samples – wearing of gloves, clean surface, venepuncture by disposal syringe and needle. Sterile containers to be used (supplied by the CHC).

2. Discard used needles into sharp boxes
3. Decontaminate used syringes by immersing in 10% bleach, autoclaving and then discarding. Recommended to use autodestruct syringes.
4. In case of spills – wipe the surface with 10% bleach.

***ii) Transportation***

1. Transportation boxes should be securely fastened. Keep absorbent cotton inside the carrier.
2. If cold chain is required, ensure that there are ice packs. Loose wet ice should not be used.
3. Containers for transportation would be provided by the CHC (tube + Plastic bag + Cotton pad).
4. Care should be taken to see that there is no leakage.
5. In case of suspected unusual pathogens, e.g. plague, anthrax etc; sample collection and transportation should be done with utmost precautions;
6. Post mortem samples maybe transported in reverse cold chain in a sterile container to the designated laboratory (as decided by the State RRT).

# SECTION 2

## CASE DEFINITIONS

**This section deals with:**

- **Case definitions of diseases under surveillance.**

**NB: Unless otherwise stated, these case definitions have been taken from the "WHO Recommended Surveillance Standards". Second edition,1999.**

## CHOLERA

### Clinical case description:

In an area where the disease is not known to be present:

Severe dehydration or death from acute watery diarrhoea in a patient aged 5 years or more[1]. Severe dehydration implies lethargy, altered consciousness, decreased urine.

In an area where Cholera is endemic:

Acute watery diarrhoea, with or without vomiting in a patient aged 5 years or more.

In an area where there is a cholera epidemic:

Acute watery diarrhoea, with or without vomiting, in any patient.

### Laboratory criteria for diagnosis:

Isolation of Vibrio cholera O1 or O139 from stools in any patient with diarrhoea.

### Case classification

| | |
|---|---|
| Suspect case: | A case that meets the clinical case definition. |
| Probable case: | Not applicable |
| Confirmed case: | A suspected case that is laboratory-confirmed. |

1 Cholera does appear in children under 5 years; however, the inclusion of all cases of acute watery diarrhoea in the 2-4 year age group in the reporting of cholera greatly reduces the specificity of reporting. For management of cases of acute watery diarrhoea in an area where there is a cholera epidemic, cholera should be suspected in all patients.

## Dengue Fever (DF)

### Clinical case definition:

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

- headache
- Retro-orbital pain
- Myalgia
- Arthralgia
- Rash
- Haemorrhagic manifestations
- Leucopoenia

### Laboratory criteria for diagnosis:

Any one or more of the following:

- Isolation of the dengue virus from serum, plasma, leukocytes, or autopsy samples
- Demonstration of a fourfold or greater change in reciprocal IgG or IgM antibody titres to one or more dengue virus antigens in paired serum samples (depending on the diagnostic kit used)
- Demonstration of dengue virus antigen in autopsy tissue by immunohistochemistry or immunofluorescence or in serum samples by EIA
- Detection of viral genomic sequences in autopsy tissue, serum or CSF samples by polymerise chain reaction (PCR)

### Case classification

**Suspected**: A case compatible with the clinical description.

**Probable**: A case compatible with the clinical description with one or more of the following:

- Supportive serology (reciprocal haemagglutination-inhibition antibody titre, comparable IgG EIA titre or positive IgM antibody test in late acute or convalescent-phase serum specimen).
- Epidemiologically linked with a confirmed case of dengue fever (occurrence at same location and time as other confirmed cases of dengue fever).
- High vector density.

**Confirmed**:

- Isolation of the dengue virus from serum, plasma, leukocytes, or autopsy samples
- Demonstration of a fourfold or greater change in reciprocal IgG or IgM antibody titres to one or more dengue virus antigens in paired serum samples (depending on the diagnostic kit used)

- Demonstration of dengue virus antigen in autopsy tissue by immunohistochemistry or immunofluorescence or in serum samples by EIA
- Detection of viral genomic sequences in autopsy tissue, serum or CSF samples by polymerase chain reaction (PCR)A case compatible with the clinical description and confirmed by positive IgM ELISA rapid Test in the laboratory.

## Dengue Haemorrhagic Fever (DHF)

A probable or confirmed case of dengue

1. And Haemorrhagic tendencies evidenced by one or more of the following:
   - Positive tourniquet test
   - Bleeding: mucosa, gastrointestinal tract, injection sites or other
   - Petechiae, ecchymoses or purpura
   - Haematemesis or melaena
2. And thrombocytopenia (100,000 platelets or less per $mm^3$)
3. And evidence of plasma leakage due to increased vascular permeability, manifested by one or more of the following:
   - >_20% rise in average haematocrit for age and sex
   - >_20% drop in haematocrit following volume replacement treatment compared to baseline
   - Signs of plasma leakage (pleural effusion, ascites, hypoproteinaemia)

## Dengue Shock Syndrome (DSS)

All the above criteria, plus evidence of circulatory failure manifested by rapid and weak pulse, and narrow pulse pressure (<_20 mm Hg) or hypo-tension for age, cold, clammy skin and altered mental status.

[2] Most infections occur in early childhood. A variable proportion of adult infections is asymptomatic.
[3] The anti-HBc IgM test, specific for acute infection, is not available in most countries. HbsAg, often available, cannot distinguish between acute new infections and exacerbations of chronic hepatitis B, although continued HBsAg seropositivity (>6 months) is an indicator of chronic infection.

## ACUTE VIRAL HEPATITIS

### Clinical case description:

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

Biological signs include increased urine urobilonogen and >2.5 times the upper limit of serum alanine aminotransferase2.

### Laboratory criteria for diagnosis:

| | |
|---|---|
| **Hepatitis A:** | IgM anti HAV positive |
| **Hepatitis B:** | Positive for HBsAg or IgM anti-HBc |
| **Hepatitis C:** | Positive for anti-HCV |
| **Hepatitis D:** | Positive for HBsAg or IgM anti-HBc Plus anti-HDV |
| **Hepatitis E:** | Positive for anti-HEV IgM |

### Case classification

| | |
|---|---|
| Suspect case: | as per clinical case definition. |
| Probable case: | Not applicable |
| Confirmed case: | A suspect case that is laboratory confirmed. For Hepatitis A, a case compatible with the clinical description and with epidemiological link with a lab confirmed case of Hepatitis A. |

## HIV INFECTION

**Clinical case description:**

There is no clinical description; the diagnosis is based on lab criteria

**Laboratory criteria for diagnosis:**

HIV positive serology (ELISA)

Confirmation should be a second ELISA[4].

## AIDS

**Clinical case description:**

WHO clinical case definition for AIDS in an adult or adolescents (>12 years of age) when diagnostic resources are limited; for the purposes of AIDS surveillance an adult or adolescent (>12 years of age) is considered to have AIDS if at least 2 of the following major signs are present in combination with at least 1 of the minor signs listed below, and if these signs are not known to be related to a condition unrelated to HIV infection

*Major signs (2 signs or more):*

- Weight loss >_10% of body weight
- Chronic diarrhoea for >1 month
- Prolonged fever for >1 month (intermittent or constant)

*Minor signs (1 or more):*

- Persistent cough for >1 month
- Generalized pruritic dermatitis
- History of herpes zoster
- Oropharyngeal candidiasis

**Laboratory criteria for diagnosis:**

HIV positive serology (ELISA)

Confirmation should be a second ELISA[4].

[4] Confirmation by a second serological test is necessary only in settings where estimated HIV prevalence is known to be <10%

## JAPANESE ENCEPHALITIS (JE)

### Clinical case description:

A case of sudden onset of fever, chills and aches, including headaches and sometimes meningismus, particularly in adults. In children, gastrointestinal pain and dysfunction may dominate the initial stage of the disease and convulsions are common. Although the disease is often mild, some cases rapidly progress to severe encephalitis with mental disturbances, general or focal motor abnormalities and progressive coma. The encephalitis cannot be distinguished clinically from other central nervous system infections.

### Laboratory criteria for diagnosis:

Presumptive: Detection of an acute phase anti-viral antibody response through one of the following:

- Elevated and stable serum antibody titres to JE virus through ELISA, haemagglutination-inhibition or virus neutralization assays or
- IgM antibody to the virus in the serum

### Confirmed:

- Detection of the JE virus, antigen or genome in tissue, blood or other body fluid by immunochemistry or immunofluorescence or PCR, or
- JE virus-specific IgM in the CSF, or
- Fourfold or greater rise in JE virus-specific antibody in paired sera (acute and convalescent phases) through IgG, ELISA, haemagglutination inhibition test or virus neutralization assay, in a patient with no history of recent yellow fever vaccination and where cross-reactions to other flaviviruses have been excluded

**Note: JE infections are common and the majority are asymptomatic. JE infections may occur concurrently with other infections causing central nervous system symptoms, and serological evidence of recent JE viral infection may not be correct in indicating JE to be the cause of the illness.**

### Case classification

| | |
|---|---|
| Suspect Case: | A case that is compatible with the clinical description |
| Probable Case: | A suspect case with presumptive lab results |
| Confirmed Case: | A suspect case with confirmatory lab results. |

Source: NICD Manual on Japanese Encephalitis

## MALARIA

### Clinical case description:

A case of fever.

May be accompanied with

- Headache, backache, chills, rigors, sweating, myalgia, nausea and vomiting
- Splenomegaly and anemia
- Generalized convulsions, coma, shock, spontaneous bleeding, pulmonary edema, renal failure and death (untreated falciparum infection)

### Laboratory definition of malaria:

Demonstration of malaria parasites in blood films OR Positive Rapid Diagnostic Test for Malaria

### Case classification

**Suspect case:** Any case of fever (in an endemic area)

**Probable case:** A case that meets the clinical case definition

**Confirmed case:** A suspect case with malaria parasites in blood films

**Confirmed complicated/severe malaria:** A confirmed case with symptoms/signs of complicated/severe malaria (prostration, impaired consciousness, respiratory distress (acidotic breathing), multiple convulsions, circulatory collapse, pulmonary oedema (radiological), abnormal bleeding, jaundice, haemoglobinuria, severe anaemia, etc).

**Confirmed malaria death:** Death of a confirmed case.

Source: NAMP

## MEASLES

### Clinical case description:

Any person with:

- Fever and
- Maculopapular (non-vesicular) rash lasting for more than 3 days, and
- Cough, coryza (i.e. running nose) or conjunctivitis (i.e. red eyes).

### Laboratory criteria for diagnosis:

- Presence of measles specific IgM antibodies; or
- At least a fourfold increase in antibody titre in pained sample (acute and convalescent; collected at 14 days interval); or
- Isolation of measles virus.

### Case classification

| | |
|---|---|
| Suspect case: | A case that meets the clinical case definition. |
| Probable case: | Not applicable |
| Confirmed case[6]: | A case that meets the clinical case definition and that is laboratory-confirmed or linked Epidemiologically to a lab-confirmed case. |

[6] Only for outbreak confirmation and during elimination phase.

## POLIOMYELITIS

### Clinical case description:

A case of AFP is defined as any child aged <15 years who has acute onset of flaccid paralysis for which no obvious cause (such as severe trauma or electrolyte imbalance) is found, or paralytic illness in a person of any age in which polio is suspected.

**Cases of AFP without isolation of wild poliovirus may be classified as "polio compatible" if:**

- Stool specimens were inadequate

  AND

- Residual weakness was present 60 days after onset of paralysis or 60-day follow-up was not done (due to death or absence)

  AND

- Expert review concludes that these cases could not be discarded as "non-polio" based on available data.

### Laboratory criteria for diagnosis:

- Wild poliovirus isolated from any stool specimen

### Case classification

*Suspect case:* Syndromic case of AFP – Fever with abrupt onset of paralysis of leg or arm

*Probable case:* Epidemiologically linked case

*Confirmed case*: A suspected case that is laboratory-confirmed.

## PLAGUE

### Clinical case description:

Disease characterised by rapid onset of fever, chills, headache, severe malaise, and prostration with

**Bubonic form:** extreme painful swelling of lymph nodes (buboes)

**Pneumonic form:** cough with blood-stained sputum, chest pain, difficult breathing

**Septicaemic form:** toxic changes in the patient.

**Case classification**

**Suspect case:** A case that meets the clinical case definition.

**Probable case:** A suspect case with

- ❖ Y.pestis F1 antigen detected in clinical materials by direct fluorescent antibody testing or by some other standardized antigen detection method, **or**
- ❖ Isolate from a clinical specimen demonstrates biochemical reactions consistent with Y.pestis or PCR positivity, **or**
- ❖ A single serum specimen is found positive for diagnostic levels of antibodies to y.pestis F1 antigen, not explainable on the basis of prior infection or immunization
- ❖ Epidemiological link with a confirmed case.

**Confirmed case:** a suspected or probable case that is lab-confirmed

- ❖ Isolate identified as Y. pestis by phage lysis or cultures; **or**
- ❖ A significant (4-fold) change in antibody titre to the F1 antigen in paired serum specimens.

### Laboratory criteria for diagnosis:

- Giemsa smear should be positive
- Direct fluorescent antibody testing of smears (for anti-F1 antibody)
- PCR test
- 4 fold increase in antibody titres against F1 antigen (by PHA tests)
- Isolation of the bacteria by culture and phage lysis

## TUBERCULOSIS

CASE DEFINITION (according to site and bacteriology).

### Pulmonary tuberculosis, sputum smear positive (PTB+)

- Tuberculosis in a symptomatic patient with at least two initial sputum smear examinations (direct smear microscopy) positive for Acid-Fast Bacilli (AFB), or
- Tuberculosis in a patient with one sputum examination positive for acid-fast bacilli and radiographic abnormalities consistent with active pulmonary tuberculosis as determined by the treating medical officer, or
- Tuberculosis in a patient with one sputum specimen positive for acid-fast bacilli and at least one sputum that is culture positive for acid-fast bacilli.

### Pulmonary tuberculosis, sputum smear negative (PTB-)

Tuberculosis in a patient with symptoms suggestive of tuberculosis with at least three (3) sputum specimens negative for acid-fast bacilli, and any one of the following:

- Radiographic abnormalities consistent with active Pulmonary TB (as determined by a MO), or
- Culture is positive.

### Extra-pulmonary tuberculosis (ETB)

- TB of organs other than lungs: pleura, lymph nodes, abdomen, genito-urinary tract, skin, joints, bones, meninges etc.
- Diagnosis should be based on one culture positive specimen from an extra-pulmonary site, or histological or strong clinical evidence consistent with active extra-pulmonary TB, followed by a decision by a MO to treat with a full course of ATT.

Any patient diagnosed with both pulmonary and extra-pulmonary TB should be classified as a case of pulmonary TB.

## TYPHOID

### Clinical case description:

Any person with an insidious onset of sustained fever, headache, malaise, anorexia, relative bradycardia, constipation or diarrhoea, and non-productive cough. Intestinal ulceration can produce intestinal haemorrhage or perforations. However, many mild and atypical infections occur.

### Laboratory criteria for diagnosis:

Isolation of S. typhi from blood, stool, or other clinical specimen

### Case classification

| | |
|---|---|
| Suspect case: | A patient with fever of at least 38 degree C for 3 or more days. |
| Probable case: | A clinically compatible case that is epidemiologically linked to a confirmed case in an outbreak |
| Confirmed case: | A suspect case with laboratory confirmed positive blood culture. |
| Carrier: | S.typhi organisms persisting in stools or urine for >1 year after onset of disease. |

# SECTION 3

## REPORTING UNITS, PARTICIPANTS & THEIR ROLES IN DISEASE SURVEILLANCE

**This section deals with:**

- **The individual roles of each of the key functionaries**
- **An overview of all the key activities necessary for surveillance to be successful.**

## 3.0 Introduction

In any system, it is important that the participants roles are clearly defined. This is the basis of the operational manual – so that it is clear who is to do what. In this chapter, this is expanded so that the details of each role and functionary is clearly spelt out. An overview of the roles is given in Table 3.1.

## 3.1 Reporting Units participating in regular passive surveillance under IDSP:

The Syndromic surveillance will be at the field by the health workers of the public sector units at both urban and rural setting. Medical Officers will undertake disease based surveillance at a probable level when not confirmed by laboratory tests. The regular surveillance will be primarily passive in type and will be undertaken at all reporting units by the Medical Officers. Each reporting unit will be provided a unique identifier so that computerization and identity and type can be recognised.

### Reporting units for disease surveillance

| | **Public health sector** | **Private health sector** |
|---|---|---|
| **Rural** | CHCs, District Hospitals | Sentinel Private practitioners and Sentinel hospitals. |
| **Urban** | Urban Hospitals, ESI / Railway / Medical college hospitals . | Sentinel Private nursing homes, sentinel hospitals, Medical colleges, Private and NGO laboratories |

1. Sub-center - Health Worker / ANM reports all patients fulfilling the clinical syndrome from PHC, private clinic, Hospital etc.
2. PHC / CHC Medical Officers reports all probable cases of interest where this cannot be confirmed by laboratory tests at the peripheral reporting units and as confirmed when the laboratory information is available as in case of blood smear positive Malaria and sputum AFB +ve Tuberculosis.
3. Sentinel Private Practitioners, District Hospitals, Municipal Hospitals, Medical colleges, Sentinel hospitals, NGOs - Medical Officers Reports as probable cases of Interest.
4. Other Sentinel sites
    - o ANC Sites NACO - HIV/ HBV/HCV surveillance,
    - o Water Board,
    - o Pollution control Board,
    - o District Police Office for Road Traffic Accidents.
5. Participating Labs will report confirmed cases when they get positive diagnostic tests especially in PHC, CHC, Medical Colleges, District Hospitals, Private Hospitals etc

### 3.2 Role of the various functionaries in regular surveillance

The cases that have been detected and recorded need to be compiled and transmitted to the next level on a regular basis. This should be done on a fixed date from each type of reporting unit. The day of the week for reports to reach District surveillance office from CHC, Medical colleges, Sentinel Private Practitioners (SPPs) Private Hospitals etc should be fixed by the district surveillance officer in each district. All reporting centers will provide zero reporting if no cases were detected.

1. The MO of PHC will report weekly statistics on Monday to CHC by telephone. Hard copy of Form A and Form L will also be sent by PHC to CHC once weekly. The computer /Pharmacist at the CHC will compile statistics from all PHCs along with CHC data and transmit the same every Tuesday to District Surveillance Officer through Dial up Computer network in both Form A and Form L.

2. Health worker as and when he detects additional cases during routine field visits, will add to the compiled report from CHC in the week of reporting. However this information may be available at PHC fortnightly when ANMs come to PHC and no alteration in this frequency is included.

3. The SPP from rural area will provide regular reports to MO PHC in form A. Weekly reports will reach every Monday to CHC. If no cases are detected, zero reports will be sent by all SPPs. The mode of transmission will be in any of the following methods.

    1. Letter
    2. Fax
    3. Telephone
    4. Direct Courier

4. Medical Colleges, District Hospitals, Railway Hospitals and SPPs from urban areas will report in Form A and Form L (if there are accredited laboratories) to District Surveillance officer at weekly intervals.

**Remember to report any unusual clustering of cases or any health event causing deaths in a short span of time.**

**Use telephone, fax, email, special messenger, police wireless – any method to report immediately.**

**Verbal report to be followed by a written case based form**

**If there are no cases in that week / month, do not forget to write 'zero' in the relevant row.**

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

| | | |
|---|---|---|
| 1. | PHC | Pharmacist |
| 2. | CHC | Computer / Pharmacists |
| 3. | SPPs | MO |

4. District Hospital Computer / Pharmacists
5. Medical Colleges Statistical Officer
6 Laboratory MO in charge / Laboratory Technician

The quality of the data filled up by the health staff need 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.

## THE COMMUNITY INFORMANTS

**People responsible**

| Public Sector | | Private sector | |
|---|---|---|---|
| **Rural** | **Urban** | **Rural** | **Urban** |
| Teachers, AWWs, Panchayat members, Ward members. | | SHG leaders, Health club / Youth club / Farmer's club leaders etc. | |

The conditions that they would be able to identify would be syndrome of diarrhoea, jaundice, fever and unusual events leading to death or hospitalization.

## THE MPWs and the HEALTH ASSISTANTS

**People responsible**

| Public Sector | | Private sector | |
|---|---|---|---|
| **Rural** | **Urban** | **Rural** | **Urban** |
| MPWs (M & F), HA (M & F) | Urban link workers | NGO peripheral workers. | |

The conditions that they would be able to identify would be syndrome of diarrhoea, jaundice and fever, unusual events leading to death or hospitalization, syndrome of caugh, and syndrome of AFP

THE PHARMACISTS (PHC / CHC / Hospitals)

**People responsible**

| Public Sector | | Private sector | |
|---|---|---|---|
| **Rural** | **Urban** | **Rural** | **Urban** |
| Pharmacists of the PHCs, CHCs and Hospitals | Pharmacists in the urban dispensaries or | Pharmacists of private clinics, private Corporation Hospitals hospitals and nursing homes. | |

## THE MO – PHC / CHC / Private dispensaries.

**People responsible**

| Public Sector | | Private sector | |
|---|---|---|---|
| **Rural** | **Urban** | **Rural** | **Urban** |
| MO of PHC / CHC | MO in Dispensary | Private practitioners in dispensaries | |

The diseases that they would be able to identify would be diarrhoeal diseases, jaundice, suspected malaria, suspected typhoid, measles, suspected dengue, suspected JE, and TB.

## THE DISTRICT RRT

**People responsible**

| Public Sector | | Private sector | |
|---|---|---|---|
| **Rural** | **Urban** | **Rural** | **Urban** |
| District RRT | Corporation RRT | Not Applicable | |

The diseases that they would be able to identify would be diarrhoeal diseases, jaundice, suspected malaria, suspected typhoid, measles, suspected dengue, suspected JE, and TB.

## THE DISTRICT SURVEILLANCE OFFICER

**People responsible**

| Public Sector | | Private sector | |
|---|---|---|---|
| **Rural** | **Urban** | **Rural** | **Urban** |
| DSO | MHO | Not Applicable | |

## THE DISTRICT SURVEILLANCE CELL

**People responsible**

| Public Sector | | Private sector | |
|---|---|---|---|
| **Rural** | **Urban** | **Rural** | **Urban** |
| DSO, DHO, DTO, DMO, DIO, Representatives of the Dt RRT, others involved in public health prg. | MHO, TB Officer, Malaria officer, Immunisation officer, Representatives of the Corporation. RRT, others involved in public health prg. | Representatives of the IMA, NGOs. | |

## MO – HOSPITALS

**People responsible**

| Public Sector | | Private sector | |
|---|---|---|---|
| **Rural** | **Urban** | **Rural** | **Urban** |
| MOs in the Department of Medicine, Pediatrics, Infectious diseases and Casualty of the District Hospital. | MO in the Department of Medicine, Pediatrics, Infectious diseases and Casualty of the Municipal/ Corporation / Medical College Hospital. | MO in the Department of Medicine, Pediatrics, Infectious diseases and Casualty of the Private / NGO / Medical College Hospitals. | |

The diseases that they would be able to identify would be diarrhoeal diseases, jaundice, suspected malaria, suspected typhoid, measles, suspected dengue, suspected JE, and suspected TB.

## THE STATISTICAL ASSISTANT – DISTRICT

This is basically the person responsible for collating all the data at the Block / District or the Corporation Health Office. His/her activities would include

- Receiving all the data from the reporting units (CHCs, District Hospital, Private practitioners, Private institutions, Labs, Urban dispensaries etc.) The data may be received in paper/electronic format.
- Entering the data into the computer.
- Checking the validity of the data reported. This will be done electronically and the software will have the inbuilt checks.
- Once the data is entered and checked, then the reports may be generated. These reports will be generated weekly for diseases of outbreak potential and monthly for the other communicable diseases. For non communicable diseases, the report will be generated as and when the special survey is conducted in the field.
- Once the reports are generated, they will be submitted to the District Surveillance Officer / Municipal – Corporation Health Officer.
- After the analysis by the concerned officer, they will then prepare a report summarising the analysis and submit it to the State Surveillance officer.

## THE LAB TECHNICIAN

**People responsible**

| Public Sector | | Private sector | |
|---|---|---|---|
| **Rural** | **Urban** | **Rural** | **Urban** |
| Lab technicians at the CHC or the Lab in charge at the District Hospital / Public Health Lab. | Lab technicians in the urban dispensary or the lab in-charge at the Municipal / Corporation/ Medical College Hospital | Lab technicians / lab in-charge from accredited and identified labs | |

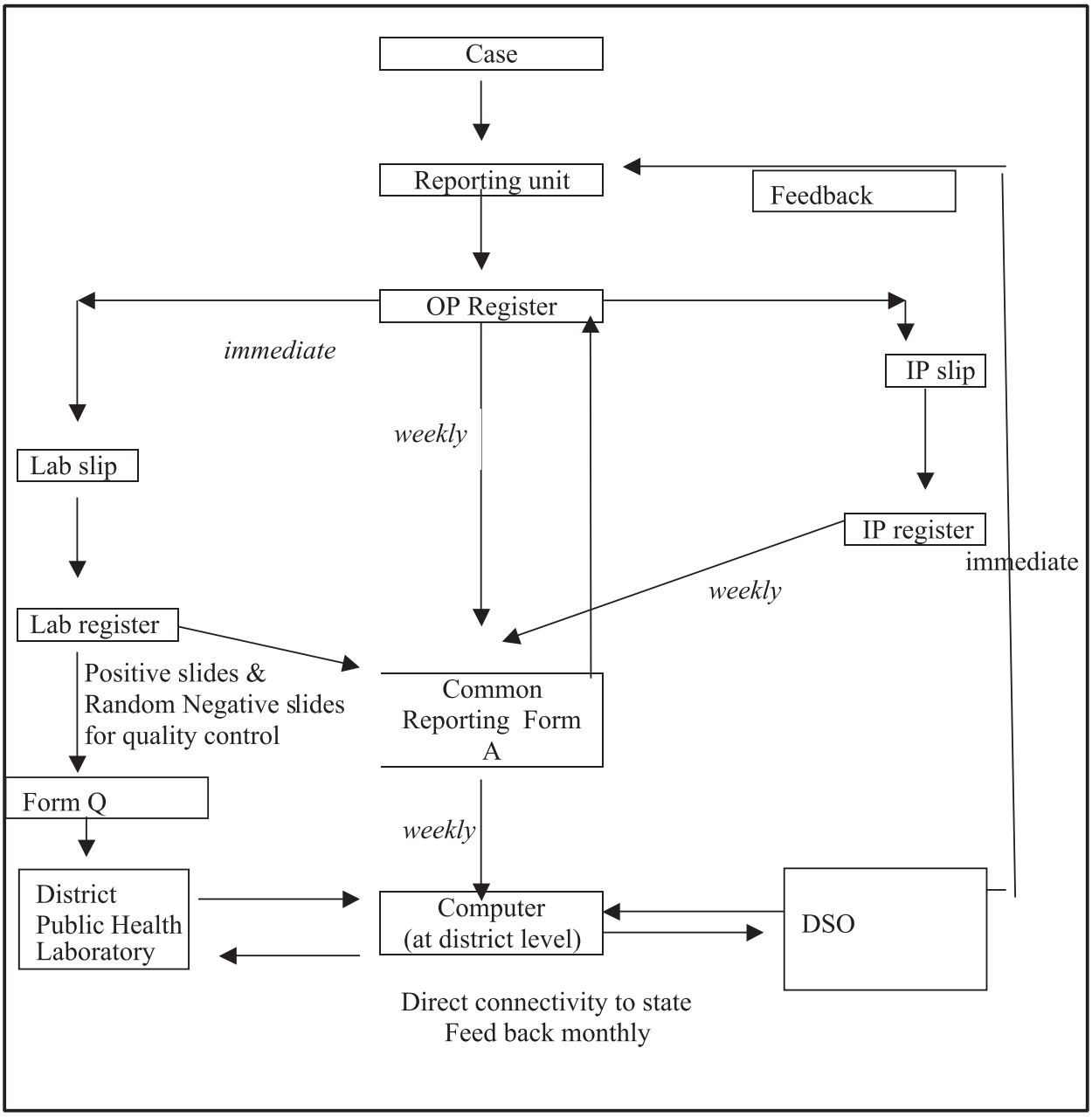
The diseases that they would be able to identify would be TB, Malaria and Typhoid at CHC level , Hepatitis A, B etc, malaria, typhoid, dengue, suspected JE, TB and HIV at district level onwards.

## THE STATE SURVEILLANCE CELL

**People responsible**

| Public Sector | | Private sector | |
|---|---|---|---|
| **Rural** | **Urban** | **Rural** | **Urban** |
| Not applicable | State Surveillance officer, DHS, Jt Dir – PH, Jt. Dir – TB, Malaria, FW, DME. | Representatives of the IMA, NGOs. | |

## METHOD OF PASSIVE SURVEILLANCE FROM PHC/CHC




**The laboratory report and the clinical report are in the same forms forwarded to the DSO. However they will be considered as independent reports.**

### Role of the various functionaries in regular surveillance

The cases that have been detected and recorded need to be compiled and transmitted to the next level on a regular basis. This should be done on a fixed date from each type of reporting unit. The day of the week for reports to reach District surveillance office from CHC, Medical colleges, SPPs, Private Hospitals etc should be fixed by the district surveillance officer in each district. All reporting centers will provide zero reporting if no cases were detected.

1. The MO of PHC will report weekly statistics on Monday to CHC by telephone. Hard copy of Form A and Form L will also be sent by PHC to CHC once weekly. The computer /Pharmacist at the CHC will compile statistics from all PHCs along with CHC data and transmit the same every Tuesday to District Surveillance Officer through Dial up Computer network in both Form A and Form L.

2. Health worker as when he detects additional cases during routine field visits this will be added to the compiled report from CHC in the week of reporting. However this information may be available at PHC fortnightly when ANMs come to PHC and no alteration in this frequency is included.

3. The Sentinel Private Practitioner from rural area will provide regular reports to MO PHC in form A. Weekly reports will reach every Monday to CHC. If no cases are detected zero reports will be sent by all SPPs. The mode of transmission will be in any of the following methods.

    - Letter
    - Fax
    - Telephone
    - Direct Courier

4. Medical Colleges, District Hospitals, Railway Hospitals and SPPs from urban areas will report in Form A and Form L (if there are accredited laboratories) to District Surveillance officer at weekly intervals.

Remember to report any unusual clustering of cases or any health event causing deaths in a short span of time.

Use telephone, fax, email, special messenger, police wireless – any method to report immediately.

Verbal report to be followed by a written case based form

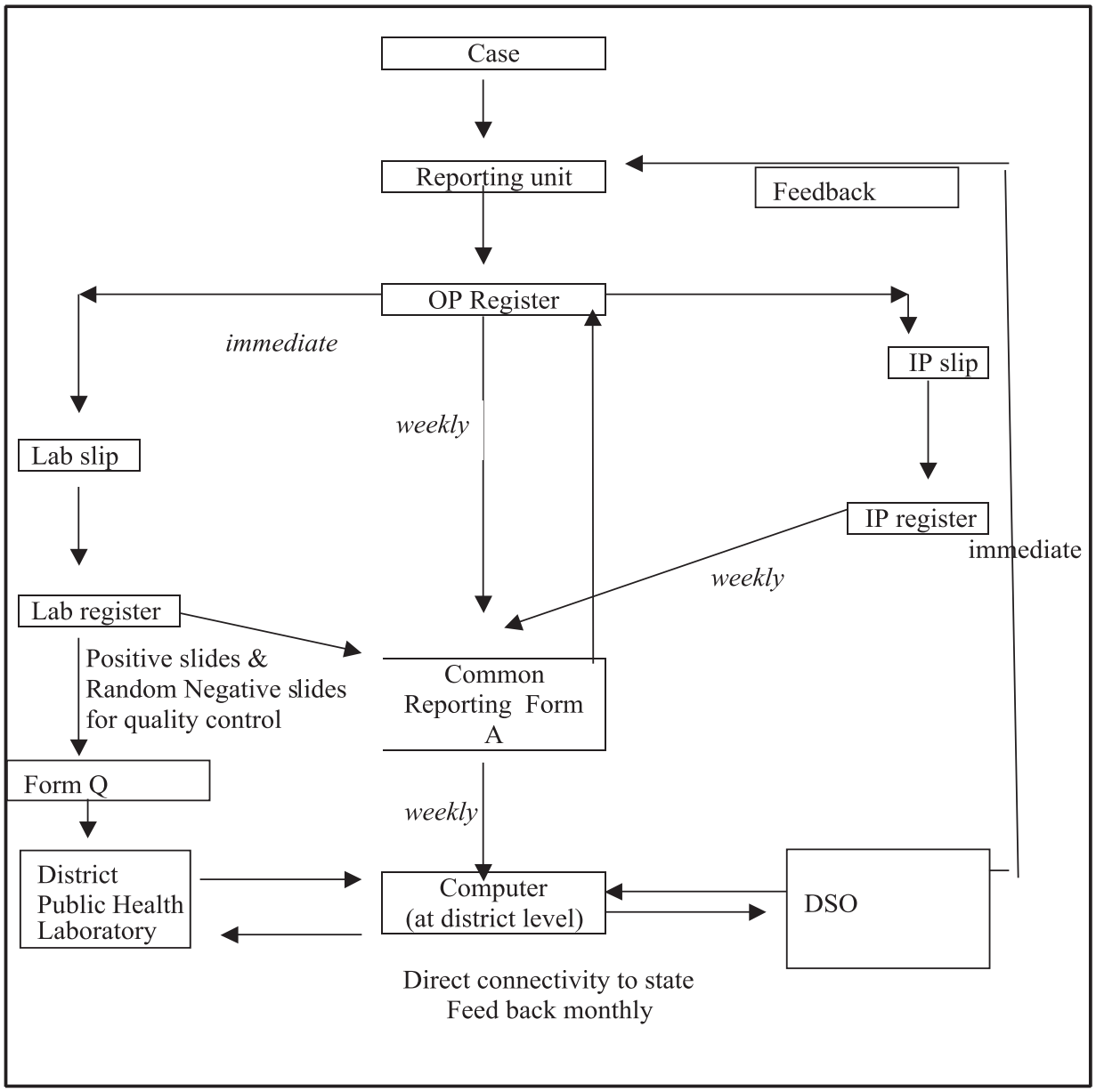
If there are no cases in that week / month, do not forget to write 'zero' in the relevant row.

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

| | | |
|---|---|---|
| 1. | PHC | Pharmacist |
| 2. | CHC | Computer / Pharmacists |
| 3. | SPPs | MO |
| 4. | District Hospital | Computer / Pharmacists |
| 5. | Medical Colleges | Statistical Officer |
| 6 | Laboratory | MO in charge / Laboratory Technician |

The quality of the data filled up by the health staff need 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 a copy to be maintained at the reporting unit from where it originated.

## Method Of Passive Surveillance by SPPs, Private Hospitals, Clinical reports from Medical Colleges, Municipal Hospitals etc




**The Laboratory reports flow independent of the clinical reports in separate forms this situation and there is no linkage with clinical cases.**

### Formats for Reporting:

The passive surveillance by the reporting units will be transmitted to the District Surveillance Officer once a week since most diseases with epidemic potential has a short incubation period.

Since IDSP is primarily designed as action oriented programme. The formats have been designed to bring in information on the action taken from the reporting units as well as the frequency of diseases particularly from the public health systems participating in the programme

The formats for the private practitioners and Sentinel hospitals participating in the programme have been designed to make it feasible for SPPs to report diseases with minimum effort and has been simplified to include only the most essential summary data. The action taken will not be included from SPPs since this responsibility rests with the public health system.

The participating laboratories will have a reporting format which allow them to provide weekly summary reports of confirmed cases of diseases in the laboratories participating in IDSP.

Considering the complexity of linking clinical and laboratory records during passive reporting. It was felt that these remain unlinked for the purpose of surveillance and only feed back from laboratories be case based so that this will allow the clinician to manage cases more effectively in the participating reporting units.

**The Formats are given in the Health Worker Manual & Medical Officers Manuals**

## Table 4.3 Procedure for reporting by various functionaries at various levels.

| From | To | Functionary | Frequency* | Source / Forms | Method of transmission |
|---|---|---|---|---|---|
| PHC | CHC | MO pharmacist | Weekly | Compile combined Form A , Form Q / | The information is transmitted by telephone from PHC to CHC and manually sent to CHC once week on Monday. |
| **CHC** | **District Surveillance officer** | **MO / pharmacist** | **Weekly** | **From OP / IP register and Form A and form LForm Q** | **The reports received from PHCs along with the CHC report will be sent to District surveillance officer preferably by Electronic method so that information is compiled at the DSO without delay.** |
| **SPPs both rural and urban** | **District Surveillance officer** | **MO / pharmacist** | **Weekly** | **From OP / IP register to Form A** | **The information is sent to the District Surveillance officer by E-mail, courier or by a specific method arranged earlier.** |
| Urban dispensary | District hospital or Corporation Hospital | MO / Pharmacist | Weekly | From OP / IP register to Form A | The information is transmitted manually once week on Monday |
| **District hospital/ Medical colleges/ NGO hospitals Corporation Hospital** | **District surveillance officer Corporation Surveillance Officer** | **MO / Nurse / Pharmacist/ statistical officer** | **Weekly** | **From OP / IP register and from Form A Laboratory confirmed list will be sent separately in Form L** | **The compiled list of all cases will be sent to District surveillance officer preferably by Electronic method so that information is compiled at the DSO without delay.** |

* Special circumstances will be taken into consideration in hilly region where DSO will set different frequency.

## Laboratory Network at District Level:

| From | To | Functionary | Frequency* | Source / Forms | *Method of transmission* |
|---|---|---|---|---|---|
| Sentinel Private labs | District Surveillance officer | Nodal lab technician | Weekly | From Lab register to Form L | In clustering of cases or suspected epidemic situation. Any available method of communication may be used. Telephone, fax, courier |
| Medical College Laboratory | District surveillance officer | Nodal lab technicians | Weekly | From the lab registers in Form L | Electronic communication with DSO<br>Telephone, Fax, E-mail, network |
| District Public Health Laboratory | District Surveillance Officer | Officer in charge of District Lab | Weekly | Summary format to be completed at District public health laboratory. Case based reports for Quality assurance tests | Through District Computer network so that feed back from DPHL is quickly available for case management at the reporting units |
| District Public Health Laboratory | All reporting units | Officer in charge of District Lab | As early as possible | Case based reports for case management | Through District Computer network so that feed back from DPHL is quickly available for case management at the reporting units |

## District Surveillance Unit:

The district surveillance unit will collate the information received electronically from CHC, Medical colleges, District hospitals, and by courier or by mail from SPPs and other laboratories on a weekly basis. This will be analysed and forwarded to State surveillance officer at weekly intervals.

| | | | | | |
|---|---|---|---|---|---|
| District Surveillance officer | Reporting Units | DSO | Dial up Connectivity | Summary quality control reports<br>Feed back reports | These will be summary reports send at monthly frequency |
| District Surveillance officer | State Surveillance officer | DSO | Real time connectivity from district to state envisaged | From Forms A, B, C to Form D | All compile non case based information will be available to the state surveillance officer from rural / urban , Government and SPPs in real time connectivity. |
| District Surveillance Officer | Reporting Units | DSO | Dial up Connectivity | Case based reports for case management. As soon as laboratory tests are ready | The reports will be made available through the network and made available through dial up connectivity to reporting units. |

| LEVEL | FUNCTIONARIES | DATA COLLECTION | DATA ENTRY | ANALYSIS | INVESTIGATION | RESPONSE | FEEDBACK | Monitoring & Evaluation |
|---|---|---|---|---|---|---|---|---|
| SUB DISTRICT LEVEL | COMMUNITY INFORMANTS | + | - | - | - | + | - | - |
| | MPW / HAs | ++ | ++ | - | + | ++ | - | - |
| | COMPUT/PHARM /LABAST | - | +++ | - | - | - | - | - |
| | MO (PHC / CHC) | +++ | ± | + | ++ | +++ | + | +++ |
| | PRIVATE PRACTITIONER | ++ | ++ | - | - | ± | ± | - |
| DISTRICT LEVEL | MO (HOSPITALS) | +++ | +++ | - | + | + | - | ++ |
| | PRIVATE HOSPITALS | +++ | + | - | - | + | - | - |
| | MUNICIPAL MOs | +++ | + | + | ++ | ++ | - | + |
| | District Data Entry Personal | - | +++ | - | - | - | - | - |
| | District RRT | - | - | - | +++ | ++ | - | - |
| | Dt. SURVEILLANCE OFFICER | - | - | +++ | +++ | ++ | +++ | +++ |
| | MUNICIPAL HEALTH OFF. | + | - | ++ | +++ | +++ | ++ | + |
| | LAB TECHNICIAN (CHC/HOSP) | +++ | + | - | ++ | - | + | - |
| | STATISTICIANS (CHC/Dt) | - | ± | +++ | - | - | - | - |
| | DISTRICT MAGISTRATES | - | - | + | - | - | - | + |
| | NGOs | +++ | ± | - | + | + | - | - |
| | MEDICAL COLLEGES | +++ | + | ++ | ++ | + | + | - |
| STATE LEVEL | STATE SURVEILLANCE CELL | - | - | +++ | ++ | ++ | +++ | +++ |
| NATIONAL LEVEL | NICD / ICMR / NIE/ INDICLEN | - | - | - | + | + | - | ++ |
| | WHO / WB | | | | + | | | ++ |

# SECTION 4

## ANALYSIS & INTERPRETATION OF DATA

**This section describes how to :**

- **Analyse and interpret the data received**
- **Compare analysis results with thresholds to identify outbreaks**
- **Compare analysis results between regions to detect poorly performing regions**

## 4.0 Introduction:

Ongoing analysis of surveillance data is important for detecting outbreaks andunexpected increases and decreases in disease occurrence, monitoring diseasetrends, and evaluating the effectiveness of disease control programmes and policies. This information is also needed to determine the most appropriate and efficient allocation of public health resources and personnel. Analyses should be performed at regular intervals to identify changes in disease reporting. These analyses can be performed using standard approaches (tabulating reports manually and filling in a summary data sheet, for example, or running a standard computer programme to generate a summary report). Findings of these analyses should be reviewed regularly, and provided as feedback to medical providers and others in the community who are asked to report cases. Additional special analyses are often needed to answer specific questions that arise;1 these analyses may require additional customized approaches beyond what are routinely performed.

## 4.1 Role of computers in analysis

In many health departments, surveillance data are routinely entered into a computerized database programme. Use of computers can greatly facilitate analysis of surveillance data, especially for large and complex datasets. Analyses can be done using any one of a number of database and statistical programmes. In many health departments, a public domain word processing, database, and statistics package for IBM-compatible computers, is used for data entry, analysis, and generating reports. Mapping capability is an important adjunct to data analysis. Although mapping of public health surveillance data may be performed using a variety of software packages, some are quite expensive and complex to use.

### 4.1.1 What computers cannot do

Although computers can greatly facilitate analysis of surveillance data, especially if the dataset is large and the analyses complex, most analyses of surveillance data are simple (see examples included in this chapter) and can readily be performed with the assistance of an inexpensive pocket calculator. Likewise, data can be graphically presented with only graph paper, a ruler, and colored pencils.

Computers cannot contact physicians and laboratories and obtain missing information. Computers cannot interpret laboratory tests or make judgements about epidemiologic linkage. Computers cannot make judgments about duplicate records or identify and correct mistakes in data entry. Computers can't even tell you if there is an outbreak in progress; they can provide information that may help you make a decision, but even a sophisticated trend analysis is no substitute for familiarity with the people and the disease patterns in your community and with your reporting system.

The mistake most commonly made in analysis and use of public health surveillance data is not related to statistical testing, improper presentation of data, or failure to perform complex multivariate analyses; the most common mistake is **not looking at the data.** Computer hardware and software can facilitate the epidemiologist's task, but are no substitute for looking, thinking, discussing, and taking action.

## 4.2 Analyzing surveillance data

Analyses of surveillance data begins with characterizing the pattern of disease reports by person, place, and time. Compare patterns of disease reports at different times (e.g., the number of mumps cases reported in 1999 compared with the number of mumps cases in 1998); in different places (e.g., the number of measles cases reported in one district compared with the number of measles cases in another district); and among different populations (e.g., the number of measles cases reported among infants, pre-schoolage children, schoolage children, adolescents, and adults). Vaccination status of cases should also be examined; if there is disease transmission in the community, lack of vaccination is likely to be the factor most strongly associated with illness. Analyses looking at delays in reporting, completeness of reporting of critical variables, and applying case definition criteria also are useful in evaluating the quality of case investigation and reporting, and should be undertaken regularly. Missing or inaccurate data may limit the usefulness of any analysis. Erroneous or incomplete data cannot be corrected through statistical procedures.

## 4.3 Objectives of Surveillance Analysis:

- Analyse and interpret the data received within 24 hours so that action can be initiated
- Compare analysis results with thresholds to identify outbreaks
- Compare analysis results between regions to detect poorly performing regions

While collection of good quality data is important for a surveillance Programme, analysis and interpretation of this data is of equal significance. Without this, all the hard work put in by the workers becomes meaningless. Data Analysis provides four important outcomes

- Frequency count by reporting unit helps in identifying outbreaks or potential outbreaks
- During an outbreak, analysis of the data identifies the most appropriate and timely control measures. Analysis in terms of person, time and place will be able to focus the intervention; e.g. analysis of suspected and confirmed cases of Malaria will be able to identify the affected families and the cause of the outbreak so that corrective action can be targeted at this cause.
- Analysis of routine data provides information for predicting changes of disease rates over time and enables appropriate action.
- Identifies problems in the health system; so that gaps can be effectively plugged – e.g. an outbreak of Malaria should alert the public health manager about the possibility of increasing vector density, poor mosquito control, migration of infected people etc in that region.
- Comparison of analysed data between regions or between sectors (public and private) helps the public health manager in improving the quality of the surveillance system

- Analysis also helps identify high risk population groups, so that targeted interventions can be provided to them and scarce resources utilised appropriately.

While, analysis should ideally be done at all levels from the periphery upwards, the main people responsible for analysis are the District Surveillance Officers. The degree of analysis would depend on the capacity of the persons involved. For example, the community informants would be alert for any unusual increase in the number of fever cases occurring in the community. He should then be able to inform the MPW with details of how many people, what are the symptoms, where are they located etc. The PHC MO will limit his analysis to detection of outbreaks and anticipating seasonal trends. While the District Surveillance Officer would be doing all of the above as well as monitoring the effectiveness and efficiency of the health service Similarly other functionaries at various levels would be able to carry out analysis as outlined in another section

### 4.3.1 Suggested analyses:
### (description of cases by person, place, and time)

The following analyses should be regularly performed as part of routine analysis of surveillance data. Additional analyses may be needed under special circumstances; the state health department can provide you additional guidance in routine and special analyses of surveillance data. The interpretation and possible action steps are only examples, to indicate some of the information that may be gained from the analysis.

#### i) By person

Describe the persons (cases) with vaccine-preventable diseases who were identified by your surveillance system. Attributes of the cases include age group, sex, and race or ethnicity. It may be appropriate to divide age groups based on recommended ages of vaccine administration (e.g., separating those too young to be vaccinated from those eligible for vaccination), as well as the age distribution of reported cases. Age groups should span a narrower age range for ages in which disease incidence is highest and a broader age range in which disease incidence is lower.

**Example 1**

**Measles Cases by Age Group**

| AGEGRP | Freq | Percent | Cum |
|---|---|---|---|
| A<MO | 57 | 36.1% | 36.1% |
| B 6-12 MO | 41 | 25.9% | 62.0% |
| C 13-18 MO | 6 | 3.8% | 65.8% |
| D 19-23 MO | 6 | 3.8% | 69.6% |
| E 2-5 YR | 18 | 11.4% | 81.0% |
| F 6-9 YR | 17 | 10.8% | 91.8% |
| G 10 YR + | 12 | 7.6% | 99.4% |
| H AGE UNK | 1 | 0.6% | 100.00% |
| Total | 158 | 100.0% | |

**Interpretation-Measles** cases were clustered among infants, with more than 60% of reported cases among those 12 months of age and younger (Figure 1). The occurrence of measles among infants <6 months of age is extremely worrisome, because these children are too young to have received sufficient doses of vaccine. Note that it is difficult to draw any conclusions about disease incidence from these data; although these age group divisions are logical for analysis of data, presentation of data in such unequal age groups may obscure important differences in disease incidence. Figure 2 shows the incidence of measles, by age group.

**Figure 1**
**Measles Cases by Age Group**

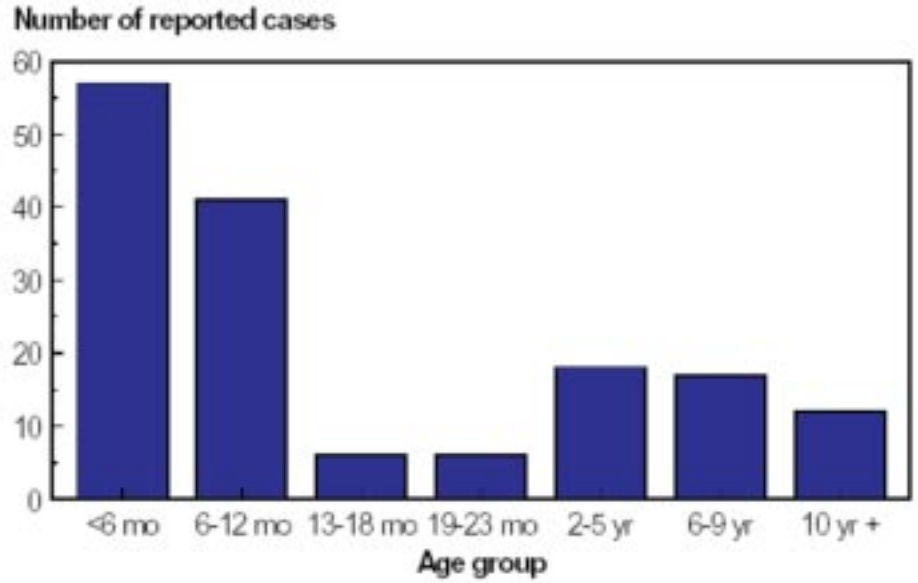
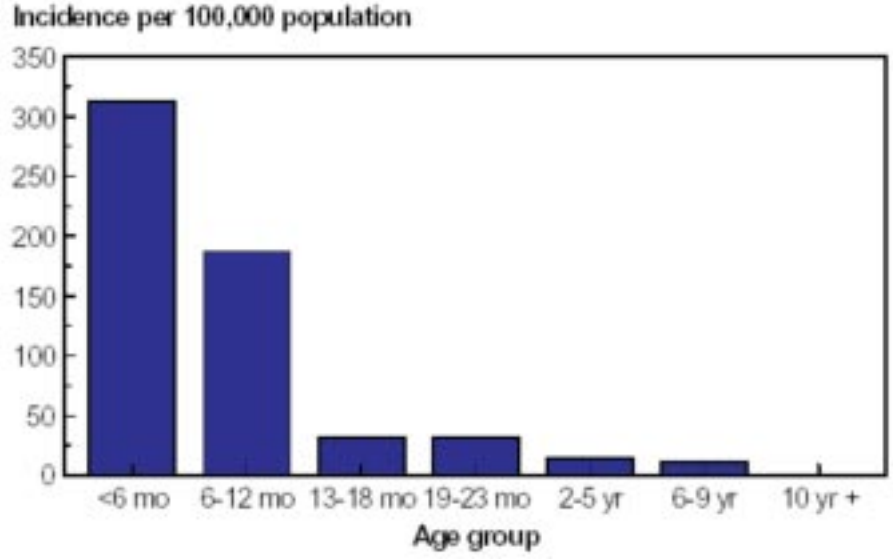



**Figure 2**
**Measles Incidence by Age Group**

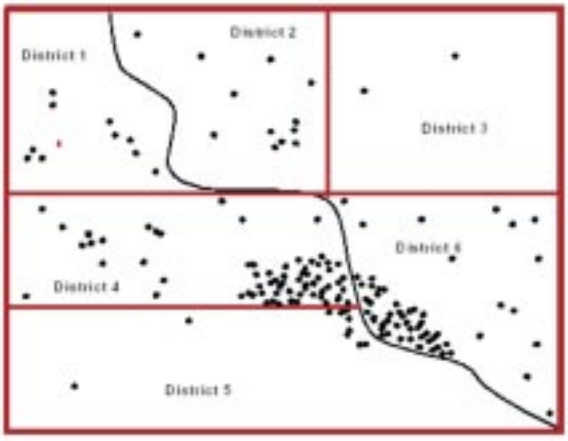


### ii) By place

Describe the persons with vaccine-preventable diseases (cases) detected by your surveillance system by geographic location. Location may be defined as the place where the case was first reported, place of residence of the case, or place of hospitalization. Location may be a city, country, or health district.

| DISTRICT | Freq | Percent | Cum |
|---|---|---|---|
| 1 | 10 | 6.3% | 6.3% |
| 2 | 12 | 7.6% | 13.9% |
| 3 | 2 | 1.3% | 15.2% |
| 4 | 67 | 42.4% | 57.6% |
| 5 | 10 | 6.3% | 63.9% |
| 6 | 57 | 36.1% | 100.0% |
| Total | 158 | 100.0% | |

### Measles Cases by Health District




**Interpretation.** The data demonstrate marked clustering of reported pertussis cases in District 4 and District 6 (Figure 3). The number of reported cases in those two districts is of concern regardless of the distribution of population in this area, but comparing disease occurrence in the six districts requires knowing the district population and calculating rates. The differences in reported cases by district in this example may be due to differences in population, disease incidence, or case ascertainment

### iii) By time

Describe the distribution of cases over time. Look for changes in the number of cases over time. Time intervals may be in years, months, weeks, or other unit of time. Date may be defined as date of onset of illness, date of diagnosis, or date of report to health department. Analysis by date of onset gives the most accurate representation of disease occurrence. Distribution of cases over time is most clearly presented as a graph with time on the x-axis and number of cases on the y-axis.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 5 years. Compare the cumulative number of cases year-to-date with the cumulative number of cases year-to-date of previous years.

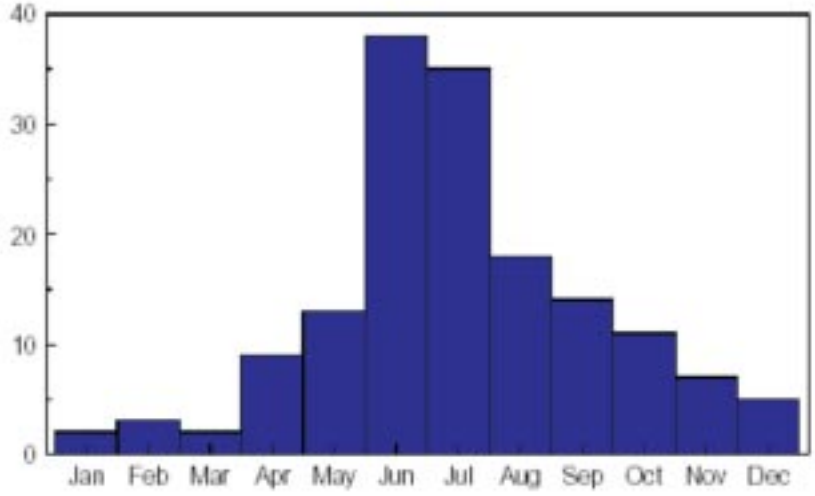
## Reported Measles Cases, by Month of Onset

| MONTH | Freq | Percent | Cum |
|---|---|---|---|
| A OCT 97 | 3 | 1.9% | 1.9% |
| B NOV 97 | 1 | 0.6% | 2.5% |
| C DEC 97 | 1 | 0.6% | 3.2% |
| D JAN | 2 | 1.3% | 4.4% |
| E FEB | 3 | 1.9% | 6.3% |
| F MAR | 2 | 1.3% | 7.6% |
| G APR | 9 | 5.7% | 13.3% |
| H MAY | 13 | 8.2% | 21.5% |
| I JUN | 38 | 24.0% | 45.6% |
| J JUL | 35 | 22.2% | 67.7% |
| K AUG | 18 | 11.4% | 79.2% |
| L SEP | 14 | 8.9% | 99.0% |
| M OCT | 8 | 5.1% | 93.0% |
| N NOV | 6 | 3.8% | 96.8% |
| O DEC | 5 | 3.2% | 100.0% |
| Total | 158 | 100.0% | |

**Interpretation.** There is marked temporal clustering beyond the expected seasonal increase in measles, suggesting that a large outbreak occurred during the summer of 1998. Note that in this dataset of cases reported during 1998 there are a number of cases with onset during 1997. 1999 reports should be reviewed to look for cases with onset in 1998, because of apparent delays in reporting. The magnitude of these delays can be monitored by tracking the interval between onset of disease and initial report.

Figure below demonstrates the reported cases of meales for 1998 by month of onset, deleting the cases with onset in 1997, and including the few additional cases reported in 1999, but with onset in the latter months of 1998.

**Reported Measles Cases**
**by Month of Onset (1998)**



### Pertussis Cases by Age Group and DTaP/DTP Doses

| | DTP DOSES | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| AGEGRP3 | 0 | 1 | 2 | 3 | 4 | 5 | 9 | Total |
| A 0-2 MONTHS | 7 | 1 | 0 | 0 | 0 | 0 | 0 | 8 |
| B 3-4 MONTHS | 7 | 6 | 1 | 0 | 0 | 0 | 0 | 14 |
| C 5-6 MONTHS | 2 | 6 | 1 | 0 | 0 | 0 | 1 | 10 |
| D 7-18 MONTHS | 5 | 6 | 9 | 10 | 4 | 0 | 0 | 34 |
| E 19 MO-6 YRS | 1 | 2 | 4 | 8 | 0 | 2 | 0 | 27 |
| F 7 YEARS+ | 1 | 0 | 1 | 1 | 0 | 10 | 9 | 22 |
| Total | 23 | 21 | 16 | 19 | 14 | 12 | 10 | 115 |

**Interpretation.** Many of the children reported with pertussis were undervaccinated; cases among children <6 months of age are not preventable by vaccination, because they are too young to have received 3 doses of pertussis vaccine, the minimum number of doses needed to confer protection. In order to be up-to-date, children 3–4 months of age should have received at least 1 dose, 5–6 months at least 2 doses, 7–18 months at least 3 doses, 19 months to 3 years of age 4 doses, and those > 7 years of age should have received 5 doses. Many of these cases were among children who were not appropriately immunized, suggesting that there may be a wider problem with immunization coverage among young children in this community. It is often extremely difficult to verify vaccination of adults, which may account for the high proportion of cases with unknown vaccination status among cases >7 years of age.

### Dengue Cases by Case Definition

| Category | Frequency | Percent | Cumilative |
|---|---|---|---|
| Syndrome of Fever | 57 | 36.2 | 36.2 |
| Fever with rash | 46 | 29.2 | 65.4 |
| Probable case of Dengue Fever | 18 | 11.5 | 76.9 |
| Confirmed case of Dengue Fever | 10 | 6.4 | 83.3 |
| Linked Case | 1 | 0 | 83.3 |
| Fever with insufficient information | 26 | 16.7 | 100 |
| Total | 158 | 100% | |

### 4.3.2 When should analysis be done?

Analysis is done at various frequencies – daily, weekly, monthly, annually (see Table 5.1). Reports should be generated, either manually or computerized according to this frequency.

**Table 5.1: Frequency of analysis and summary reports**

| No | Summary Reports | Daily[7] | Weekly | Monthly | Yearly |
|---|---|---|---|---|---|
| 1 | Timeliness and completeness of reports | | ✓ | ✓ | ✓ |
| 2 | Description by time, place and person | ✓ | ✓ | ✓ | ✓ |
| 3 | Trends over time | ✓ | ✓ | ✓ | ✓ |
| 4 | Checking for crossing of threshold levels | | ✓ | ✓ | |
| 5 | Comparison between reporting units | | | ✓ | |
| 6 | Comparison between public and private | | | ✓ | |
| 7 | Comparison between disease and lab data | | | ✓ | |

Dissemination of results:

- The results of the analysis should be shared on monthly basis with the all the members of the District surveillance Unit
- During outbreak and epidemics, the results will be shared within a week with district administration, panchayat leaders, municipal council /corporation officials, and other stake holders as decided by the DSO

While collection of good quality data is important for a surveillance Programme, analysis and interpretation of this data is of equal significance. Without this, all the hard work put in by the workers becomes meaningless. Data Analysis provides four important outcomes

- Analysis of routine data helps in identifying outbreaks or potential outbreaks e.g. a case of measles identified should alert the health services about a potential outbreak.
- During an outbreak, analysis of the data identifies the most appropriate and timely control measures. Analysis in terms of person, time and place will be able to focus the intervention; e.g. analysis of a diarrhoeal outbreak will be able to identify the affected families and the cause of the outbreak so that corrective action can be targeted at this cause.
- Analysis of routine data provides information for predicting changes of disease rates over time and enables appropriate action. E.g. the increasing trends in Road Traffic accidents should help the public health manager raise resources and plan interventions to reduce the same.
- Identifies problems in the health system; so that gaps can be effectively plugged – e.g. an outbreak of measles should alert the public health manager about the possibility of low vaccination coverage in that region.
- Comparison of analysed data between regions or between sectors (public and private) helps the public health manager in improving the quality of the surveillance system

- Analysis also helps identify high risk population groups, so that targeted interventions can be provided to them and scarce resources utilised appropriately.

### 4.3.3 Analyses - at which level?

While, analysis should ideally be done at all level from the periphery upwards, the main people responsible for analysis are the District surveillance Officers (for rural areas) and the Corporation Health Officer (for urban areas). The degree of analysis would depend on the capacity of the persons involved. For example, the community informants would be alert for any unusual increase in the number of fever cases occurring in the community. He should then be able to inform the MPW with details of how many people, what are the symptoms, where are they located etc. The PHC MO will limit his analysis to detection of outbreaks and anticipating seasonal trends. While the District Surveillance officer would be doing all of the above as well as monitoring the effectiveness and efficiency of the health service Similarly other functionaries at various levels would be able to carry out analysis as outlined in Annex 5.1. It is important for the Medical College staff to get involved to analysis of surveillance data.

**Data analysis should ideally be done at each level**

#### When should analysis be done?

Analysis is done at various frequencies – daily, weekly, monthly, annually (see Table 5.1). Reports should be generated, either manually or computerized according to this frequency.

**Table 5.1: Frequency of reports and analysis**

| No | Reports | Daily[1] | Weekly | Monthly | Yearly |
|---|---|---|---|---|---|
| 1 | Timeliness and completeness of reports | | ✓ | ✓ | ✓ |
| 2 | Description by time, place and person | ✓ | ✓ | ✓ | ✓ |
| 3 | Trends over time | ✓ | ✓ | ✓ | ✓ |
| 4 | Checking for crossing of threshold levels | ✓ | | ✓ | |
| 5 | Comparison between reporting units | | | ✓ | |
| 6 | Comparison between public and private | | | ✓ | |
| 7 | Comparison between disease and lab data | | | ✓ | |

#### How to analyse?

As can be seen most of the analysis is done on a weekly or monthly basis. In the event of an outbreak, of course the analysis has to be done on a daily basis. This will be dealt in the chapter on the investigation of and response to an outbreak. In this chapter, only the analysis of routine data will be dealt with.

[1] In the event of an outbreak

When analysing the data the Technical Committee needs to keep some key points in mind

1. The strengths and weaknesses of the data collection method and reporting process. Is the data generated reliable and valid?
2. Examine each disease separately
3. Start with crude numbers and then proceed to summarized data
4. Tables are necessary, but graphs are easier to review
5. When comparing between institutions / areas, use rates and ratios (Incidence rate / Case fatality ratio) rather than actual numbers. This takes care of the effect of different populations in different regions e.g. if Block A has 50 cases of malaria and Block B has 75, it does not naturally imply that the situation in Block B is worse. If Block B has a larger population, then it could account for the higher case load.

A systematic approach to analysis will help the public health manager in getting a clear picture of the situation. The steps given below are the same whether the analysis is done on a weekly basis or on a monthly or annual basis.

### 4.3.4 Steps in analysis

1. Convene the technical committee – preferably on a fixed day every week / month
2. Ask for the reports (see below for details of each report) – a minimum of 4 reports on a weekly basis and 7 on a monthly basis
3. Review the reports disease wise and interpret it appropriately.
4. Check the validity of the data
5. Prepare a summary, which is to be shared with colleagues at the same level as well as with the concerned officers at the higher level. This summary report, especially the monthly report should be also used as a tool for feedback.
6. Take action where necessary

The details of the reports that need to be generated are as follows:

#### Report 1 – Completeness and Timeliness of data

This is one of the first report that has to be generated. It is a reflection on the performance of the reporting units. For this one needs to have a list of the reporting units. The MO then monitors which of the reporting units are sending complete reports on time. A simple tool to monitor the Completeness and Timeliness of the reporting units is provided in Annex 5.2.

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 catchment 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)

Timeliness and Completeness of reporting units is a proxy indicator of the alertness of the surveillance system. An alert system will have timeliness and completeness approaching 100%.

Also completeness of reporting units gives one an idea about the reliability of the data; for example, if completeness of reports is only 50%, then the incidence of disease would be under reported by 50%. So the incidence rates and CFRs need to be read in conjunction with the Completeness reports.

### Interpretation of the report:

| Scenario | Interpretation |
|---|---|
| Reporting unit A is timely and complete | An ideal scenario, everything is working well |
| Reporting unit B is timely, but regularly incomplete | The MO of B has understood 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 MO has to find out what the problem is. |
| Reporting unit C is late, but reports are complete | The MO of C has not understood the importance of reporting on time. He is probably waiting for all the reporting units under his jurisdiction to report before submitting his report. He needs to be impressed about the significance of timely reporting. |
| Reporting unit D is late and the reports are incomplete. | Major problem in this reporting unit – neither the MO of D nor the MOs of the reporting units under D have understood the importance of surveillance and timely data. |

### Report 2 – Weekly / Monthly summary report

This is the second set of reports that need to be generated and consists of a subset of reports in the form of tables, graphs and maps. It is based on the compiled data of all the reporting units. Some samples are shown in Annex 5.3.

Tables – there are various tables, starting from the primary one giving the number of cases and deaths to tables with summarized data and rates etc.

Graphs – bar graph to identify the incidence of diseases and deaths; pie graphs to show the load of diseases

Maps – this helps the officer to identify the areas where health events are occurring.

As can be seen, the tables are cumbersome to read and interpret. However it is necessary for the sake of records. Also a cursory scanning should identify missing values, transposition of rows or columns and biases. In the event of computerisation, once the data is entered, various tables to suit the need of the individual surveillance officer can be obtained. Preferably data should be presented in a graphical manner so that the MO can review the data easily.

When looking at the data of a single region / reporting unit, primary measures like cases and deaths would suffice, incidence rates and case fatality ratios are necessary for comparing data between reporting units and regions.

**Some of the measures that need to be used for analysis are**

- **Cases – the number of <u>New</u> cases that have been detected in the specified period**
- **Deaths – the number of deaths that have occurred in the specified period in the community or in the institution**
- **Incidence Rate – the number of new cases that have occurred in a 1000 population over a fixed period of time.**
- **Incidence rate of disease A:**

$$\frac{\text{No of new cases of disease A X 1000}}{\text{Mid year Population in the catchment area}}$$

- **Case Fatality Ratio – the number of deaths from a particular disease that have occurred per 100 cases of that particular disease. This gives an idea about the**
  - **Virulence of the disease e.g. a high case fatality in a particular outbreak may be an early indication of a change in strain of the agent.**
  - **Whether a case has been identified promptly and hence the efficiency of the surveillance system, e.g. if the cases are being identified very late, then the deaths will be high also.**
  - **Whether a case has been managed properly and hence the effectiveness of the health services in terms of case management.**
- **Case fatality ratio for disease A:**

$$\frac{\text{No: of deaths from disease A X 100}}{\text{No: of new cases of disease A}}$$

**In the case of hospitals / private sector one cannot calculate the incidence rate as there is no catchment area.**

For the sake of clarity initially, separate tables and graphs should be made for data from the public and private sector.

This preliminary analysis should give the MO an idea of the health problem under his/ her jurisdiction in terms of basic epidemiological parameters (time, place and person). It thereby helps the MO to focus on problems that need further analysis.

**GIS**

Analysing data by place gives information about where the disease is occurring. This sort of analysis maybe done manually or by using computers and GIS software (WHO's Health Mapper is an example). It allows the MO to

- detect any clustering of cases – e.g. if there is any increase in the number of diarrhoea cases, the GIS will help in checking whether this is a sporadic increase or whether there is a clustering in a particular village etc. the latter has more significance.
- understand some of the risk factors that may have contributed to the spread of disease – e.g. in the above instance, if the GIS map shows the clustering to be around a water source, then one can hypothesise that this may be the source of this outbreak.
- predict any potential outbreaks e.g. if the water quality in a particular area is low, then one can predict a potential outbreak of water borne disease.

### Some of the possible interpretations from this report(s) are

- Any increase or decrease in incidence of a disease for a particular reporting unit, (as compared to other reporting units).
- Any increase or decrease in deaths from a disease for a particular reporting unit (as compared to other reporting units).
- Age group of cases (under 5 or 5 and above).
- Place where the events are occurring
- Any clustering of cases (from the spot map).

### Report 3 - Comparison with previous weeks / months / years

This report helps the MO to detect the trend of the disease over time. It needs to be done for each disease and should done on a weekly, monthly and annual basis.

Weekly analysis: should compare the current week's data with the data of the previous three week's. Here one takes the current week's cases and deaths and compares it with the cases and deaths for the same disease in the same region for the previous 3 weeks. An example is shown in Fig 5.1. As can be seen from the example, there seems to be an increasing trend in the number of cases of malaria. This should alert the district authorities to take the necessary preventive action.

Monthly and yearly analysis looks at the secular trends and tries to identify the months in the year when the disease tends to peak. This should alert the Public health manager about the possibility of intervention to prevent the peaks. An example is given in Fig 5.2

**Fig 5.1– Number of cases and deaths due to malaria in Keonjhar District – Orissa - 2001**

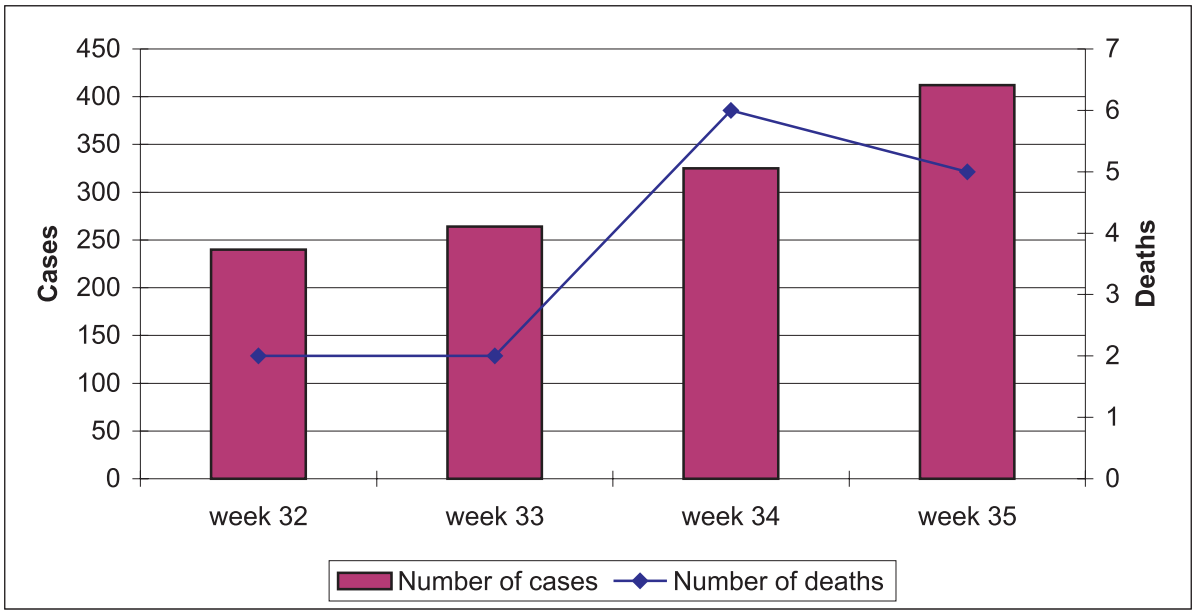
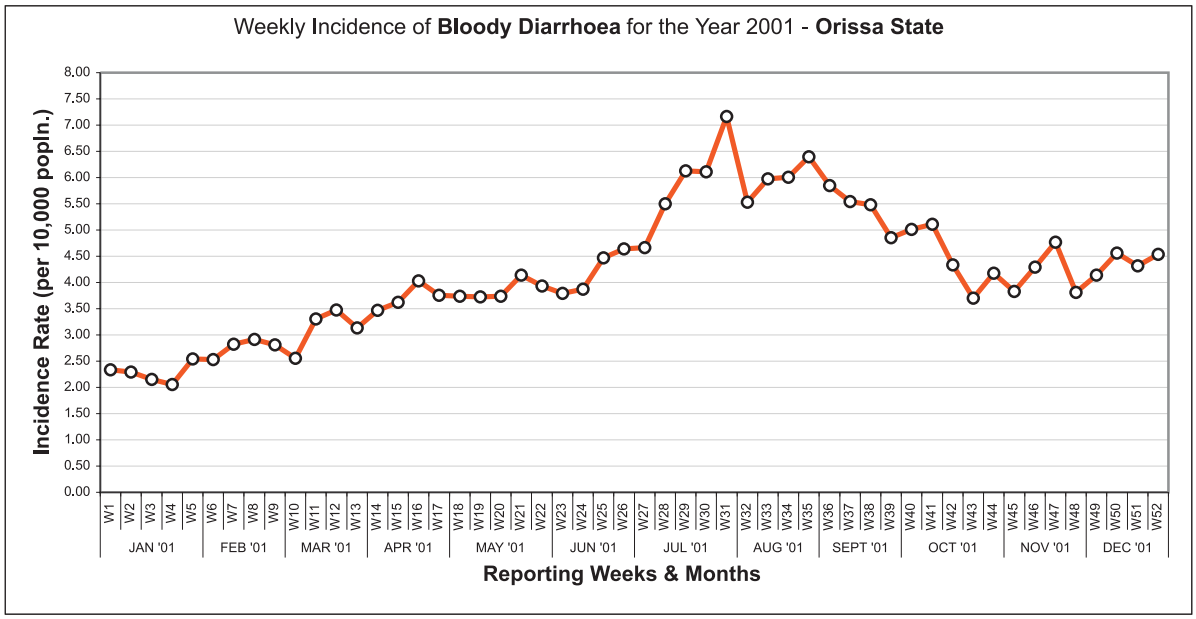


**Fig 5.2 – Incidence rate of dysentery in Orissa - 2001**




The main purpose of this report is to understand the trends over time.

***Some of the possible interpretations are***

| Scenario | Interpretation |
|---|---|
| Increasing trends | o Could be a potential outbreak<br>o Could be better reporting<br>o Could be a change in the detection and reporting |
| Decreasing trends | o Could indicate improved control measures<br>o Could indicate under reporting because of incomplete reports<br>o Could indicate a change in the detection and reporting |
| Plateau of the graph | o Could indicate stable situation<br>o Has to be corroborated with the completeness report. |

## Report 4 - Crossing threshold values

This report helps to identify outbreaks early enough. The weekly / monthly data should be always 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 measles in a tribal area is considered as an outbreak and reason for action
2. Based on historical data e.g. if data for a particular disease is available, then the monthly mean should be calculated for the previous three years (excluding months in which there was an outbreak).
3. Increasing trends of the disease over a short duration of time (e.g. in weeks)

Some examples of thresholds are given below in Table 5.2

### Report 5 - Comparison between the reporting units in the region

This is a useful report and is a good proxy indicator for the quality of the data generated. One compares the *Incidence rates and Case Fatality Ratios* for the current month between the various reporting units. This should ideally be done from the Block and above level. If there are sharp rises or falls in the incidence rates (where one is not expecting one), then one should look more carefully at the veracity of the reports from that reporting unit. In a given region, one will not expect a major difference in incidence rates etc unless there are some specific interventions there. An example of this, comparing the 10 coastal districts of Orissa is given in Fig 5.3

Here one can see that Jagatsinghpur has a very low incidence rate as compared to its neighbouring districts. As there are no particular intervention Programmes in this district, one may need to look carefully at the data from this district.

This report needs to be generated on a monthly basis.

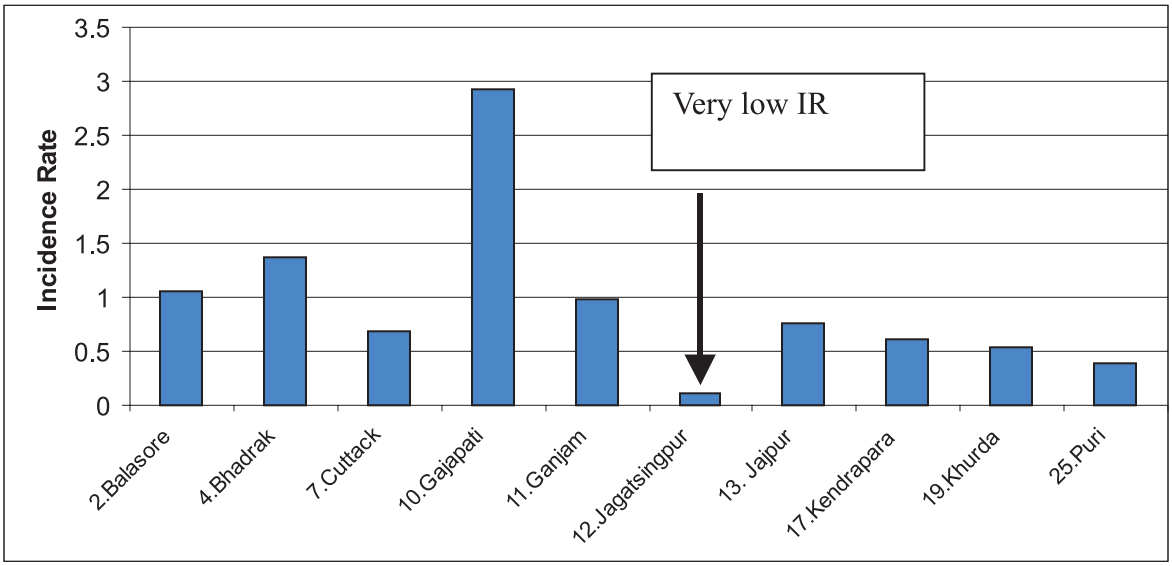
**Table 5.2– Threshold levels for common epidemic prone diseases**

| Threshold level | Disease | Action to be taken |
|---|---|---|
| A single suspect case of | Cholera<br>Dengue disease<br>JE<br>Measles<br>Plague<br>AFP | • Immediate reporting the next level to alert them.<br>• Investigation and confirmation of the existence of case<br>• Lab confirmation where possible<br>• Specific response if confirmed epidemiologically and/or by lab. |
| If the number of cases exceed the mean number of cases from the previous non-epidemic years | Diarrhoeal disease<br>Typhoid<br>Hepatitis<br>Malaria<br>Water pollution<br>Air pollution | • Immediate reporting the next level to alert them<br>• Investigation and confirmation of existence of cases<br>• Check for epidemiological linkages<br>• Reviewing the past data<br>• Lab confirmation where possible<br>• Specific response if confirmed epidemiologically and/or by lab. |
| If the number of cases or deaths are increasing over a short period of time | Diarrhoeal disease<br>Typhoid<br>Hepatitis<br>Malaria<br>TB<br>HIV<br>Water pollution<br>Air pollution | • Immediate reporting the next level to alert them.<br>• Investigation and confirmation of existence of cases<br>• Check for epidemiological linkages<br>• Reviewing the past data<br>• Lab confirmation where possible<br>• Specific response if confirmed epidemiologically and/or by lab. |

### Interpretations that are possible are:

| Scenario | Interpretation |
|---|---|
| Number of cases much below the threshold | o No reason to worry<br>o Check for under reporting<br>o Review the threshold value |
| Trends approaching threshold | o Potential outbreak |
| Number of cases have crossed the threshold | o Outbreak situation, to take necessary action |

**Fig 5.3 Comparison of the Incidence rate for malaria for the week 27 (2001) for the 10 coastal districts of Orissa.**




**Possible interpretations are:**

| Scenario | Interpretation |
|---|---|
| IR and CFR in the various reporting units are similar | Maybe indicative of good reporting mechanism |
| Markedly low IR / CFR in a reporting unit | Quality of data from this unit needs to be reviewed – possibility of under reporting |
| Markedly high IR / CFR in a reporting unit | Quality of data from this unit needs to be reviewed– possibility of an outbreak or a data entry error. |

## Report 6 - Comparison of reports received from private sources with that of public sources

The data from the 2 independent sources is a good proxy indicator of the quality of data generated from the two sectors. The trends in the incidence of new cases / deaths in the public and private health sector may be analysed to see if they are following a similar pattern. If there is correlation between the two sources, then one can assume that the quality of data is good and it represents the events in the community. In case there is discordance between the two data sets, one has to do further operational research to identify which data source is more reliable and measures to correct the unreliable source.

**Possible interpretations are:**

| Scenario | Interpretation |
|---|---|
| Trends in public sources are similar to that in Private sources | Quality of data in the Public health services seems to be representative. |
| Trends in Public sources are not similar to that in Private sources | Quality of data in the Public health services may not be reliable (assumption being that the Private sector data is reliable). |

### Report 7 - Comparison of reports received from the public health sources and the lab sources

It is important to correlate the findings of the data analysis with the availability of other data obtained from labs. This comparison may be vis-à-vis

- the cases diagnosed in the labs and the number of cases seen by the providers.
- 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.
- The entomological data and the cases of vector borne diseases. For example a high vector density of aides mosquitoes could clearly link to an outbreak of dengue fever in that area.

Once again this sort of comparisons should validate the data as well as identify potential areas of problems in data collection and generally in the surveillance systems.

On a weekly basis, the first 4 reports need to be generated and reviewed. This can be done by a technical committee comprising of the MO in charge of surveillance and some other Medical and Para-Medical workers. The review should try and identify

- Any lacuna in the system (through Report 1)
- The presence of any outbreak (through Reports 2 – 4)

Based on the review, a summary should be prepared which should be sent to the next level on a weekly basis along with the compiled data. At the district level, only the weekly summary will reach the State level. A sample format for the Summary Report is given in Annex 5.4

On a monthly basis, at least 7 reports need to be generated and reviewed. The Reports 5 – 7 would help the MO to better review the performance of the surveillance system, by validating the data.

Also the data from the other disease (TB, HIV, Malaria, Road Traffic Accidents) should be incorporated and analysed in a similar way.

A summary should be prepared for the month which should be shared with the concerned officers at that level; e.g. at the district level, the summary should be shared at the monthly meeting of the MOs, with the Programme Managers and with the District Collector / Magistrate. This summary sheet should then be forwarded to the next level for information.

## CONCLUSIONS

Analysis is one of the mainstay of the surveillance Programme. A combination of accurate data and reasonable analysis is a powerful tool to identify potential and real outbreaks and take focused action so that unnecessary morbidity and mortality are prevented.

While it is important to analyse the data, it is also important that the analysed reports are sent to the appropriate authorities, both at a higher level as well as at a lower level. The latter is very important as it gives the staff a tool to assess their own performance. This sort of feedback is also a good motivator.

However, while doing the analysis, one must be aware of the inherent limitations

- The quality of data may not be very high. There are various reasons starting from inconsistent use of case definitions to difficulty in confirming cases. In depth analysis on poor quality data is not of much use
- There is a time lag between detection, reporting and analysis. The ground situation may have changed by the time of analysis
- There is an inherent under – reporting in surveillance data, one is never able to efficiently capture all the health events that have occurred in the community. However surveillance data gives trends which is of importance
- The data is not representative and the only way to overcome this to increase the sources of data, including the private sector and the NGO sector etc.

Analysis of data for the risk factor surveillance is dealt with in the specific chapter.

- **Data must be analysed carefully and interpreted prudently**
- **Ability to effectively analyse, interpret and present surveillance data is an important skill for the Public Health Manager.**

# SECTION 5

## OUTBREAK INVESTIGATION, RESPONSE & CONTROL

**This section covers:**

- **Defining an outbreak/epidemic**
- **Detecting an outbreak**
- **Investigation of an outbreak**
- **Response to an outbreak and control measures**

## 5.0 WHY AN OUTBREAK HAS TO BE INVESTIGATED?

Analysis of the data may reveal potential or actual outbreaks. These need to be investigated and if verified, needs to be controlled. This is the basic essence of this chapter. The purpose of an investigation is to

- Verify the outbreak
- Recognise the magnitude of the outbreak.
- Diagnose the etiological agent, identify the source and the route of transmission as well as the people at risk
- Recommend measures so that the outbreak can be controlled as well as prevented in the future.

### DEFINITION OF AN OUTBREAK:

**An outbreak or epidemic is defined as the occurrence in a community of cases of an illness clearly in excess of expected numbers. While an outbreak is usually limited to a small focal area, an epidemic covers large geographic areas and has more than one focal point. There is yet another definition of an outbreak – occurrence of two or more epidemiologically linked cases of a disease of outbreak potential (e.g. measles, cholera, dengue, JE, AFP or plague).**

## 5.1 DETECTING AN OUTBREAK:

There are various ways in which outbreaks can be detected. Some of these are:

### i) Rumor register

The rumor register is to be maintained in each public health institution. Source of information from the community should be verified to identify outbreaks. It is an important source of information and should not be neglected. On the other hand, key informants in the community should be assiduously cultivated, so they become the eyes and ears of the health services in the community.

The medical officer in charge of the public health institution should investigate all rumors of epidemic prone diseases recorded in the rumor registry. The format for rumor registry is given in section dealing along with syndromic surveillance section. This data is sent at weekly intervals to the District surveillance officer along with the weekly reports of syndromic surveillance.

### ii) Community Informants

| Public Sector | | Private sector | |
|---|---|---|---|
| **Rural** | **Urban** | **Rural** | **Urban** |
| Teachers, AWWs, Panchayat members, Ward members. | | SHG leaders, Health club / Youth club / Farmer's club leaders etc. | |

### iii) Media

The media is an effective source of information on any unusual health event in the community. This important source is unfortunately neglected and ignored by the health services. It may help to tap this source.

**Epidemic related rumor register at all Government Reporting Units**

| Unique Identifier reporting unit | | | | District | | | |
|---|---|---|---|---|---|---|---|
| | | | | | Action Taken | | |
| Date of rumor | Description of rumor | Source of information | Village/urban ward | Taluk/block/ sub division | Epidemiological workup | Sample | ORI |
| | | | | | | | |

| | Action points for MO PHC | Done | Not done | Remark |
|---|---|---|---|---|
| Epidemiological workup | Verification of rumor by health worker of the area within 48 hours | | | |
| | If information correct then health worker does active case search | | | |
| | Line listing of cases with info on age/sex/location/ immunization status | | | |
| | Confirmation of type of disease/syndrome by MO PHC | | | |
| Sample sent | As specified for the disease/syndrome | | | |
| ORI | Specific ORI as per guidelines | | | |

The weekly report on rumors will also be action based that report of actions taken in response to the rumor will need to be informed to DSO at weekly intervals.

### 5.1.1 Review of routine data

The first step in investigating an outbreak is to detect it. One of the common ways of early detection is to review the data from the routine surveillance and check if it crosses threshold levels. Details of this are provided in the previous chapter. If the cases are approaching the threshold level or has crossed it, then an outbreak should be suspected. Remember to review the lab data also.

One another method is to be alert for any unusual events that maybe reflected in the routine data. Some examples are given below

**Warning signs of an impending outbreak**

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

### 5.1.2 Media

The media is an effective source of information on any unusual health event in the community. This important source is unfortunately neglected and ignored by the health services. It may help to tap this source.

### 5.1.3 Trigger events

Some times trigger events indicate a potential outbreak. Details of these are given below.

**Surveillance Action:**

Preset trigger levels for diseases will be identified with specific responses identified for various levels. The levels will depend on the epidemic potential, case fatality of the disease and the prevalence of the problem in the community.

1. Trigger Level-1 Suspected /limited outbreak – Local response
2. Trigger Level-2 Epidemic – Local & Regional Response
3. Trigger Level -3 Wide spread Epidemic – Local, Regional and state level response

a) In a non endemic area even 1 case of suspected epidemic prone disease should initiate a trigger response at various levels

b) In an endemic region change in pattern of disease or evidence of clustering of disease should be considered a trigger event.

## SUMMARY OF OUTBREAK INVESTIGATIONS / RESPONSE

| Sr. No | Syndrome | Trigger event | Action taken |
|---|---|---|---|
| 1 | Acute watery stools | A single case of severe dehydration /death in a patient > 5 years of age with diarrhea.<br>More than 10 houses having at least one cases of loose stools irrespective of age per village or an urban ward | 1. Treat with appropriate antibiotics.<br>2. Treat with ORS<br>3. Refer to PHC if dehydration is severe.<br>4. Inform MO PHC<br>5. Collect water samples and send to PHC for analysis.<br>6. OT testing<br>7. Check TCL stock (bleaching powder)<br>8. Train the local person about chlorination of water.<br>9. IEC for Community awareness about safe water and personal hygiene. |
| 2 | A ) Fever < 7 days duration<br>a) Only fever | 5 cases in 1000 population. | 1. Slides for MP with presumptive /RT for malaria<br>2. Inform MO PHC.<br>3. IEC for community awareness. |
| | b) With rash<br>(Measles / Dengue) | Two similar cases in a village (1000 population) | 1. Collect slide for MP.<br>2. Refer the case to PHC<br>3. Inform MO PHC<br>4. Give vitamin A<br>5. Give paracetamol.<br>6. Check immunisation<br>7. Surveillance for Aedes Egypti Larvae in the house.<br>a. Containers<br>b. Coolers, etc |
| | c) Altered consciousness | Two cases of fever with altered consciousness in the village / 1000 population | 1. Collect slide for MP.<br>2. Refer the case to CHC/DH<br>3. Antipyretics<br>4. Inform to PHC<br>5. IEC |
| | d) Fever with bleeding | Two cases fever with bleeding in a village or 1000 population | 1. Refer the case to CHC/DH<br>2. Inform to PHC<br>3. IEC |
| | Fever with convulsions | Two cases fever with bleeding in a village or 1000 population | 1. Refer the case to CHC/DH<br>2. Inform to PHC<br>3. IEC |
| | Fever more than 7 days | More than 2 cases in a village or 1000 population | 1. Give paracetamol.<br>2. Collect slide for MP.<br>3. Give anti malarial treatment.*<br>4. Inform and refer to PHC for treatment.<br>5. OT testing of drinking water.<br>6. Collect water sample and send it to PHC for onward transmission.<br>7. Check TCL stock.<br>8. Train local person about water Chlorination.<br>9. Community awareness about safe water and Personal hygene. |

| Sr. No | Syndrome | Trigger event | Action taken |
|---|---|---|---|
| 3 | Jaundice | More than 2 cases in a village or in 1000 population. | 1. Refer to PHC<br>2. Inform MO PHC<br>3. Search and refer antenetal cases with jaundice in 2nd/3rd trimester.<br>4. Collect water samples for analysis and send it to PHC<br>5. OT testing. 5. OT testing of drinking water.<br>6. Collect water sample and send it to PHC for onward transmission.<br>7. Check TCL stock.<br>8. Train local person about water Chlorination.<br>9. Community awareness about safe water and Personal hygiene. |
| 4 | Unusual event | More than 2 deaths or hospitalization | 1. Inform MO PHC<br>2. Community awareness |

## Level 2 Medical Officer Level (PHC/CHC)

| Sr. no | Probable Diagonosis | Trigger event | Action taken |
|---|---|---|---|
| 1 | Acute watery diarrhea/ cholera | A single case of cholera or epidemiologically linked case of diarrhea, / a case of severe dehydration or death due to diarrhea in a patient > 5 years old<br>Clustering of cases particularly village or ward where more than 10 houses having at least 1 case of loose stools irrespective of age | • Verify the information from ANM.<br>• Confirmation of the outbreak.<br>• Active search of cases with standard case definition.<br>• Standard case management.<br>• Stool sample collection for Cholera.<br>• Ensure safe water supply.<br>• Inform district authority and ask for help SOS.<br>• IEC.<br>• Documentation.<br>• Ensure buffer stock. |
| 2 | Typhoid | More than 30 cases of prolonged fever a week from the entire PHC or5 or more case per week from 1 sub-center.<br>Or<br>More than 2 cases from a single village/urban ward with 1000 population | • Verify the information from ANM<br>• Confirmation of the outbreak<br>• Active search of cases with standard core definition<br>• Stool sample collection<br>• Standard case management<br>• Ensure safe water supply<br>• Inform district authority and ask for help SOS<br>• IEC<br>• Documentation<br>• Ensure buffer stock<br>• Blood culture for S typhi. |
| 3 | Viral hepatitis | Clustering of cases from a particular village / urban ward where more than 2 cases of jaundice in different households or<br>More than 10 cases per PHC per week. | • Clinical verification.<br>• Standard case management.<br>• Active search of cases.<br>• Ensure Safe Water supply.<br>• Serological investigation.<br>• Active search for 2nd/3rd trimester cases with jaundice and keep them under observation with referral to district hospital SOS.<br>• Investigation of water Treatment Plant/ pipeline Leakages. |

| Sr. no | Probable Diagonosis | Trigger event | Action taken |
|---|---|---|---|
| 4 | Measles | A single case of probable measles from a tribal or remote areaTwo or more cases with fever with rash | • Verify the case through clinical manifestation.<br>• Send samples for laboratory testing.<br>• Standard case management.<br>• Active search of cases.<br>• Ring vaccination.<br>• IEC<br>• Vitamin A. |
| 5 | Japanese Encephalitis | Even a single case of probable JE or<br>2 cases with fever with altered consciousness / seizures. | • Verify the information.<br>• Clinical confirmation.<br>• Standard case management.<br>• Active search of cases with standard case definition.<br>• Vector surveillance and control.<br>• IEC<br>• Subsequently inform to higher authority.<br>• Isolation of virus.<br>• Sero-diagnosis• Referral of serious cases to district hospital. |
| 7 | DF/DHF | Even a single case of suspected DHF from a community<br>Rising number of fever cases for previous 3 weeks | • Verify the information.<br>• Suspect if clustering of fever cases with M.P. negative slides are found.<br>• Confirmation of outbreak.<br>• Standard case management.<br>• Active search of cases with standard case definition.<br>• House-to-house Vector surveillance for *A.. Egypti Larvae.*<br>• Fogging/spraying if necessary.<br>• Inform the DHO.<br>• IEC<br>• Empty the coolers, vessels and keep them dry for 24 hours at least once in a week.<br>• Remove garbage.(containers etc.)<br>• Laboratory confirmation. |
| 8 | Malaria | Even single case is found malaria + ve in an area where malaria was not present for minimum three months.<br>or<br>SPR rise more than double over last three months.OrStates will have to set trigger value based on endemicity of malaria. | • Mass survey for fever cases.<br>• Microscopic examination within 24 hours<br>• Start CRT to all fever cases/all contacts of + ve cases and all migratory population. (in case of single PF case of indigenous origin is found)<br>• Focal spraying with synthetic pyrethyroid<br>• Fogging daily X 3 days followed by biweekly for 3 weeks.<br>• Larvicidal application<br>• Elimination of mosquitogenic places by tempting of water tables, land filling, chanalizing the drains.<br>• Activate DDC/FTD<br>• Involve local bodies and community by IEC.<br>• Daily surveillance for 3 to 4 weeks. |
| 9 | Unusual syndromes causing death or hospital admission | Hospitalization or death of minimum two cases of similar illness from same geographical area. | • Verification of the rumor.<br>• Clinical verification of cases.<br>• Basic Life Support and emergency medical care.<br>• Refer to appropriate hospital if necessary.<br>• Active search of cases.<br>• Autopsy and preservation of body fluid and tissues of vital organs for laboratory diagnosis.<br>• IEC to avoid panic.<br>• Reporting to the higher authority. |

## 5.2 Reporting an Outbreak

At the PHC and CHC level, the MO of the concerned institution will be the nodal officer who will be responsible to respond to an outbreak. At the district, the Corporation, the State and the Central level special Rapid Response Teams will have the primary responsibility is to investigate outbreaks.

If an outbreak is suspected, the local health team should verify the same.

A First Information Report will be submitted to the District Surveillance Officer by the fastest route to facilitate action. The format for the 1st information report is given in the later chapter

> The first information Report (Form C) should be submitted to the District Surveillance officer by the reporting unit as soon as verification of the suspected epidemic is made.
>
> The fastest route of information available will be used and this may be by Telephone, Fax, E-mail or through IDSP computer format entry.

In an established outbreak, the Response Include the following:

1. Emergency Case Management
2. Referral to an appropriate level of care
3. Epidemiological Investigations
4. Laboratory Investigations to identify the etiology
5. Presumptive & definitive control Measures
6. Upgrading response to a higher level by informing the DSO if outbreak is confirmed.

## 5.3 WHO SHOULD RESPOND TO AN OUTBREAK

At the PHC and CHC level, the MO of the concerned institution will be the nodal officer who will respond to an outbreak. At the district, the Corporation, the State and the Central level special Rapid Response Teams need to be formed whose prime responsibility is to investigate outbreaks. If an outbreak is suspected, the local health team should verify the same. Once this is done and if there is a need to investigate, the RRT should take over and do the needful.

### i) The Rapid Response Teams (RRT):

The RRT is a multi faceted team that looks into the various aspects of an outbreak. A suggested composition of this team is an epidemiologist, a clinician and a microbiologist. Further details of the RRT are given in Annex 6.8

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. While they will help and support the local staff in the management and control of the outbreak, the prime responsibility for

implementing control measures rests with the local health staff (with additional support from the district health authorities).

The names, addresses 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.

### ii) Epidemic preparedness

Preparatory action before an outbreak

- Formation of the RRT
- Training for the RRT
- Regular review of the data
- Identifying 'outbreak seasons'
- Identifying 'outbreak regions'
- Ensuring that these regions have the necessary drugs and materials (including transport media) prior to the 'outbreak season'
- Identifying and strengthening the appropriate labs
- Designating vehicles for outbreak investigation and ensuring that it is in working condition
- Ensuring that communication channels like telephones are in working condition.

### Step 1 - Verification of the outbreak

The preliminary step of the outbreak investigation would be to verify the outbreak. Much time may be wasted due to a false alarm. Even 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

If there is evidence of an outbreak, and if the etiology, the source and the route of transmission is known, then the specific control measures need to be immediately instituted. If however, any one of the above is unknown, then the outbreak must be investigated to identify the specific cause. The RRT should be alerted and requested to investigate the outbreak. At the same time, general control measures should be instituted.

### Step 2 – Sending the RRT

A RRT should be immediately formed with those readily available. As stated above, it should have the minimum 4 categories of professionals.

Resources (vehicles, drugs, reagents and forms) should be made available to the RRT and they should proceed to the location. At the location the RRT members along with the local health staff should initiate a Medical / Epidemiological / Laboratory investigation simultaneously.

- Medical investigation - The physician / paediatrician will clinically examine the available cases (in the hospital or the community) and make a clinical diagnosis. The history will include questions that will identify the possible source, routes of transmission and contacts. He will also review the case management (as per the recommended protocol) and recommend suitable amendments to the therapy if required.
- Laboratory investigation - The microbiologist will perform the appropriate lab investigations. The microbiologist will advise on what samples are required, mode of collection and method of transportation and also to which lab it has to be sent. He will be responsible for the lab confirmation of the outbreak. If the outbreak warrants entomological investigation should also be done.

**It is not necessary to collect specimens from ALL cases; just enough to confirm the diagnosis.**

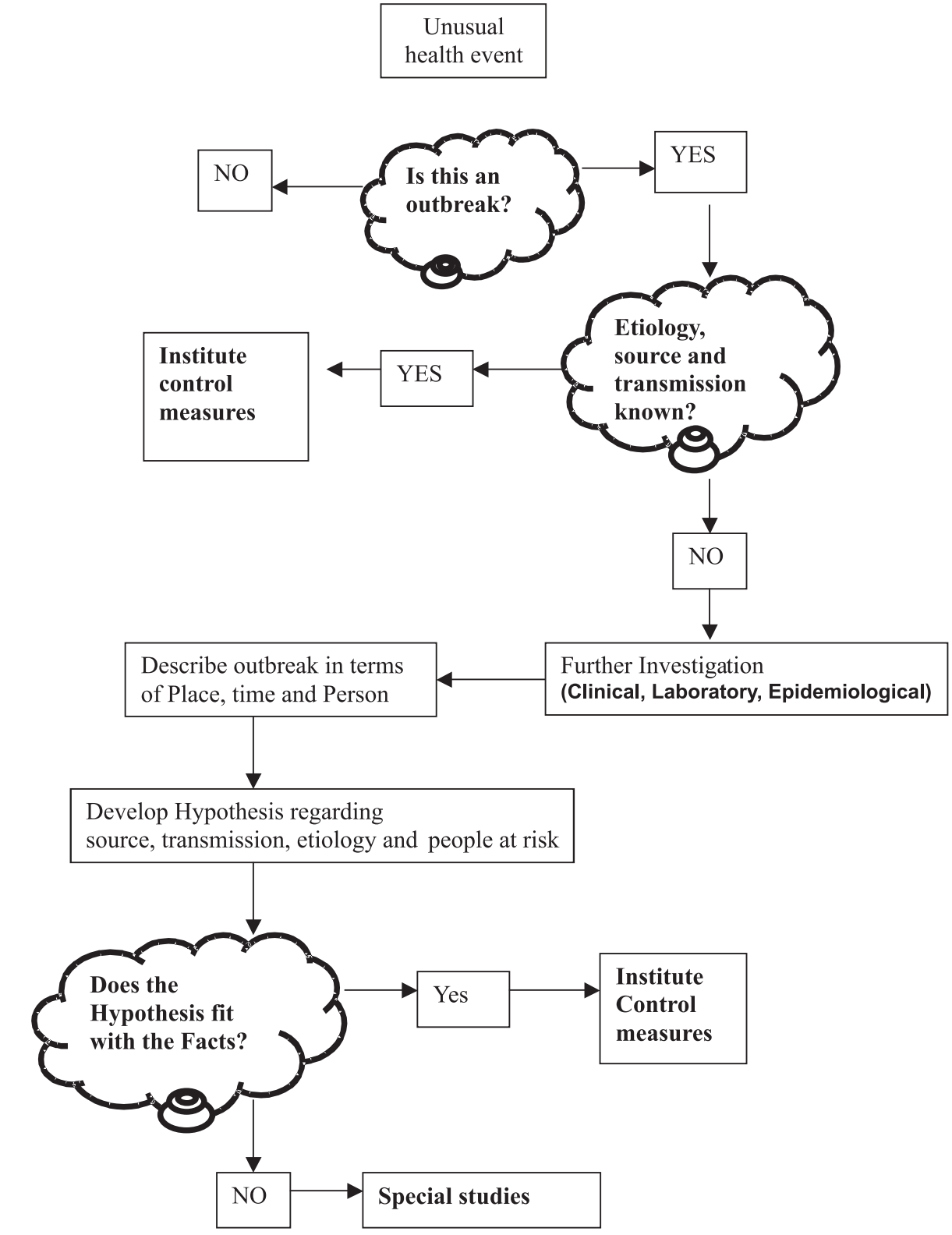
- Epidemiological investigation - The epidemiologist will carry out a detailed epidemiological investigation that will look into the epidemiological and environmental aspects of the outbreak. The basic aim of the epidemiological investigation is to identify the source of the problem and the routes of transmission. For this he may ask for further tests like water analysis, entomological survey, etc. The detailed steps in the epidemiological investigation is given in annex
- Formulation of hypothesis: The RRT will then 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?

  If this hypothesis fits with the facts, then specific response measures can be instituted. If however, the hypothesis does not fit with the facts, then further analytical investigation in terms of case control studies will need to be carried out. In the meantime, general control measures may be instituted.
- Specific response measures: Based on the above hypothesis, the RRT will recommend suitable control measures to be immediately implemented by the local PHC staff to curtail the epidemic. If the team feels that the PHC staff needs any support, then they will request the District to provide the necessary help. Similarly if the district team needs support, then they need to call the State team.

**Call for help from State surveillance officer if:**

- the outbreak is unusual, or
- the CFR is high, or
- if the aetiology cannot be determined

## INVESTIGATING AN OUTBREAK




**Remember that an outbreak is a sudden and unexpected event usually. There is a need to act quickly. So a SYSTEMATIC APPROACH needs to be adopted.**

When the DSO suspects an outbreak, he/she should initiate the following steps immediately.

- Special studies if necessary: Following the institution of control measures, if the epidemic is under control and tapers off, the hypothesis of causation could be considered as correct. If the epidemic continues unabated then the Hypothesis would have to be reviewed. In such cases analytical studies like a case control study might have to be conducted to confirm the hypothesis. The decision to investigate further or to institute control measures are dependent on whether the source and the transmission are known or not. See Fig 6.1
- Interim report: The RRT should file an interim report, giving details of the investigation and the diagnosis and also the control measures initiated. A format is given in Annex 6.5
- Follow-up Visits: Once the outbreak is coming under control, the RRT can leave but should make follow up visits to ensure that the control measures are being implemented adequately. Also these follow up visits help to identify any new information that may have been missed in the first visit.

**Fig 6.1: Investigate or control?**

| ETIOLOGY | | SOURCE / TRANSMISSION | |
|---|---|---|---|
| | | **Known** | **Unknown** |
| | **Known** | **Control +++**<br>**Investigate +** | **Control +**<br>**Investigate +++** |
| | **Unknown** | **Control +++**<br>**Investigate +++** | **Control +**<br>**Investigate +++** |

### Step 3: 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:

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

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

### Step 4: 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.

### Step 5: Review of the final report

The DSO / MHO should receive the final report from the PHC MO within 10 days of the outbreak being declared to be over. The Technical committee should review the report basically to understand why the outbreak occurred. Based on this review the Committee should make recommendations – immediate and medium term, so that similar outbreaks do not occur. Most important, they should try and identify deficiencies in the system that needs to be rectified.

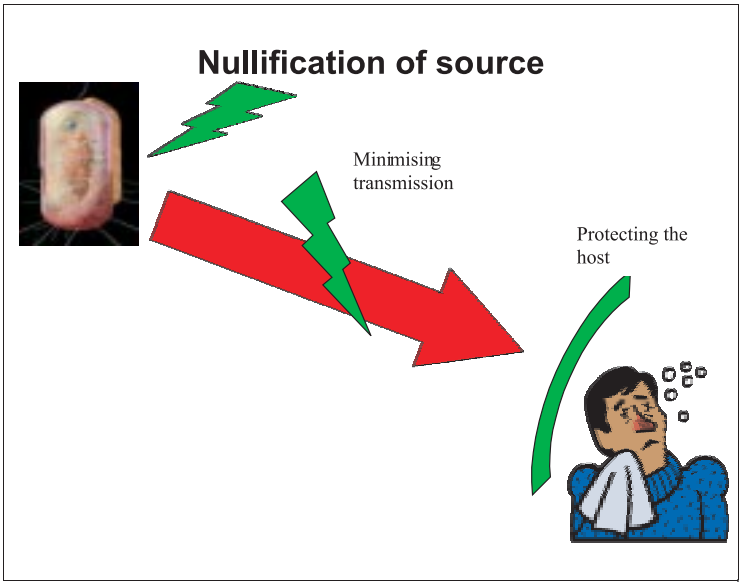
## 5.4 RESPONSE TO AN OUTBREAK

Even as the outbreak is detected, and is being investigated, control measures need to be instituted. These may be divided into

1. General measures - till the specific source and route of transmission is identified. For example, if one is suspecting a water borne disease, then one should start a campaign requesting people to use safe drinking water.
2. Specific measures – depending on the causative agent. The broad steps would include

- Identification and nullification of the source of the outbreak e.g. chlorinating wells.
- Minimising transmission and so further exposure e.g. vector control
- Protection of the host e.g. immunisation or chemoprophylaxis.
- Effective case management

**Fig 6.2 Specific measures**



### General measures:

- Logistic support to the field teams: This would start immediately when the outbreak is reported without waiting for verification, etc. The emphasis should be on saving lives. Some of the resources that would be necessary are
  - Human resources - Additional MO's, lab technicians and nursing staff (depending on the number of cases/deaths reported) may be sent from the block/ district hospital to strengthen in-patient treatment facilities in the nearest health facility, like the PHC. They will assist the MO health facility in providing emergency health care to the patients. Assistance from local practitioners/ specialists should also be sought for better on the spot management of cases. If situation demands 'camp hospitals' should be established in school buildings or similar structures.
  - Drugs – In the event of an outbreak, there should be an uninterrupted flow of medicines to the area. Emergency medicine stocks should be mobilised and if necessary medicines should be relocated from unaffected regions for the use of the affected region.
  - Equipment and supplies – this is also important and the district health manager should ensure that this takes place.
  - Vehicles and mobility – this is of utmost importance as the teams need to move as fast as possible to the affected areas.
  - 24-hour Communication channels to be established between the District and the team leader at the outbreak location.
- IEC to sensitise the community about the problem, give them the correct messages and enroll their help in containing the outbreak. More details are given in Annex 6.6
- Handling of the media – this is an important task and needs the appointment of a special officer whose main responsibility is to update the press on a daily basis. This will reduce the stress for the district managers and will go a long way in communicating the right message to the community.

### WATER BORNE OUTBREAK

- If one is suspecting a water borne outbreak – then one has to ensure
  - **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. All wells in the area should be cleaned by frequent emptying out of water by portable pump sets and then chlorinated with fresh bleaching powder.
  - **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.

- **Frequent hand washing.**
- **Adopting safe practices in food handling.**

## VECTOR BORNE OUTBREAK

- If one is suspecting a vector borne outbreak, then one has to ensure
  - **Vector control:** Integrated vector control i.e. use of environmental methods (draining of water collections/ stagnation, filling, etc), biological (use of larvivorous fish, Bacillus thuringensis, etc) and chemical (larvicidal – abate/ baytex, anti-adult-space sprays, fogging only if absolutely essential, and indoor residual spray with appropriate chemicals) should be implemented on priority under guidance by the entomologist (if available).
  - **Personal protective measures:** Prevention of exposure to mosquito bites by using repellents (including neem oil) and use of mosquito nets at night (plain or impregnated) would significantly reduce risk of infection during an outbreak.

## VACCINE PREVENTABLE OUTBREAK

- If one is suspecting an outbreak due to VPD, then one has to ensure
  - Adequate supply of vaccines, syringes and needles
  - Adequate staff who are able to administer the vaccines.
  - Ring immunisation where applicable.

### Specific measures:

This depends on the causative agent, the source of the agent, the method of transmission, the host response, the local conditions including the environment, the effectiveness of the health services etc. A framework for specific intervention is given in Annex 6.7 and each individual disease is tackled separately.

**What is important is to nullify the source as soon as possible, stop (or minimise) transmission and effectively manage the existing cases.**

To summarise, general measures should be instituted immediately and specific measures on confirmation. The DSO / MHO should also make a decision as soon as possible whether they need the support of others e.g. the nearby medical colleges, the State or the Centre.

## 5.5 REPORTS

It is important for the concerned officials to make appropriate and timely reports to higher authorities. 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.

**Some of the reports recommended are:**

### i) Preliminary report by nodal MO:

The nodal MO of the peripheral health facility who first reports the outbreak should submit a preliminary report to the next level. The report should cover briefly about how the outbreak came to his attention, verification of the outbreak, total number of affected cases/ deaths, time, person, place analysis, management of the patients, likely suspected source, immediate control measures implemented, etc. A sample report form from Maharashtra is shown in Annex 6.2

### ii) Daily situation updates:

During the period of the outbreak the nodal MO should continue to give daily situation updates of the outbreak to the next level. This should continue even when the EIT has started its investigation and should include the list of new cases, 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 suspect case during a period which is double the incubation period). However it is important that these updates are kept as simple as possible – thereby sparing the MO unnecessary work.

### iii) Interim report by RRT:

The RRT will submit an interim report within one week of starting their investigation, response and control activities. The report should cover verification of the outbreak, total number of affected cases/ deaths, time, person, place analysis, management of the patients, likely suspected source, immediate control measures implemented, etc. The report will include reports by the physician and microbiologist, and entomologist (where applicable), the lab results received during that period, environmental factors, etc. It will also have a provisional hypothesis of the causation of the outbreak and comments/recommendations, if any, including whether any further outside help is necessary.

### iv) Final report:

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. Publication in a journal will ensure wider circulation of the lessons learnt.

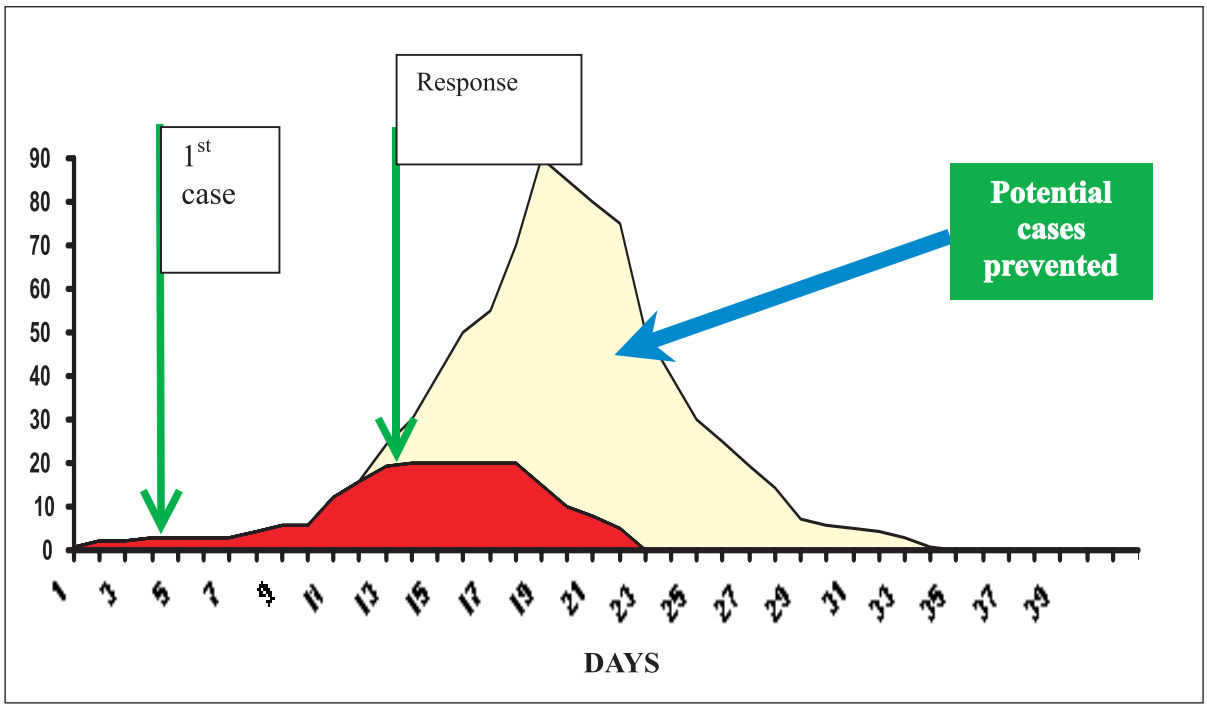
## 5.6 CONCLUSION

Surveillance has no meaning if there is no action taken. So the response mechanism is necessary to ensure an effective surveillance system. Response has two objectives, one is to contain the outbreak, while the other is identify problems with the health systems so that repetitions of the outbreaks do not occur.

There are certain principles of outbreak response that is common to most outbreaks and if applied will be effective in most situations. Fig 6.2 depicts graphically the benefit of a timely response.

In the case of Non-communicable diseases, the response is usually in the form of IEC and patient education so that there are behavioral changes. This IEC may be done by the concerned department in the Ministry of Health, based on the findings of the surveys.

**Fig 6.2: Natural history of an outbreak in the event of an effective response**



# SECTION 6

## COLLECTION, STORAGE AND TRANSPORTATION OF SAMPLES FOR CONFIRMATORY DIAGNOSIS

## 6.0 Method of Laboratory Surveillance:

The laboratories will report to the district surveillance officer summary report of the frequency of diseases every Saturday of the week.

In addition cased based reports will be sent to the respective reporting units as soon as they are ready as part of the outbreak investigations and diagnosis.

The District surveillance laboratory will be linked to the District surveillance Unit by network computer through a dial up network, which will transfer up-to-date laboratory information to the database once a day.

## 6.1 Method of reporting:

The laboratories at PHCs/CHCs will send all the weekly reports without summation to the District Surveillance Unit.

**Table 6.1 Action to be taken by the MPW in the field:**

| **Syndrome** | **Action** |
|---|---|
| Fever | Blood smear for all patients |
| AFP | 2 samples of stools taken at interval of 24 hours and transported to the MO PHC in reverse cold chain |
| Cough more than 3 weeks | **Referred to the MO PHC for specific lab action** |
| Fever with rash | |
| Fever with altered sensorium | |
| Fever with bleeding | |
| Fever more than 14 days | |
| Cough less than 3 weeks | |
| Loose watery stools | |
| Acute jaundice | |
| Unusual severe syndromes | |

## Action to be taken by the Medical Officer / Lab technician of PHC/ CHC for lab

### Investigation:

| | Dengue/Fever with rash | Japanese Encephalitis/ Fever with loss of Consciousness | Malaria/ Fever |
|---|---|---|---|
| **When to collect sample** | When a single case of probable dengue presents at the OP. In an outbreak situation, the specimens from the first 10 cases need to be taken for investigation | When a single case of probable JE presents at the hospital. In an out-break situation, the specimens from the first 10 cases need to be taken for investigation | When a single case of fever presents at the OP |
| **What specimens to be collected** | Blood – 5ml for serology Blood – 5ml in citrate, for virus isolation ( if recommended by RRT) | Blood – 5ml for serology CSF in hospitalized cases – serology and virus isolation | Blood smear |
| **Processing at the CHC by the technician** | Serum separation | Serum separation | Staining and Microscopy |
| **Storage** | Serum and blood in refrigerator . If there is delay in transportation, store in –20°C Deep freezer | CSF and Serum in refrigerator . If there is delay in transportation, store in -20°C Deep freezer | All positive and 10% negative slides to be kept for quality assurance |
| **Transportation** | Transport as quickly as possible within 24 hours in Reverse cold chain to the district lab | Transport as quickly as possible within 24 hours in Reverse cold chain to the state reference lab | NIL |
| | **Cholera /Loose watery diarrhoea** | **Typhoid / Fever > 7 days** | **Hepatitis/ Acute jaundice** |
| **When to collect sample** | When a case of probable cholera presents at the OP. In an outbreak situation, the specimens from first 10 cases need to be collected | When a case of probable typhoid presents at the OP. In an outbreak situation, the specimens from first 10 cases need to be collected | Only in the event of outbreaks first 10 cases to be confirmed |
| **What specimens to be collected** | Fresh stool or Rectal swab in Cary – Blair medium if stool specimen is not available | Blood – 5ml in citrate Blood – 5ml for serology ( 2 samples at one week interval if the first sample is negative and if requested by the district lab) | Blood – 5ml for serology |
| **Processing at the CHC by technician** | NIL | Separation of serum Typhi dot test | Separation of serum |
| **Storage** | In refrigerator | In refrigerator | At - 20°C deep freezer |
| **Transportation** | As soon as possible within 24 hrs. No need for cold chain. | 1st and 2nd Serum sample and blood sample to be sent to the district lab . | In Reverse cold chain to the State/Reference lab |

| | Measles /Fever with rash | TB / Cough > 3 weeks | Acute Flaccid Paralysis |
|---|---|---|---|
| **When to collect sample** | During an outbreak only first 10 cases need to be confirmed | All probable cases of TB presenting at the OP | A single case of AFP |
| **What specimens to be collected** | Blood for serology – 5ml 30 ml Urine for virus isolation ( if required by RRT) | Sputum – 3 specimens Spot/Early morning/spot | 2 Stools specimens at 24 hour interval |
| **Processing at the CHC by lab technician** | Serum separation | Smear staining and microscopy | NIL |
| **Storage** | In refrigerator | 10% of positives and all negative smears to be kept for QA. | In the refrigerator. |
| **Transportation** | Immediately to the district Lab within 24 hrs maintaining reverse cold chain | Sputum to the state lab for culture sensitivity | With 24 hours In Reverse cold chain to the designated National Polio lab |
| | **HIV/HBV** | **Plague** | **Leptospirosis** |
| **When to collect sample** | NIL | From the probable cases Samples to be collected by RRT | From the probable cases |
| **What specimens to be collected** | NIL | Aspirate from the Bubo. Sputum from pneumonic plague cases Blood sample for serology – 5ml | Blood – 5ml for serology |
| **Processing at the CHC** | NIL | NIL | Serum separation |
| **Storage** | NIL | Nil | At +4°C |
| **Transportation** | NIL | Immediately to the state/ national reference lab with P3 facility | Immediately by reverse cold chain to the district. |

## 6.2 Action by the District and State Labs

### Samples are received from CHC, District hospitals or referred :

| | Dengue | JE | Malaria |
|---|---|---|---|
| **Processing at the District/ Public Health lab/ Medical colleges/ selected sentinal labs** | Serology – IgM Elisa / Rapid test.Platelet count if samples are from hospitalised cases. | NIL | As in PHC for cases seen at the District Hospital |
| **Storage of samples** | At –20°C | At – 20°C | As in PHC |
| **Transportation** | 1st and 2nd Serum and Blood sample sent to the State / Reference lab | CSF and Serum samples to be sent to the State / Reference lab | NIL |
| **Processing at the State Lab/ National Lab** | Virus isolation and antigen detection. HAI /Nt test for detection of rise in Ab titre.Quality control of the IgM Elisa of the district. | IgM Elisa for CSF and serum.HAI /Nt test for detection of rise in Ab titre.Virus isolation and Antigen detection for CSF | NIL |

| | Cholera | Typhoid | Hepatitis |
|---|---|---|---|
| **Processing at the District** | Culture, identification and sensitivity | Serology – Widal in paired sera (if first sera sample is negative). Blood/stool/BM culture, identification and sensitivity. | NIL |
| **Storage** | Positive isolates at +4°C | At +4°C | At – 20°C |
| **Transportation** | Sealed stab culture of +ve isolates to state ref lab | 10% of positive and negative specimens to be sent to the State for QA | Reverse cold chain to the State / Reference lab |
| **At the state lab** | | | |
| **Processing at the State lab** | Confirmation of serotype/phage typing, antibiotic sensitivity.Q A | Blood culture, identification and sensitivity. | Serology – IgM Elisa for Hep A and Hep E. |
| | **HIV/ HBV** | **Plague** | **Leptospirosis** |
| **Processing at the District** | Only at VCTC or blood bankSerology as per NACO's recommendations | TO BE DONE AT MEDICAL COLLEGE LEVEL ONLY Smear, microscopy of aspirate / sputum for bacilli | Rapid agglutination kit |
| **Storage** | - 20°C deep freezer | + 4°C in refrigerator | At + 4°C |
| **Transportation** | All positive specimens to the state lab | All samples by reverse cold chain to the nearest in reverse cold chain reference lab as specified by the RRT | To the State |
| **At the state/national lab** | | | |
| **Processing at the State Processing at the Reference / National Labs** | Confirmatory tests – Western blot | Isolation of the bacteria by culture. Antigen detection. Direct fluorescent antibody testing of smears (for anti-F1 antibody) PCR test | MAT For identification of serovars |
| | **Measles** | **TB** | **AFP** |
| **Processing at the District** | Measles IgM ELISA | Smear, microscopy | NIL |
| **Storage** | - 20°C deep freezer | 10% of positives and all negatives to be kept for QA | NIL |
| **Transportation** | 10% of positive, all negative and urine samples to be sent to the State / Reference lab. | | Reverse cold chain |
| **At the state Labs** | | | |
| **Processing at the State Lab** | Urine virus isolation / antigen detection QA of the positivesRecommended to test all negative specimens for Rubella | For Quality assurance – blinding and sending to districts. | Only at the NATIONAL POLIO LABS – virus isolation, identification. QA is by Reference lab and by WHO |

## Lab Investigation for NCD under IDSP

**Action to be taken by the HW / MO PHC:** Sample collection and transportation

- When the sample is to be collected: When the sentinel surveillance is conducted
- What sample is to be collected: Blood sample
- Transportation: To the designated labs
- Where the tests are to be done: At the District lab/ medical colleges lab/ identified sentinel labs.

Tests to be done: Blood sugar, serum cholesterol, Tri glycerides.

# SECTION 7

## INTERSECTORAL COORDINATION & SOCIAL MOBILIZATION

## 7.0 Integrating private practitioners in surveillance

More than 70% of primary health 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. Therefore it is proposed to have selected Sentinel Private Practitioners (SPPs) to be part of the programme so as to detect trends of disease and identify the occurrence of outbreaks, early.

Objective:

1. To identify disease outbreaks early
2. To find out trends of disease over a period of time

## 7.1 Identification and selection of sentinel private practitioners

The district surveillance officer will be responsible for integrating SPPs in each district. The selection criteria will be:

- Willingness to participate in the programme.
- SPPs who are likely to come across a large number of cases of the disease of interest.
- Previous experience with collaboration on health programmes with the Public Health System.

The private sector has been effectively involved with AFP surveillance by the NPSP, as reporting units. Involving ~20,000 private sites across the country, and ensuring their sustained interest as well as participation will be very challenging. A partnership of this magnitude between the public and private sector has not been experimented with before in the health sector.

### 7.1.1 Recruitment of Private Practitioners to be Sentinel Sites in IDSP

Specific steps required to be taken by the district surveillance officer to facilitate private participation include:

a) Approaching the private practitioner through professional bodies like IMA, IAP, API, ASI etc.

b) Organizing surveillance workshops at state and district levels to disseminate objectives, methods and outcome of proposed IDSP.

c) Establishing direct dialogue with potential private sentinel sites.

d) Motivating participation through incentives such as:-

- Inclusion of name in the network directory.
- Certificate of recognition and participation for participation in National IDSP.

- Access to IDSP computer web reports.
- Quarterly bulletins on health status of the region from District Surveillance Officer.
- Feedback from health workers during regular visits to collect data.
- Membership in village health committee meetings on rotatory basis.

The most important incentive will be the regular feedback offered to them. 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. The name included in the data base will act as an incentive.

Printed quarterly reports will be sent to all participating SPPs from the district surveillance unit. This bulletin will list all the SPPs who are contributing to the programme in the district and the number of cases reported by them in each quarter. A written memorandum of understanding will be made with participating SPPs in each district.

### 7.1.2 Sentinel private laboratory sites

These will serve as another category of urban reporting units. At least 10 urban private laboratories per district including the district hospital will be included. If and when the accreditation process becomes operational, then all accredited laboratories will be included. Till then, the process of selection would be similar to the one detailed under SPPs.

### 7.1.3 Number of private sentinel reporting sites

It is proposed that each surveillance unit at the block level have at least one sentinel private practitioner / Sentinel Private Hospital site reporting regularly on specified diseases under IDSP. There are approximately 15 blocks per district. Thus there will be ~9000 rural sentinel sites. Similarly, in the urban area of each district there will another 15 SPPs / SPH sites per district total of about ~9000 urban sites. In large metros there will be at least 20 sentinel sites selected and distributed throughout the urban surveillance unit in the city / municipal limits. Large cities in the country with a population of more than 2 million will be considered metros. These cities will contribute another 500 additional sentinel sites bringing the total of SPPs / SPHs to ~ 20,000 in the country with 650 districts. This would also ensure that at the district level we will be entering data from 10 CHCs and 30 SPPs, a total of 45 per district.

**Phased Induction**

There will be a phased increase in the induction of SPPs in the programme. In the second year, the total number of SPPs will be increased from 15 to 30 per rural and urban region of the blocks and 40 SPPs from large metropolis cities. This will bring ~20,000 urban and ~20,000 rural SPPs contributing to the IDSP by year three.

## 7.2 Facilitating reporting by private sentinel sites

### 7.2.1 Simplified Formats

As this is an attempt to see the disease pattern and not actually the disease burden, the format would contain limited information like diagnosis, age, sex only.

### 7.2.2 Frequency of Reporting

It is suggested that each of the SPPs report at weekly intervals. Since at each PHC there will be 10 SPPs this will mean at least one report per day from each region and three to four reports per day at the Block PHC. In addition, if there is any untoward case or a sudden increase noted, additional reports may be sent. Emergency telephone numbers will be made available to contact MO PHC / Health worker.

Flexibility will be provided in the method of reporting by the SPPs. Each PHC may choose an optimal method that is suitable in the situation. Any of the following methods may be used:

1. Telephone followed by mailing of IDSP format by hard copy
2. Fax
3. Electronic mailing
4. Courier
    a. Office of the DSO / CHC
    b. Direct contact with Health Worker if necessary
    c. Private Courier can be contracted

Telephonic reports will be encouraged during epidemic situations so as to avoid delay. MO Block PHC / computer entry person / District Surveillance Officer will be able to receive information from the periphery. Routine reporting will be facilitated by the health worker visiting the SPPs in the rural areas on specific days assigned for reporting. In urban areas, telephones can be used or the health workers can collect reports from SPPs as done in the polio programme.

## 7.3 Medical colleges

Medical colleges are currently not contributing effectively to surveillance activities in the country. Diseases presented at medical colleges are not being reported to surveillance officers due to poor motivation and other commitments. In IDSP, a defined role for all the medical colleges of the country is being proposed. The following departments in the colleges will be the sites for reporting the diseases under surveillance. In this way it would become part of urban surveillance activity, because most of these colleges are situated in urban areas.

It is proposed that one faculty member from each of the following departments will constitute an institutional IDSP sub-committee. The chairperson of the sub-committee can be the nodal person who will report to the district surveillance officer and ensure that relevant information is sent in on time.

- Principal / Medical superintendent (Chair)
- Community Medicine

- Medicine
- Pediatrics
- Chest and Tuberculosis
- Microbiology
- Cardiology

The participants of the IDSP sub-committee are selected on the basis of diseases currently under surveillance in the programme. Medicine and Cardiology are also responsible for NCD components of the IDSP. The sub-committee is chaired by a senior administrative staff member of the medical college so that participation in the programme will be effective.

In addition to data collection Medical colleges can contribute to the IDSP as

- Reference laboratories
- Quality Assurance / Evaluation
- Training
- Epidemic Investigation / response in collaboration with DSO or SSO (State Surveillance Officer)
- NCD Surveillance

**Reference Laboratory:** Many state medical colleges are functioning as reference laboratories for specific microorganisms. They will continue to do the same under the IDSP. Members of the IDSP sub-committee can serve as members of the rapid response team at the district and state level if required. The evaluation and quality assurance team can include members of the medical college staff. Since, the staff in medical colleges in the state is often not administratively under Director of Public Health this allows for independent evaluation. IDSP plans to integrate the surveillance of communicable and non-communicable diseases in one programme. The NCD risk factor surveillances are planned as regular surveys once in three to five years in different parts of the state in a cyclical manner. The members of the medical college sub-committee, particularly cardiology and medicine will assist the director of Public Health in planning and executing the NCD risk factor surveillance.

The participation of medical colleges will not only help IDSP activities as outlined above but, also help the institutions in the teaching and training of undergraduates and postgraduate students and in operational research in surveillance related issues. This would give students an opportunity to have hands on experience in surveillance while under training for the first time in the country, as they are the future health care providers and managers of the various programmes. This would mean sustainability on a long-term basis for the IDSP programme.

Medical college faculty members are particularly good at training issues since they are primarily teachers. IDSP plans to incorporate these faculty members in improving the training of IDSP personnel.

Each Medical College will be encouraged to adopt an administrative block from the field practice area used for the training of medical undergraduate and postgraduate students. The surveillance data collected from this block will be provided to the district surveillance unit. Since most of the medical colleges are situated in the urban and semi-urban regions where surveillance is weak, this will provide additional inputs from the urban regions of India.

### 7.3.1 Responsibility of Integrating Medical Colleges:

The state surveillance unit will take responsibility of training and facilitating the integration of medical colleges into the system. The director of Medical Education in the state will select one of the medical college team members as the overall coordinator for all the medical colleges' activities in the state. The health secretary will facilitate the activity of developing the state IDSP unit in each medical college in the state. Medical colleges willing to take on the surveillance function as urban district surveillance unit (urban - DSU) will be provided data entry and other resources allocated to the district surveillance unit to facilitate this activity. The State Surveillance Unit will enter into a written memorandum of understanding with the medical college administration regarding performance of IDSP functions. At the central level interaction with the IMC by the MOHFW will emphasize the need for this integration.

## 7.4 Feedback and sharing information

Sharing of information with all stake holders for effective public health action is the primary purpose of the IDSP. Regular reports generated by the district surveillance unit will be shared with all the stakeholders of the programme at the district level and all reports generated by the state surveillance unit will be shared by the stakeholders at the state level. The reports will be available through internet / intranet services which can be obtained by dial up services to the district surveillance unit and through the IDSP network at the district level. The stakeholders include:

**Periphery**

Medical officer of PHCs

Sentinel Private Practitioners participating in IDSP

Participating laboratories

**District**

All members of the district surveillance unit

State Surveillance unit

District Public Health Laboratory

Sentinel Private Hospitals participating in IDSP

Programme officers of disease control programmes

Medical Colleges

Other members as decided by the district surveillance unit officer

**State**

All members of the state surveillance unit

National IDSP Officer at Delhi

State level Disease control programme offices

State laboratories

Medical Colleges in the state

Others as decided by the state surveillance unit

In addition a monthly surveillance bulletin will be published by the state officer and dispatched to other stakeholders in the state similar to CD Alert by NICD. The state surveillance unit may contract private agencies to do this work.

In addition a monthly summary bulletin will be issued to all other stake holders of the programme.

## 7.5 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.

### 7.5.1 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, chauwkidar and other community members who tell them about the occurrence of diseases. Current efforts are based on individual initiative taken by some enthusiastic health staff. However there is no institutionalized system of involving the community in health programmes including surveillance activities. In addition, the community consistently expected to get feedback about the activities and data collected by health workers. When no feedback is given to the community, the people consider the whole exercise as part of the health worker's job responsibility which was irrelevant and of no benefit to them.

The community members, press, and local leadership often give information about epidemics. 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.

### 7.5.2 Socio-cultural issues to be taken up for social mobilization campaign

There are several socio-cultural barriers prevailing in the communities across the country that influence the sensitivity of data collected for surveillance activities.

Social mobilization campaign in IDSP will need to address all diseases associated with socio-cultural beliefs.

Religious minority groups in some areas are suspicious of the government health systems and hence withhold information. Urban clients staying in high-rise buildings do not wish to utilize public health services and therefore are non-cooperative even for surveillance activities. Due to poor credibility of health systems, many clients consider surveillance activity is meant for health departments with no benefit to common people.

Tribal and rural women felt that doctors in public sector health facilities do not provide good care because they are poor. Local leadership may sometimes refuse to support public health activities including surveillance if these hurt their personal interests.

### 7.5.3 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 is provided under ensuing sub-sections.

#### (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; private rural practitioners.

#### (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.

### 7.5.4 Social mobilization strategies

The aim of the social mobilization campaign under the IDSP will be:

- To create awareness among the partners, notably the private practitioners, NGOs and the community about existing health programmes, IDSP, the potential benefits, areas in which their participation will be solicited
- To establish an institutional mechanism to involve community and their leaders
- Develop a system of providing regular feedback to the community about disease occurrence, the responses to surveillance and impact of disease control programmes
- IEC must address all the issues that are likely to improve the sensitivity of the surveillance data, particularly the prevalent socio-cultural beliefs and gender disparities

- To increase the reach of the campaign, all channels of communication are to be used; these will include electronic media, press, hoardings, hand bills, posters, and inter-personal communication through health providers at all levels
- Content and messages of the campaign targeted at health workers and private practitioners will be different from that meant for the community, panchayat members, local influential persons and NGOs.

In view of the above, resources will be required for following activities:

**(a) Central level**:

- Organizing a media campaign for creating mass awareness about the usefulness of the surveillance, about core disease surveillance, dispelling common socio-cultural beliefs and gender disparity
- Sensitization and mobilization meetings for central and state level functionaries of IMA and other professional bodies to solicit their support for the programme
- Some IEC material for health functionaries and selected sentinel private practitioners, highlighting technical issues

**(b) State Level**

- Organizing a media campaign for creating mass awareness about usefulness of the surveillance, about core and state specific disease surveillance, dispelling common socio-cultural beliefs and gender disparity
- Sensitization and mobilization meetings for state and district level functionaries of IMA and other professional bodies, medical colleges, NGOs involved in health, to solicit their support for the programme
- IEC material for health functionaries and selected sentinel private practitioners highlighting technical issues
- IEC material and messages to be prepared within the local context and in the locally comprehensible language
- Bring out periodic reports on surveillance data and the consequent responses by the health department as feedback to the community and local leadership

**(c) District Level and Periphery**

- Organize sensitization and mobilization meetings at district head quarters for local IMA executive members, prominent practitioners, NGOs in health, elected representatives of the local as well as state bodies, district panchayat board members, teachers
- IEC material and messages to be prepared within the local context and in the locally comprehensible language; put up hoardings, posters, distribute

hand bills to create wide spread awareness. The IEC material has to be displayed in schools, all sentinel sites, prominent locations in the village and busy street crossings in urban areas, and in all places where mass human gatherings occur e.g. festivals, melas, exhibitions

- At village and block level: organize meetings between medical officers of the area, health workers and village health committees once in three months, with the purpose of revitalizing this institution, enhance community participation in all health related matters and identifying the community as partners in the planning and decision making process.

# SECTION 8

## SURVEILLANCE OF RISK FACTORS OF NON-COMMUNICABLE DISEASES

## 8.0 NON-COMMUNICABLE DISEASE RISK FACTOR SURVEILLANCE

The key to the control of epidemics of NCDs is primary prevention. The basis of prevention of NCDs is therefore identification of the major risk factors and their prevention and control. Population measurements of these risk factors are used to describe the distribution of future disease in a population, rather than predicting the health of a specific individual. Knowledge of risk factors can then be applied to shift population distribution of these factors. Emphasis has therefore been given to risk factors that are measurable under field conditions and that are amenable to intervention.

The following major risk factors will be measured under IDSP by conducting periodic surveys in the population:

i) Tobacco use

ii) Alcohol consumption

iii) Raised Blood Pressure (Systolic and Diastolic)

iv) Obesity (Height, weight, BMI, Waist circumference)

v) Diet (Low fruit, high fat, added salt to served food)

vi) Physical Inactivity

vii) Diabetes Mellitus (Fasting Plasma Glucose)

viii) High Serum Cholesterol

In addition, demographic (age, sex, urban/rural residence), socio-economic variables (educational level, occupation, income), past and family history of cardiovascular diseases, diabetes, and hypertension will be measured,

### 8.1 Organising and conducting the surveys:

The prevalence of risk factors will be measured by periodic sample surveys in States conducted once in 5 years. Twenty percent of districts will be surveyed each year, so that the whole population is covered in 5 years. The survey would be conducted every year in randomly selected districts in a five-year cycle. Thus, the same district will be covered once again after five years and the changing trends observed (thus having a repeat coverage of the same cross-section of the population only once in five years).

Director of public Health of the State, State surveillance Officer, District Surveillance Officer of concerned districts and NCD Surveillance units of Medical Colleges of the state will closely coordinate and supervise the survey. The survey will be contracted out to the best bidders for this programme who will be able to deliver the results in stipulated time. Financial resources will be allocated under IDSP for this activity.

### 8.1.1 Sampling

It is costly, impractical and unnecessary to survey an entire population for NCD risk factors. A good picture of risk factors for NCDs in the population can be easily assessed from a sample of that population. The selected sample however would have to be representative of the whole population.

The target population for the survey will be from 15 years to 64 years. As a standard, 10-year age groups (15-24, 25-34, 35-44, 45-54, 55-64) will be used.

The NFHS sampling technique will be used for selection of sample.

Proportionate to population cluster survey technique will be used to draw the sample.

While estimating sample the following recommendations of the WHO STEPs approach to NCD Surveillance should be considered:

"It is recommended that a minimum sample of 2500 persons across the recommended core age range of 15-64 years (equivalent to 250 participants in each 10-years age- and sex group) is undertaken for additional variable of interest such as ethnicity, area or urban-rural differences, the sample will need to be increased where an additional is of interest which is based dealt with by stratification of the total population, the same number of cases in each age and sex groups needs to be added for each level of the additional variable". It is important to detect urban-rural differences and hence 2500 individuals from urban area and further 2500 from rural area will be required.

### 8.1.2 Survey Instrument:

A pre-tested simple questionnaire has been prepared for carrying out the survey (Annexure 1). These questionnaires has already been developed by WHO (STEPS) and modified for the Indian scenario and is already in use for sentinel surveillance for cardiovascular risk factors in 10 selected Industrial populations all over India. The questionnaire basically includes socio-demographic data of the participant, assesses the tobacco habits and alcohol consumption pattern and records the measured data (height, weight and Blood Pressure) and biochemical results (Fasting Blood Glucose and Serum Cholesterol). It is computer friendly and it can easily feed into the software Programme to generate the necessary analysis of trends and patterns of NCD risk factors in the community surveyed.

Description of Selected Risk Factors: Brief description, interpretation and definition of risk factors selected for NCD surveillance is provided as Annexure 3. Measurement issues are given in Annexure 4

### 8.1.3 Timing of the survey

Both physiological and cultural considerations would influence the timing of the survey. A practical physiological consideration is that since the survey requires participants to fast overnight it would commence early in the morning and finish early in the afternoon (i.e. 6:00 am to 1:00 pm). The staff can use the rest of the day for coding the forms,

dealing with the lab specimens and other documentation, as well as make preparations for the next day. Flow chart and layout for conducting the survey is given in Annexure 2.

### 8.1.4 Validity of data

Ensuring valid data and hence valid conclusions would involve ensuring good practice at all stages of the process. This includes how the data is collected, the power of the study and how the data has been analysed. Relevant aspects of collection of the data include:

- The response fraction
- Having valid and reliable instruments for making the measurements (including sphygmomanometers, questionnaires, etc) and
- Attention to calibration of instruments and training of staff, and monitoring of the quality of measurements themselves.

Maximising participation of individuals selected for inclusion in the survey reduces the probability that those who do attend are unrepresentative of the sample that was originally drawn. High levels of non-participation or missing data for particular variables would be detected early and where possible prevented.

## 8.2 Laboratory Issues

The district public health labs would arrange for carrying out the estimations for blood sugar and cholesterol. They will co-ordinate the collection, transport and receipt of the samples from the periphery to the lab for the analysis. They will plan their capacity so that the analyses are carried out quickly without any significant variations due to delay. Adequate quality control of biochemical assays is a key factor in ensuring that the results of the survey are useful. (Since the blood haemolyses very rapidly and effects blood glucose estimation, glucometers would be planned for use at the PHC itself as it would be more cost effective in the long run).

## 8.3 Data entry and transmission

Data collected in surveys of risk factors for NCDs represent a large investment of time, effort and money. Great care therefore would be taken in their handling, storage and analysis. This includes transportation, storage of paper forms, as well as entry and storage of the data on electronic media. Providing for double entry of all records as well as development of software that automatically check the data for improbable values and internal inconsistencies, respectively; and range and logic checks, would reduce errors in collection. Ideally data would be entered as close as possible to the time and place of collection. This would not only allow for timely analyses, related quality control and for checking assumptions regarding parameters, but also means that at least the staff that collected the information is likely to be available to resolve problems/doubts about certain entries, etc.

The data entry will be the responsibility of the agency to which the survey has been contracted. The data will be transmitted electronically to State Surveillance Officer.

### 8.4 Analysis:

The data will be analysed and reports generated for feedback and action by the Office of the State Surveillance Officer. The purpose of analysis is to estimate the proportion of subjects with risk factors in order to identify individuals at high risk of developing non-communicable diseases and to determine the mean distribution of various risk factors in the population stratified according to age, sex, socio-economic class and urban/rural residence. Therefore the analysis will involve estimation of the proportion of obese individuals, smokers / tobacco users, alcohol drinkers, physically inactive subjects, low fruit / vegetable intake, high fat intake, hypertensives, diabetics, subjects with hypercholestrolemia, stratified according to age, sex, socio-economic class, and urban/rural residence. The mean levels of systolic and diastolic blood pressures, Body Mass Index, waist circumference, fasting blood sugar and serum cholesterol in the population will be estimated in various populations. Repeat surveys in the same populations would provide time trends of prevalence of these risk factors.

Summary Reporting Format for NCD Risk Factor Surveillance is given in Annexure 5

### 8.5 Ethical considerations

Questionnaires that deal only with lifestyle issues and not with potentially sensitive personal/medical information may not require ethical clearance and would be conducted on the basis of verbal consent alone. The same would also apply to simple non-invasive measurements also. Blood pressure is more medically significant, however as it has to be clarified whether persons with elevated readings would be followed up and treatment provided and hence written consent would have to be obtained. Also collection of blood through any means including pinprick must have prior ethical clearance and plans for treatment of those for raised levels, built-in. (The questionnaire itself will have a built-in consent form as shown in annexure 1).

Referral, diagnostic and treatment support to persons identified with NCD risk factor will be built into the system. The patient detected to have hypertension, diabetes etc will be referred to the next level, where facilities for treatment are available.

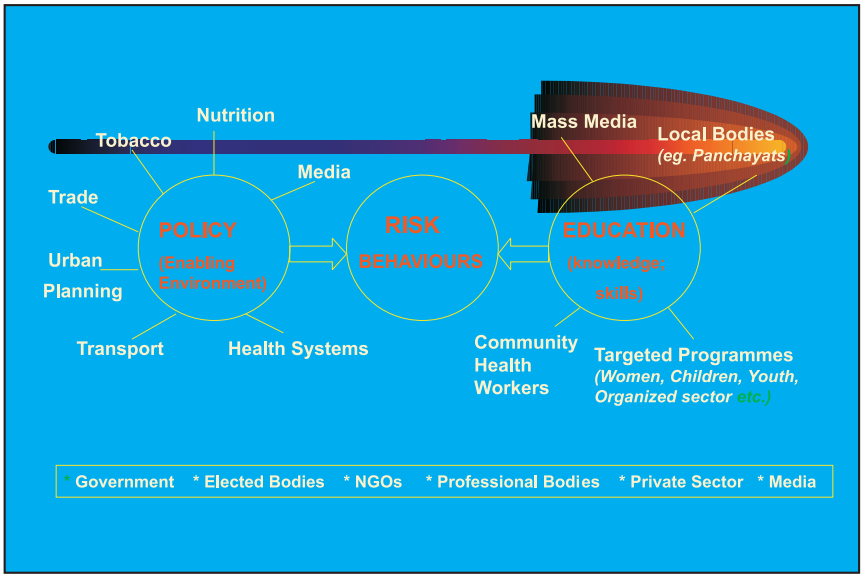
### 8.6 Plans for dissemination and use of the findings.

The data generated by periodic surveys will provide information about prevalence and time trends of NCD risk factors and unhealthy life style behaviour among various populations. This will underscore the need for NCD prevention and control programmes in the community, influence policy makers and guide in financial allocation for programmes in controlling NCDs in the community.

As against the use of communicable disease surveillance, which is for immediate control and preventive action, data from NCD surveillance would be used for policy formulations

(e.g. ban on tobacco use in specific places or for specific age,) or for Programme evaluation (e.g. number of people with hypertension detected/treated).

**Figure 1**




A coordinated approach should be undertaken to implement the risk factor intervention at community level involving medical colleges state health departments, primary health care services and non-governmental organisations so as to have cost effective implementation of these programmes. Health education material on the causes and prevention of incentives should be developed and disseminated to enhance public awareness. A combination of Population based strategy for prevention of NCDs targeting the whole population and the high-risk strategy targeting people with risk factors will be implemented. (Figure 2 and 3)

**Figure 2**

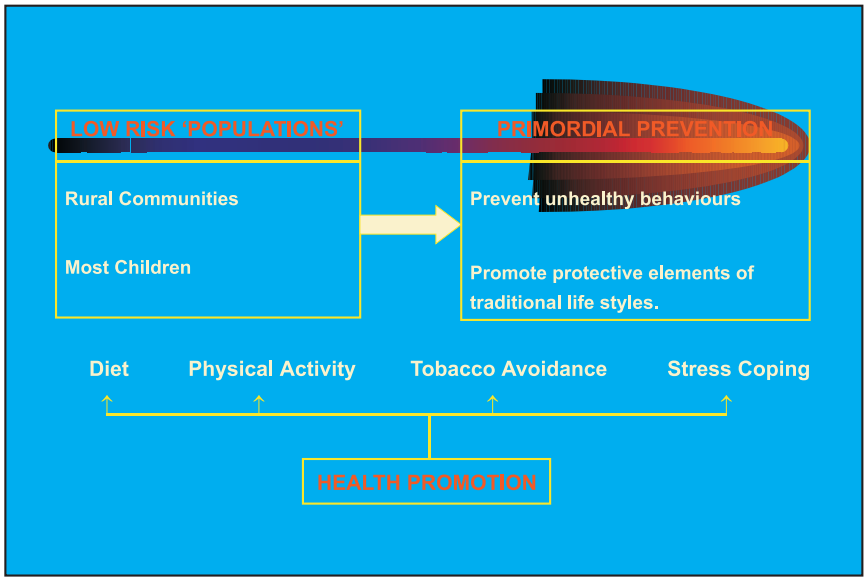
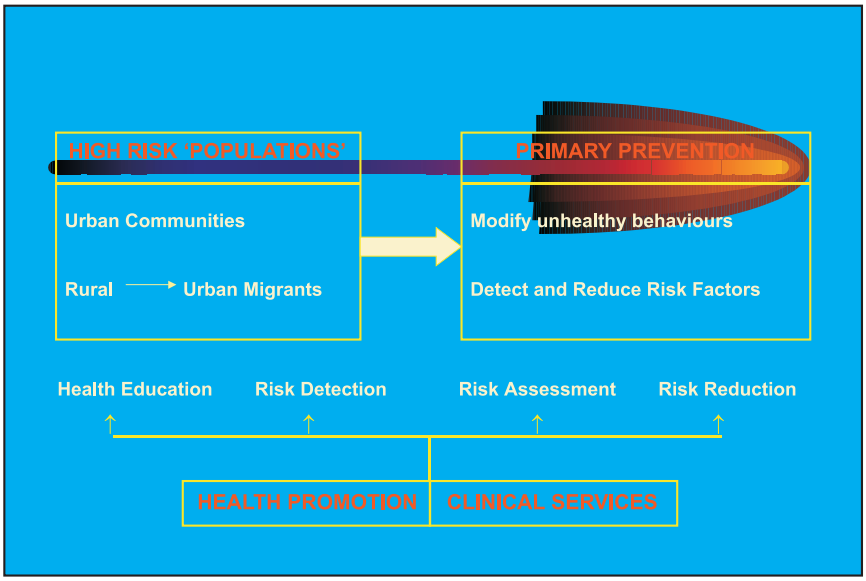


Figure 3




## QUESTIONNAIRE FOR RISK FACTOR (NCD) SURVEILLANCE

**I. Demographic Information: Unique Identifier: State code, District Code, Rural/Urban code, Individual code**

| | |
|---|---|
| Name and address in full: | |
| Sex: | M / F Age: years |
| Ethnic group:SC / ST / OBC / Others | Religion: |
| Educational qualifications: Nil / primary / middle / secondary / higher | |
| Employment: Unemployed / unskilled labour / housewife / skilled labour / technical / office staff / business | |
| Family income (per capita): Below Rs1000/-pm / 1001-3000 / above 3001 pm | |

**II. Smoking / Tobacco use**

(bidis/cigarette/hookah/snuff/chewed tobacco / ghutka)

1. Do you **now use** any tobacco product such as bidis, cigarettes, ghutka, etc? Yes / No. ***( if no, go to 3)***
2. If yes, on an average, how many a) cigarettes do you smoke every day. _____

   b) bidis do you smoke every day. _____

   c) times do you use hukka every day _____

   d) times do you chew tobacco every day _____
3. If no, have you **ever used tobacco** in any form? Yes / No. (if no, go to the next section)
4. If yes, on an average, how many a) cigarettes did you smoke every day. _____

   b) bidis did you smoke every day. _____

c) how many times did you use ghutka every day _____

d) how many times did you chew tobacco every day_____cigarettes/ bidis did you smoke every day.

5. How old were you when you started using tobacco?____years old.

6. When did you give up using tobacco? _____Years / months / days ago.

**III Alcohol consumption**

1. Do you **now consume** any alcoholic products? Yes / No. ***(if yes go to 2 & 3; if no, go to 4)***

2. If yes, on an average, what is the frequency of consumption?

   Equal to or more than 5 days per week

   1 – 4 days per week

   1 – 3 days a month

   Occasionally

3. If yes, how many drinks per session do you have, when you consume alcohol? _____

4. If no, Have you ever consumed alcohol in any form? Yes / No. (if yes go to 5, 6, 7 & 8; if no, go to the next section)

5. If yes, on an average, what was the frequency of consumption?

   Equal to or more than 5 days per week

   1 – 4 days per week

   1 – 3 days a month

   Occasionally

6. If yes, how many drinks per session did you have, when you consumed alcohol? _____

7. How old were you when you started consuming alcohol?____years old.

8. When did you give up consuming alcohol? _____Years / months / days ago.

**IV PHYSICAL ACTIVITY**

Q. 1-4 is for people who work outside the house.

Q. 1-4 is option '9' can be used for people working indoors.

**1.** What is the nature of your work?

Almost / entirely sedentary = 1

Mainly sedentary, some walking/standing = 2

Mainly standing / squatting (static) = 3

Mainly standing (active) = 4

Mainly moving around / walking = 5

Heavy physical work, load carrying / pushing, etc., = 6

**2.** Average number of hours spent at work per day?

**3.** How would do you describe your physical activity at work?

[Very light = 1 Light = 2 Moderate = 3 Heavy = 4]

4. How much time is spent on travelling to work and return in each of the foll**owing activities?**

**[Not applicable=9, <15min.=1, 15-29min.=2 >=30 min.=3]**

a) Walking

b) Cycling

c) Sitting

d) Standing

**5.** Do you undertake the following activities on a daily basis, related to work at home?

**[No =1, Yes = 2]**

a) Manual washing of clothes

b) Manual washing of utensils

c) Dry sweeping of floor

d) Wet mopping of floor

e) Drawing water from well

f) Carrying water from tap

g) Carrying water from river or well

h) Manual grinding or pounding or cereals

i) Gardening at home

j) Cooking and serving food

k) Care of children below 10 years

l) Carrying groceries from market

m) Others (please specify) _____

**6.** Any current exercise not related to work?

**[No =1, Yes = 2]**

***If 'yes'***, proceed to **Q.7**; ***if 'no'***, skip to **Q.9**

**7.** Please enumerate current physical activity not related to work or travel to work

| Activity | No = 1, Yes = 2 | Frequency/week | Minutes/session |
|---|---|---|---|
| Slow walking | | | |
| Brisk walking | | | |
| Jogging | | | |
| Cycling | | | |
| Aerobics | | | |
| Physically active games* | | | |
| Others | | | |

***Please refer to the manual of operation for the list of physically active games.***

**8.** At what age did you start the above routine **(as stated in Q.7)?** Years

**9.** Do you practice yoga?

**[No = 1, Yes=2]**

**10.** How would you describe your level of daily physical activity in the past 5 years?

**[Very light =1, Light = 2, Moderate = 3, Heavy = 4, & Not applicable = 9]**

a) At work

b) At Home

c) Non-work related

d) Overall

## V DIET

**1.** Which of the following food items do you consume?

**[No = 1, Yes = 2]**

| Vegetarian Foods | Milk-Dairy Foods | Eggs | Meat-*regularly* | Meat-*sometimes** | Chicken-regularly | Chicken-*sometimes** | Fish-regularly | Fish-*sometimes* |
|---|---|---|---|---|---|---|---|---|
| X | | | | | | | | |

**Sometimes means once or twice a week***

**2.** How often do you consume fruits?

**[Daily = 1, three-four times a week = 2, Occasionally = 3, Never = 4]**

**3.** How often do you consume fruit juice*?

**[Daily = 1, three-four times a week = 2, Occasionally = 3, Never = 4]**

***fruit juice also includes lemon juice***

**4.** Do you add extra salt to food after it is served?

[**Most of the times = 1, Sometimes = 2, Rarely/Never = 3]**

**5.** What percentage (mark the nearest category) of your weekly meals consist of food cooked outside your home?

Occasional/never = 1

Less than 25% = 2

25 – 50% = 3

More than 50% = 4

**8.** What is the main type of oil/fat used in cooking?

Mustard oil = 01

Coconut oil = 02

Groundnut oil = 03

Gingily oil = 04

Sunflower oil = 05

Palm oil = 06

Vanaspati = 07

Safflower oil = 08

Pure Ghee = 09

Other = 10

**9.** Kindly give the details of the consumption of the following items in your household.

| Item | Whether use **[No = 1, Yes = 2]** | Quantity used in Kg/month |
|---|---|---|
| Oil | | |
| Butter | | |
| Pure ghee | | |
| Vanaspati | | |
| Salt | | |

## VI HEALTH RELATED QUESTIONS

**1.** Have you ever had any of the following disease?

**[No = 1, Yes = 2, Don't know = 3]**

a) Diabetes (high Blood Sugar)

b) High blood pressure

c) Heart trouble

d) Stroke (Paralytic attack)

**2.** Has anyone in your family (parents/brothers/sisters/children) suffered from any of the following diseases, **before the age of 60 years?**

a) High blood pressure

b) Heart problem*

c) Diabetes mellitus (High Blood Sugar)

d) Stroke (paralytic attack)

***Angina/heart attack/heart failure***

## VII Physical measurements

**Height: _____ cm ____ cm ____cm (3 readings)**

Weight:_____ Kg ____ Kg ____ Kg (3 readings)

Calculated BMI (weight in Kg/height in metres$^2$)

Waist Circumference:_____cm

## VIII Blood Pressure

**Have you have been told that you have high BP. Yes/No.**

Have you been under any treatment/medication for high BP? Yes/No.

Systolic Pressure (mm of Hg): 1. _____ 2. _____ 3. _____

Diastolic Pressure (mm of Hg): 1._____ 2. _____3. _____

## IX Fasting Blood Sugar

Have you ever been told that you have diabetes? Yes/No.

Are you on any medication for diabetes? Yes/No.

Fasting status: last meal/drink consumed at_____:00pm (excluding water).

Fasting Blood Sugar:_____mg% (Sample taken at ____am.)

## X Blood Cholesterol

Total cholesterol_____mg%

## CONSENT CERTIFICATE

I have been explained the full process of the survey (verbally in the language I understand) and the different procedures and tests involved. I am willing to participate in the survey and have no objection to any tests being conducted on me. I have also been explained that if any of the results are abnormal I will be kept informed and arrangements will be made to provide me, the necessary follow-up at the nearest health centre.

_____

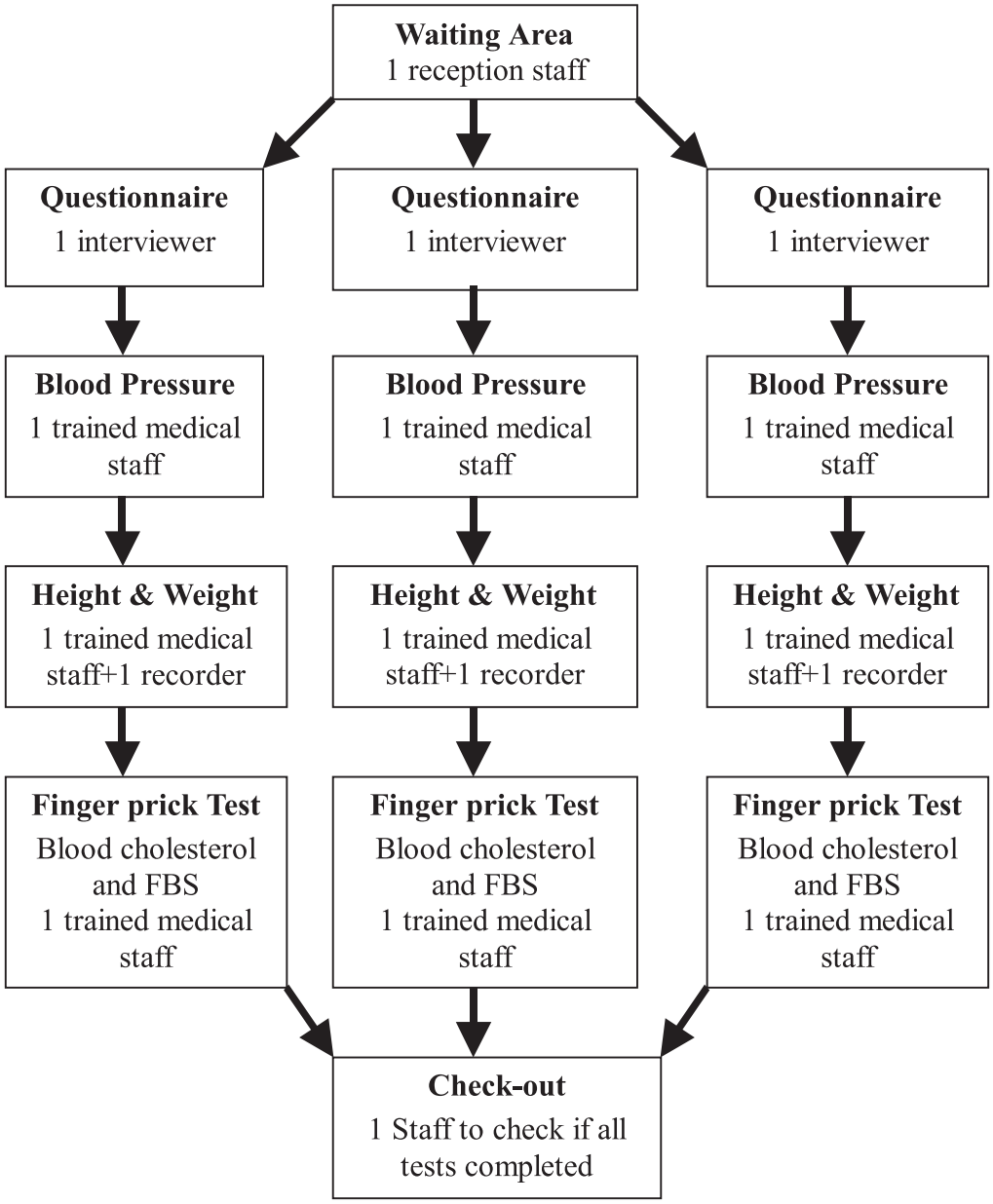
Date: (Signature/thumb imprint)

_____

(Name of the participant)

Date: Name & designation of health personnel

## Flow chart and layout for a risk factor survey




**Notes:**

1. Starting time: Staff to start at 6:00 am and finish by 1:00 pm, three participants booked in every 10 minutes starting at 6:30 am, so that 100 participants can be covered per day.
2. Registration: Includes assessment of participants fasting status, briefing of the procedures involved and signature on the consent form.
3. Questionnaire and blood pressure: If the questionnaire station is located next to the BP station it should be possible for each participant to rest for the 5 minutes required for the measurement of BP.

## Selected risk factors

### 1. Obesity

#### Weight

Weight is related to blood pressure, blood lipids and propensity to develop Type 2 diabetes. Being overweight exacerbates symptoms from osteo-arthritis in weight bearing joints and spinal disorders, if it does not actually cause these conditions. It is also a risk factor for colo-rectal cancer, uterine prolapse and uterine fibroids and, in pre-menopausal women, for breast cancer. Weight is used to calculate Body mass index (BMI), which is used as an indicator for obesity. Weight is a continuous variable, measured to the nearest 0.1 Kg, reflecting a person's body mass in light clothing. Weight can be measured by standing on a bathroom scale placed on a hard, smooth horizontal surface.

#### Height

Height is a key variable in the calculation of relative body weight. Exceeding the normal range of weight for height is related to risks of hypertension, hyperlipidaemia and Type 2 diabetes. Height is used to calculate Body mass index (BMI), which is used as an indicator for obesity. Height is a continuous variable measured to the nearest 0.5 cm to reflect a person's measured height. Height can be measured against a tape fixed to a vertical wall, with the participant standing on a firm/level surface. The participant is asked to remove all footwear and to stand, with feet together, with heels, calves, buttocks, dorsal spine and head touching the wall.

#### Body Mass Index (BMI)

BMI is used as an indicator of underweight, overweight and obesity. Epidemiological research shows that there is a strong association between BMI and risk to health. Excess adipose tissue in adults is associated with excess morbidity and mortality from conditions such as hypertension, unfavourable blood lipid concentrations, diabetes mellitus, coronary heart disease, some cancers, gall bladder disease, and osteo-arthritis. Thinness (low BMI) is also an indicator of risk to health, often being associated with general illness, anorexia, tobacco use, alcoholism and drug addiction. Low BMI is consistently associated with increased risk of osteoporosis and fractures in the elderly. BMI is calculated from height and weight measurements (weight in Kg/ height in metres$^2$). Definitions for categories of relative weight are shown in table 1.2.

**Table 1.2 Definitions for categories of relative weight**

| BMI | Category of relative weight |
|---|---|
| $< 18.5$ | Underweight |
| 18.5-24.9 | Normal weight |
| 25.0-29.9 | Grade 1 overweight |
| 30.0-39.9 | Grade 2 overweight |
| $\geq 40.0$ | Grade 3 overweight |

Source: WHO STEPwise approach to NCD surveillance
Note: These categories have been based on studies principally from developed countries. Risk of NCD may increase at lower (or in some cases higher) levels of BMI in some developing countries.

## 2. Smoking/Tobacco

Tobacco is commonly smoked or chewed or inhaled. Smoking is a leading cause of cardiovascular, neoplastic, chronic respiratory and digestive tract disease, as well as, has significant adverse effects on pregnancy. Chewing of tobacco is also a leading cause of oral cancer. Use of tobacco is determined by a pre-tested questionnaire (sample questionnaire in annexure 1) and determines a current user (daily or occasional), and non-users (ex-user and never-used).

Definitions (according to 'Guidelines for controlling and monitoring Tobacco epidemic'

Current Smoker/tobacco user: someone who at the time of survey, smokes/uses tobacco in any form either daily or occasionally.

Daily Smoker/tobacco user: someone who smokes/uses tobacco at least once a day. People who smoke/use tobacco every day with rare exceptions such as not on days of religious fasting or during acute illness are still classified as daily smokers.

Occasional Smoker/ Tobacco user (Non daily smoker/tobacco user): Someone who smokes/ uses tobacco, but not on every day.

The group of non-smokers comprises individuals who are never-smokers (those who have never smoked at all) and Ex-Smokers: People who were former daily smokers but currently do not smoke at all or those who were former occasional smokers, i.e. ex-occasional smokers). They can be sub-classified by:

- time elapsed since quitting
- those who had ever smoked daily, and
- those who never used to smoke daily but only occasionally in the past.

## 3. Alcohol

The relationship between alcohol consumption and health and social outcomes is complex and multi-dimensional. Average alcohol consumption is linked to more than 60 disease conditions (in a series of recent meta-analyses) including liver cirrhosis, several cancers (liver, laryngeal, oesophageal and oropharyngeal cancers), injuries and haemorrhagic strokes. Effects of alcohol consumption can be through biochemical effects on chronic diseases, through increased risk (by intoxication) to injuries, accidents and domestic violence and through alcohol dependency. Because consumption of alcohol may be episodic, asking individuals about their average (daily) consumption is problematic. Type of alcoholic beverage consumed also has not been found to have significant bearing on NCDs. Therefore, for ease of recall and relevance, surveys of drinking would attempt to capture both amount and pattern through the questionnaire (in spite of strong tendency to under report).

*Note:* "standard drink" would be defined keeping in mind local patterns of consumption.

## 4. Blood pressure

**Current Drinker: Those who consumed 1 or more drinks of any type of alcohol in the year preceding the survey.**
**Former drinker: Those who have ever drunk alcohol but those who did not consume 1 or more drinks during the year preceding the survey.**
**Lifetime abstainer: Those who never consumed 1 or more drinks of any type of alcohol**
**High-risk drinker: those who drink more than 5 (for women 4) standard drinks on any single day.**

Blood pressure is an important determinant of risk of cerebrovascular disease, ischaemic heart disease, congestive cardiac failure and renal failure. There are also relationships between blood pressure and risk of peripheral arterial disease and abdominal aortic aneurysm. However, blood pressure is labile and its level will vary with factors related to the individual, the observer, the setting, the equipment and the technique employed in making the measurements. The BP will be measured using a standard mercury sphygmomanometer (appropriately calibrated and maintained) and a trained health professional using a stethoscope. It will be measured in a quiet room, on the right arm (specified because differences in arterial anatomy for the right and left arms mean that the blood pressure is not same in each), while sitting. In order to provide more consistent advice to clinicians the WHO-ISH Guidelines Committee has agreed to adopt in principle the definition and classification provided in JNC VI. Hypertension is defined as a systolic blood pressure of 140 mm of Hg or greater and/or a diastolic blood pressure of 90 mm of Hg or greater in subjects who are not taking any anti-hypertensive medication. A classification of BP levels in adults over the age of 18 is provided in table 1.3.

**Table 1.3 Definitions and Classification of BP levels**

| Category | Systolic (mm of Hg) | Diastolic (mm of Hg) |
|---|---|---|
| Optimal | <120 | <80 |
| Normal | <130 | <85 |
| High-Normal | 130-139 | 85-89 |
| Grade 1 Hypertension (“mild”)Subgroup: Borderline | 140-159140-149 | 90-9990-94 |
| Grade 2 Hypertension (“moderate”) | 160-179 | 100-109 |
| Grade 3 hypertension (“severe”) | ≥180 | ≥110 |
| Isolated Systolic Hypertension | ≥140 | <90 |

When an individual’s systolic and diastolic BP fall into different categories the higher category, should apply.

Source: WHO STEPwise approach in NCD surveillance

## 5. Blood sugar

Raised fasting blood sugar gives sufficient validity to estimate population changes in diabetes and related impairment of glucose tolerance. Diabetes mellitus (DM) is an important marker of risk for arterial disease of the coronary, cerebral and peripheral arterial trees, and for microvascular disease leading to blindness and renal failure. For surveillance purposes, mean fasting blood sugar is sufficient as the population-wide

indicator of the likely burden of DM. Fasting blood sugar (FBS) can be measured in the field from a finger prick using a blotting paper technique (or glucometer), which has been standardised.

Definitions (ADA): Diabetes mellitus: Fasting plasma glucose >= 127 mg% (fasting at least 8 hours of overnight fasting)

Impaired fasting glucose = 111 to 126 mg%

Normal fasting glucose = < 110 mg%

### 6. Blood cholesterol

The concentration of cholesterol in the blood shows a continuous and graded relationship with risk of coronary heart disease. The relationship between total cholesterol and risk of cerebrovascular disease (stroke) remains less clear, though lowering cholesterol has shown reduced incidence of stroke in patients on medication. Indians have shown to be at high risk even at significantly lower values of cholesterol and hence a lower range of values for normal cholesterol will have to be decided upon. Total blood cholesterol can be measured in the field from a finger prick using a dry chemical technique, which has been standardised. In order to facilitate biochemical investigations particularly in the rural population, evaluation or measurement of cholesterol through dry chemistry and validation of this technique in the field situation should be undertaken.

Hypercholesterolemia: Serum cholesterol >=200 mg%

### 7. Physical Activity

These questions are to help determine if the subjects lead an active or passive lifestyle. The first four questions relate to physical activity involved in work and travelling to work. These provide in-depth details of physical activity done in quantifiable terms, for example, whether the work involves mostly sitting or predominantly is of manual labour. Similarly, the physical activity involved in travelling to work is elicited by asking the different modes of transport involved in travelling (for e.g. a person's travel may involve cycling followed by sitting or standing in an automobile, or it may be made by cycling followed by walking). The time spent on these individual components is also coded for in different time-slabs. Whichever activity is not applicable, should be marked as 9. For household members a separate question is asked to approximate the amount of physical work involved in domestic chores. Hence Questions 1-4 are only meant for subjects who work outside the house whereas the other questions in this section are to be answered by all the subjects i.e. those working outside the house as well as subjects who work only in the house.

The next part queries regular non-work related physical activity. The rural population might find this hard to understand, exerting to keep fit. Efforts would have to be made to explain this to them *that* regular activities like cycling to nearby towns to watch movies can be included in this category. Similarly outdoor and indoor sports, which are physically active like badminton, jogging, football, cricket, swimming etc. are asked for. Games like chess, which do not have any significant physical activity, involved

would not be considered in this category. It is necessary to be accurate with frequency and duration of the physical activity as well as how long ago such a routine was started. Such information would give clearer gradients with health situation at present and changing trends with intervention, which could be in terms of health promotion and education. Yoga has been included in this section. Practicing yoga more than once a week is considered regular and anything more than that shall be considered occasional for simplicity. At the end a simple question is posed to get an idea of overall and component wise physical activity of the interviewee in the past five years.

### 8. Diet

This section serves to seek any relation between the diet consumed and occurrence of CVDs. The first two questions probe in a limited manner, the different types of food consumed by the subject and the frequency of their consumption. Each of the components of these question should be marked as *Yes (=2) or No (=1)*

The third question is about usage of extra salt after the meal has been cooked. The fourth question tries to estimate the frequency of meals consumed by the subject, which are cooked outside the house.

The total consumption of the cooking medium and salt by the family per month is enquired separately in the family proforma.

### 9. Health related questions

This section aims to chart the current major heart related illnesses in the population. It tries to cater to those who know about their illnesses and those who have the disease symptoms but have not been diagnosed. The diseases measured are diabetes, hypertension, heart trouble and stroke. The symptoms queried are palpitation, chest pain, chest discomfort/ heaviness/ pressure, breathlessness and fatigue/weakness. In addition, an attempt to measure risk due to presence of illness in the family is made. A certain illness could prevail in a family due to genetics or the similar lifestyle the members lead. To evaluate this, the question posed is, 'if any family member has high blood pressure, heart problem/chest pain, diabetes mellitus or has had stroke and whether somebody in the family has expired before the age of 60 years due to these illnesses.

## Operational Instructions for Measurement of Variables

It is necessary to standardise the anthropometric measurements for the surveillance to prevent errors in analysing data between centres in the study.

### Blood pressure

It is important that measurement of blood pressure (BP) is as precise as possible. This is essential for valid comparisons to be drawn. Therefore a strict routine for BP measurement should be adhered to. The measurement should be planned to precede any painful or anxiety producing procedures such as blood taking. Ideally it should follow the administration or checking of the questionnaire.

1. The subject should be instructed to avoid the following activities for at least one hour before the BP measurement: strenuous exercise, eating, drinking of anything other than water, smoking, drugs that affect the blood pressure; a full bladder affects the blood pressure and patients should be advised accordingly.

2. The participant should have removed outer garments, jackets, etc. the sleeve of shirts, blouses, etc. should be rolled up so that the upper right arm is bare for the blood pressure cuff. The garment should not be constrictive and the blood pressure cuff should not be over the garment.

3. The examination should take place in a quiet room with comfortable temperature.

4. The standard Omron MX3 automated BP recording machine is to be used, as is being done worldwide in clinical trials.

5. The cuff size should be sufficiently long to surround at least two thirds of the upper arm. The centre of the inflatable part of the cuff (bladder) must be positioned over the brachial artery of the inner side of the upper arm. The cuff should not be applied too loosely or too tightly in order to avoid over or under estimation of the pressure required to obliterate the artery.

6. The BP should be measured after resting with no change of position for at least 5 minutes, in a sitting position and using the right arm – unless there is a deformity. When seated the subject's arm should be allowed to rest on a desk so that the antecubital fossa is level with the heart, at the level of the 4$^{th}$ inter-costal space at the sternum. To achieve this either the chair should be adjusted, or the arm may raised or lowered on a comfortable support. The subject must always be in an upright position and feel comfortable.

7. The observer should be in a comfortable position in relation to the examination table.

8. The cuff should now be connected to the sphygmomanometer.

9. Blood Pressure Measurement with the Omron MX3 Automated BP Recording Machine.

a. the subject should rest for 5 minutes in a sitting position – during which the whole process of BP measurement should be explained to him/her. If the subject is spoken to during the period of resting before the measurement, the staff involved should speak quietly and calmly. The subject should not be involved in animated conversation, joking or teasing as this will give a high blood pressure reading.

b. Locate the brachial pulse. The exact procedure of measuring blood pressure as described in the instruction manual of the Omron MX3 model should be followed.

c. Wait for at least 30 seconds to allow redistribution of blood in the forearm. In addition, the arm may be raised for about five seconds to further reduce venous congestion in the forearm. Then repeat the measurement in exactly the same way that the first one was carried out. Whenever experiencing difficulties, the cuff must be completely deflated and at least 30 seconds must elapse before making the next measurement.

d. Record the value of both measurements.

**Height**

Height is measured in conjunction with the weight measurement. It may precede or follow this procedure.

1. The height rule must be taped vertically to a hard flat surface with the base at floor level.
2. The correct position of the height rule should be checked daily and corrected as necessary.
3. The floor surface must be hard (tile, cement, etc.) and must not be carpeted or be covered with other soft materials. If only a carpeted surface is available, a wooden platform should be laid down to serve as a floor.
4. The participant is asked to remove his/her shoes and heavy outer garments.
5. To measure height, the participant should stand with his/her back to the height rule. The back of the head, back, buttocks, calves and heels should be touching the height rule and feet should be placed together. The top of the external auditory meatus (ear canal) should be level with the inferior margin of the bony orbit (cheek bone). The position is aided by asking participant to hold the head in a position where he/she can look straight at a spot, head high, on the opposite wall.
6. Place the set square on the height rule and slide down to the head so that the hair (if present) is pressed flat.
7. Record information on survey form to 1 significant figure after decimal in cms. For example, if 172.4, record as 172.4 cms; if 172, record as 172.0 cms.

8. Self-reported heights are not acceptable in mobile participants. Only persons who are immobile (e.g. amputees) may self-report their heights. Be sure to note this on the form.

9. To measure extreme heights, a short rule is used in addition. It is placed at the top of the long rule and the extra height is added.

### Weight

An electronic weighing machine would be used for weight measurement. The floor surface on which the scale rests must be hard and should not be carpeted or covered with other soft material.

b) The participant should have removed his/her shoes and heavy outer garments (jacket, coat, etc.).

c) The participant should stand in the centre of the platform as standing off-centre may affect measurement.

d) The weight is read and recorded on the form. Record weights to 1 significant figure after decimal for e.g. 65.23 kgs as 65.2 kgs.

e) Self-reported weights are not acceptable in mobile persons. Only participants who are immobile (e.g. amputees) may self-report their weights. Participants must not read the scales themselves.

### Waist circumference measurement

A standard tape measurement is used for waist circumference measurement.

1. Record the measurement of the circumference at a level midway between the lower rib margin and iliac crest in cms to the nearest 0.1 cm. Example: If the exact measurement is 87.7 cm, record as 87.7 cm only.

2. The circumference should preferably be measured on subject while they are semi-clothed, i.e. waist uncovered with the subjects wearing underclothes only.

3. Participants should stand with their feet fairly close together (about 12- 15 cm) with their weight equally distributed on each leg. Participants should be asked to breathe normally and at the time of the reading of the measurement asked to breath out gently. This will prevent subjects from contracting their muscles or from holding their breath.

4. The tape should be held firmly and its horizontal position should be ensured. It is recommended that the observer sits beside the participant while the readings are taken. The tape should be loose enough to allow the recorder to place one finger between the tape and the subject's body.

5. The two sides of the tape should be differently coloured or have a scale only on one side. If the tape is uniformly coloured, with readings on both sides, one side should be blanked out.

## Summary Report of NCD Risk Factor Surveillance:

**Unique Identifier: State** **District** **Period:**

**Urban** **Rural** **Total**

**a) No. Of Persons to be surveyed:** **b) No. Of Persons surveyed:** **c) % Responders= b/a x100=**

| RISK FACTORS | URBAN | | | | | | | | | | | | | RURAL | | | | | | | | | | | | OVERALL | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 15-24 | | 25-34 | | 35-44 | | 45-54 | | 55-64 | | TOTAL | | | 15-24 | | 25-34 | | 35-44 | | 45-54 | | 55-64 | | TOTAL | | TOTAL | | | |
| | M | F | M | F | M | F | M | F | M | F | M | M | M | F | M+F | M | F | M | F | M | F | M | F | M | F | M+F | M | F | M+F | M+F |
| 1) **TOBACCO** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| A) Cigarette | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| b) Bidi | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| c) Chew | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| d) Ghutka | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| e) Ex Smokerf) Mean (SE) Age of starting | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **2) Alcohol** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| a) Current | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| b) High Risk | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| c) Former | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| d) Life time abstainer | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **3) Hypertension** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Mean (SE) SBP** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Mean (SE) DBP** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **4) Diabetes** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Mean (SE) FBS** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **5) Hypercholesterolemia (>200mg%)** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Mean (SE) Cholesterol** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **6) Obesity** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Stage 1** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Stage 2** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Stage 3** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Mean (SE) BMI** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Mean (SE) Waist (cms)** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **6) Physical Inactivity** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **7) DietLow intake fruit** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **High fat intake** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Add extra salt to served food** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

# SECTION 9

## MONITORING AND SUPERVISION

**This section covers methods to:**

- **Supervise a surveillance system**
- **Monitor surveillance activities at all levels**

## 9.0 INTRODUCTION

The surveillance system must be continuously supervised and monitored if a high quality of surveillance has to be ensured. Constant and supportive supervision would vastly improve the quality of the surveillance and motivate the staff to improve their performance. Ongoing monitoring and prompt corrective action is also imperative for the success of any surveillance Programme.

## 9.1 MONITORING

All surveillance activities should be constantly monitored using standard performance indicators. If the performance of surveillance does not meet the necessary standards, prompt action should be taken to improve it. Thus constant monitoring ensures that the surveillance system is effective. Indicators should be developed for each level. Indicators may also be classified according to the periodicity of review, e.g. weekly, monthly and yearly.

The MO should monitor the following indicators on a regular basis. The source of data will be varied and are given in the table below.

| **Indicator** | **Frequency of monitoring** | **Source of information** |
|---|---|---|
| Timeliness of reporting | Weekly / monthly / Quarterly / Annually | Routine data |
| Completeness of reporting units (separately for public and private sector) | Weekly / Monthly / Quarterly / Annually | Routine data |
| Percentage of outbreaks detected by the reporting units | Quarterly / Annually | Routine data, Media, |
| Percentage of MPWs with Case definitions and using them | Annual | Supervisory reports |
| Percentage of MPWs whose reports are in concurrence with their registers | Annual | Supervisory reports |
| Percentage of private sector enrolled as reporting units | Annual | Special annual survey |
| No of outbreaks prevented | Annual | Comparison of previous year's reports. |

### 9.1.1 Weekly indicators

These indicators will be reviewed every week when the data is collated and reports generated. They reflect the effectiveness of data collection and transmission. There are 2 main indicators:

- Timeliness of reports
- Completeness of reports

**These indicators help the Programme manager to identify non-functional or poorly functioning reporting units so that necessary action can be taken.**

**The above 2 indicators will apply for all the levels e.g. the PHC MO can monitor whether all Subcentres have reported (completeness) and on time (timeliness). This same can be done at the CHC/District/State/National level.Similarly one can do it for both routine/sentinel sites; public/private sectors and in both the rural/urban settings.**

### 9.1.2 Monthly / Quarterly indicators

These indicators allow for mid term 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

- Completeness of report for the period XXX

  *No: of reporting units that have been complete during the specified period*

  *Total no. of reporting units*

- Timeliness of report for the period XXX

  *No: of reporting units that have been on time during the specified period*

  *Total no. of reporting units*

- Percentage of outbreaks that have been detected

  *No: of outbreaks detected by the surveillance system*

  *Total no. of outbreaks during that period*

### 9.1.3 Annual indicators

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.

- Completeness of report for the year
- Timeliness of report for the year
- Percentage of outbreaks that have been detected
- Percentage of newsletters published

Over and above this, some other performance indicators that may be used are:

### 9.1.4 Input indicators

Some of the useful input indicators that need to be monitored are

- Percentage of staff at each level trained
- Percentage of reporting units at each level with functioning computers
- Percentage of reporting units using case definitions
- Percentage of districts with functional RRTs
- Percentage of districts with functional labs

### 9.1.5 Outbreak response indicators

- Percentage of outbreaks that have been detected
- Percentage of outbreaks that have been detected within one incubation period
- Percentage of outbreaks that have been confirmed
- Percentage of outbreaks that have been investigated
- Percentage of outbreaks that have been investigated within 48 hours of detection
- Percentage of outbreaks that have a CFR within the accepted norms

### 9.1.6 Lab performance indicators

- Proportion of lab specimens received in good condition.
- Proportion of lab specimens received with properly completed lab forms.
- Proportion of results reported within seven days after receipt of specimens in the lab.

Performance indicators should be fed back to the local staff so that the quality of surveillance in areas performing poorly could be improved.

## 9.2 Supervision of surveillance

Supervision should help the health staff to improve their knowledge and performance and 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.

### 9.2.1 Pre-requisites for supervision

- Job Descriptions: For effective supervision each category of health staff should have job descriptions (charter of duties) for 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.

- Resources: The supervisory team would require resources like vehicle, fuel, funds etc

- 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.

### 9.2.2 Steps in supervision

The following are the steps in supervision:

- 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, etc. and hence mobility of the supervisor is critical. This plan must be informed to the field staff so that they are prepared for the visit.

- Make a checklist: A checklist is a tool to help the supervisory team. A sample of this is provided in Annex 8.1 & 8.5. This checklist helps the team to review most of the important activities

- Review the previous supervisory visit report: This is so that the supervisory team is apprised about the situation in the field. It will also make them review the follow up actions taken from the previous visit. This will also help them review the performance by the field unit.

- Supervision visit: The supervisory team should then visit the field and using tools like checklist, observation methodology, review of records and Focus group discussions should assess the performance of the staff there. Gaps identified should be tackled on the spot if possible, or solved at a later stage. On-the-job training should also be provided to improve the quality of activities.

- 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 is aware of his performance immediately.

## 9.3 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.

# SECTION 10

## FEEDBACK

**This section covers:**

- **Necessity for feedback**
- **Types of feedback**

## 10.0 INTRODUCTION

It is essential that feedback loops be in-built in the system. Invariably 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 results in demotivation of the reporting unit and unreliability, sluggishness/ falsification of data (non-reporting of suspect cases) as they would not know if the information they provided was utilised or not. Feedback helps to inform the peripheral staff the value of the work that they have performed.

## 10.1 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 energise the reporting unit to continue to report suspected cases. It should be emphasised that feedback is to reinforce health staff efforts to continue to actively participate in the surveillance system.

### Uses of 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 various 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 lower 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 teach the staff.

## 10.2 TYPES OF FEEDBACK

Feedback may be given both formally and / or informally.

The exact modality of giving formal feedback to the reporting units may be

i) Newsletters

ii) Monthly review meetings

iii) Reports

iv) Informal feedback

### i) 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 NPSP newsletter or the Orissa monthly newsletter. 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.

### ii) Monthly review meetings

At the District / Block Monthly meetings, the previous months' data is shared using information sheets, presentations and handouts. This also helps in peer review as others in the district are able to share their opinion. Care must however be taken to concentrate on the positive and not be too harsh on the negative aspects. Else this tool could demotivate staff.

### iii) 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.

### iv) Informal feedback

This is an useful form 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 again.

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

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

## 10.2.1 Completeness and Timeliness of data

It is a reflection on the performance of the reporting units. For this one needs to have a list of the reporting units. The MO then monitors which of the reporting units are sending complete reports on 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 catchment 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)

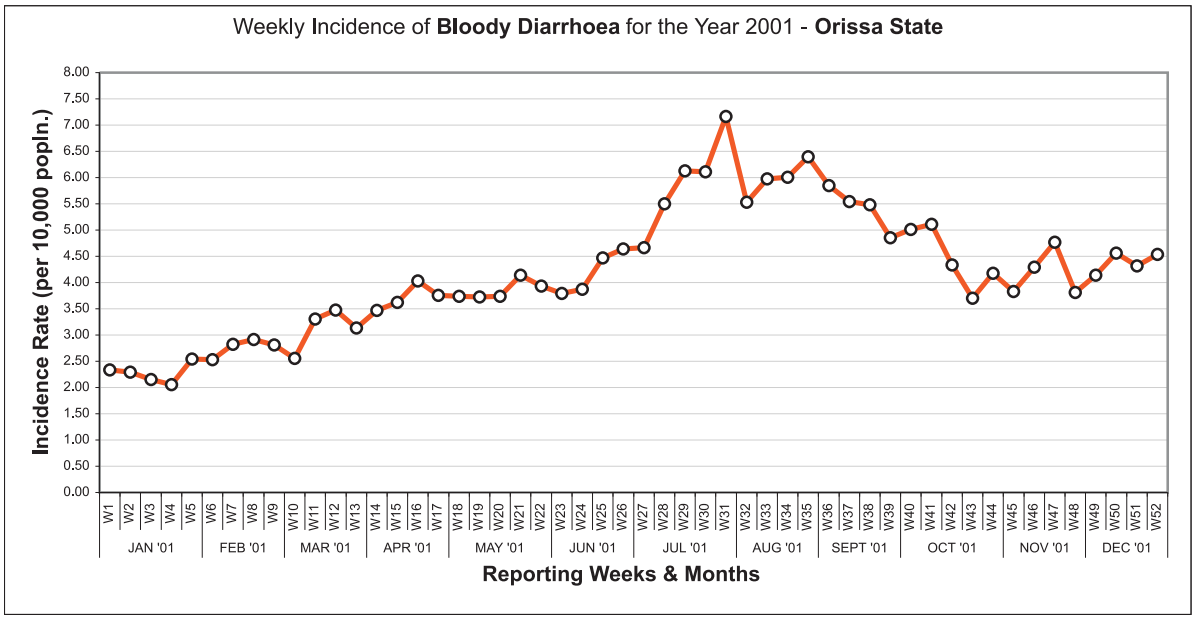
Timeliness and Completeness of reporting units is a proxy indicator of the alertness of the surveillance system. An alert system will have timeliness and completeness approaching 100%. Also completeness of reporting units gives one an idea about the reliability of the data; for example, if completeness of reports is only 50%, then the incidence of disease would be under reported by 50%. So the incidence rates and CFRs need to be read in conjunction with the completeness of reports.

### Interpretation of the report:

| Scenario | Interpretation |
|---|---|
| Reporting unit A is timely and complete | An ideal scenario, everything is working well |
| Reporting unit B is timely, but regularly incomplete | The MO of B has understood 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 MO has to find out what the problem is. |
| Reporting unit C is late, but reports are complete | The MO of C has not understood the importance of reporting on time. He is probably waiting for all the reporting units under his jurisdiction to report before submitting his report. He needs to be impressed about the significance of timely reporting. |
| Reporting unit D is late and the reports are incomplete. | Major problem in this reporting unit – neither the MO of D nor the MOs of the reporting units under D have understood the importance of surveillance and timely data. |

Please refer to Chapter on Feed back for more details.

**Fig 5.2 – Incidence rate of disease - 2001**




The main purpose of this report is to understand the trends over time.

# SECTION 11

## MANUAL OF ADMINISTRATIVE PROCEDURES IN IDSP

**Efficient Administration is the key to Every Successful Programme**

## 11.0 INTEGRATED DISEASE SURVEILLANCE PROGRAMME

*Background*

The Government of India is initiating a decentralized, state based Integrated Disease Surveillance Programme (IDSP) in the country in response to a long felt need expressed by various expert committees. The programme will function under the ministry of Health and Family Welfare and is intended to be the backbone of public health delivery system in the country. It will be able 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 programmes and help allocate health resources more optimally. IDSP will be funded by the World Bank and is expected to be initiated in at least 10 states by June 2003 and nation wide by the end of 2004.

### Objectives

- To establish a decentralized state based system of surveillance for communicable and non-communicable diseases and their risk factors so that timely and effective public health actions can be initiated in response to health challenges in the country at the state and national levels.
- To improve the efficiency of the existing surveillance activities of disease control programmes and facilitate sharing of relevant information with the health administration, community and other stakeholders so as to detect disease and risk factor trends over time and evaluate control strategies.

### Components

- Integrating and decentralizing surveillance activities
- Strengthening Public Health Laboratories
- Using information technology optimally
- Enhancing human resource development

### The highlights

- It will monitor a limited number of conditions based on state perceptions including 13 core and 5 state priority conditions for which pubic health response is available. The conditions selected initially include important communicable diseases, risk factors for non-communicable diseases, out door air pollution, drinking water contamination and road traffic accidents.
- District and State Surveillance units will be set up so that the programme is able to respond in a timely manner to surveillance challenges in the country including emerging epidemics. The District and state Surveillance units will facilitate sharing of information with health administrators and programme officers at the district and state levels.

- It will integrate surveillance activities in the country under various programmes and use only existing infrastructure and personnel for its function.
- Since more than 70% of the health care is provided by the private sector, up to 20,000 sentinel private practitioners / sentinel private hospitals / sentinel private laboratories will be inducted into the programme in the first year in collaboration with the Indian Medical Association. This number will be doubled over the next two years. This will particularly ensure better surveillance in the urban regions of the country.
- The programme will facilitate active participation of medical colleges in the surveillance activities particularly in the urban regions. Core surveillance committees will be set up in the colleges with the support of the State Governments and the Medical Council of India.
- The programme will ensure high quality surveillance activities at all levels by

  1) Limiting the total number of diseases under surveillance and reducing overload at the periphery 2) Developing user-friendly manuals 3) Developing formats for reporting 4) Developing case definitions 5) Providing training to all essential personnel, and 6) Setting a system of regular feed back to the participants on the quality of surveillance activity.
- Laboratory infrastructure will be strengthened particularly at the district level to enhance diagnosis and investigations of epidemics and confirmation of disease conditions. Support will also be provided to network district laboratory systems with the state and regional reference laboratories in the country.
- The programme will effectively use the current information technology for communication, data entry, analysis, reporting, feedback and actions. Computers will be provided up to Community Health Centers (1 per 100,000 population) to facilitate integration and timeliness of surveillance. A national level surveillance network will be established at the district level.
- Optimum social mobilization strategies will be developed, based on the experience of the National Polio Eradication Initiative. Surveillance information will be effectively shared with the public through local health committees, village leaders. Social marketing tools will be effectively used to develop public participation in the programme.
- The programme will be decentralized and the primary administrative responsibility will be at the district and state levels but will be coordinated by the center. Administrative restructuring will include setting up surveillance committees at district, state and the center, functioning under the health ministries at the state level. These committees will report to both Ministry of Health and Ministry of Family Welfare through DGHS at the center.
- Total cost of the project over five years will be Rs. 433,259 crores. This will be taken as IDA loan from the World Bank and disbursed through identified societies in the states.

- The programme will be have an external evaluation at the end of second and fourth year of initiation, using appropriate process and performance indicators specified a *priori*.

### Expectations

Surveillance is the essence of a disease control programme. By setting up a decentralized, action oriented, integrated and responsive programme, it is expected that IDSP will avert a sufficient number of disease outbreaks and epidemics and reduce human suffering and improve the efficiency of all existing health programmes. Such a programme will also allow monitoring of resource allocation and form a tool to enhance equity in health delivery.

### Integrating and strengthening Surveillance Components:

IDSP is a district centered and integrated programme of surveillance. Integration of all surveillance activities will be administered through the District Surveillance Unit. Integration will be

1. Rural and Urban Surveillance
2. Communicable and Non communicable Disease Surveillance
3. Government and Private Organizations in disease surveillance
4. Health and Non Health Departments of the Government

## 11.1 STRUCTURAL FRAMEWORK OF IDSP

Consistent with the philosophy of IDSP and to meet its objectives, the focal point of all surveillance related activities at the periphery will be the District Surveillance Unit (DSU) as depicted in Figure-1. DSU will receive surveillance data from both rural and urban reporting units. To increase the sensitivity of data, additional reporting will be identified in both urban and rural areas. It will be particularly critical for urban areas where current surveillance efforts are grossly inadequate.

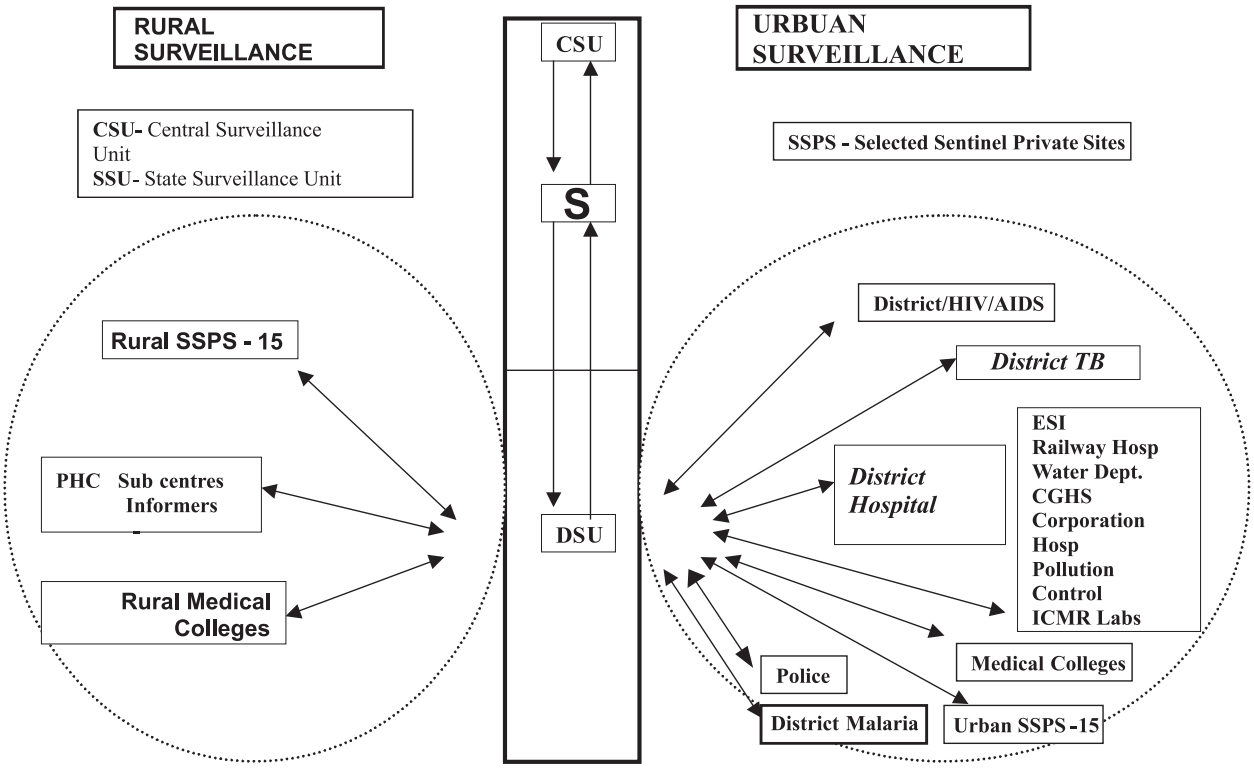
For the first time private sentinel sites from both urban and rural areas will be identified as partners. Further, in urban regions ESI, Railway Hospitals and Dispensaries, Medical Colleges, Private Hospitals, will also contribute to urban surveillance. Information on Road Traffic Accidents will be obtained from the police department. Analysis, response and feedback from these sources will be coordinated by the DSU.

DSU will be in communication with the state and central surveillance units through the district surveillance network in vertical integration.

At the periphery, public sector reporting units especially, the CHCs will be directly entering data through the computer network supplied as part of the programme. If facilities are available the sentinel private practitioners and other reporting units will directly transfer data to these units. Alternatively, data entry operators will need to input approximately 40 reports per week from rural and urban sentinel sites at the DSU.

## STRUCTURAL FRAMEWORK OF INTEGRATED DISEASE SURVEILLANCE PROGRAMME

**Figure: 1**




### 11.2 URBAN SURVEILLANCE

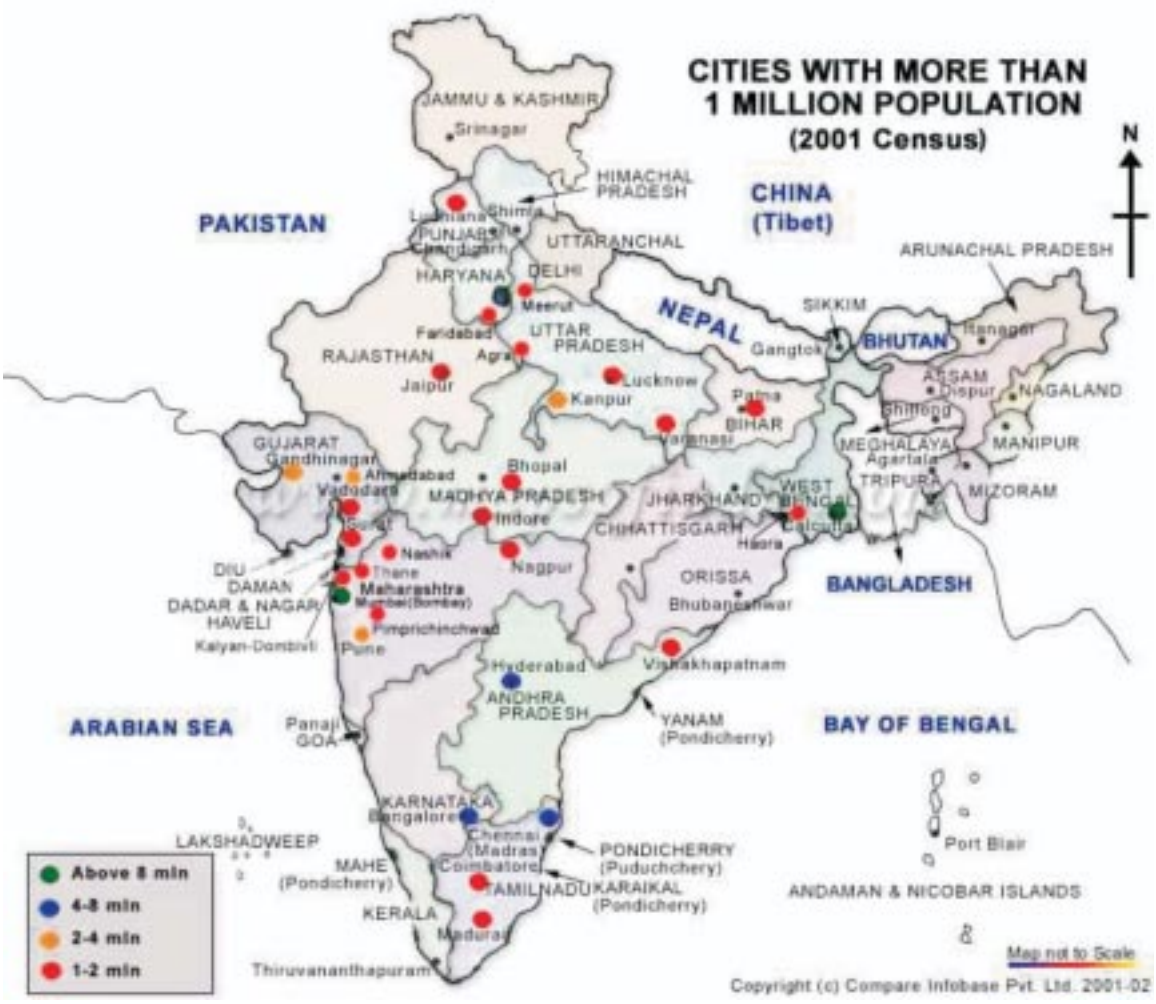
Census 2001 shows that there are 31 cities with more than 10 lacks population in the country. Of these 3 are Mega Cities (Metros) with more than 8 million population and 3 Large cities with 4-8 million population. The distribution of these cities is given in the Map attached. The urban disease surveillance system is weak with poor infrastructural support and over load of existing staff in most urban setting. There is also wide variability in the administrative structure of these corporations. Currently surveillance is weak and the programme involves only the government sector. The IDSP envisages integrating all available resources with emphasis on private practitioners, Private hospitals and laboratories and medical colleges wherever available as described under sections 15 and 16. Thus the thrust of the IDSP in urban surveillance will be through Sentinel hospitals, Medical colleges and Sentinel Private Practitioners.

It is proposed that for every 20 lacks-40 lacks (2-4 million) population infrastructure will be provided to undertake district level surveillance activities. Thus metro cities of Delhi, Mumbai & Culcutta will have 3 district level infrastructure while large cities like Chennai, Bangalore and Hyderabad will have 2 district level infrastructure each. Smaller corporations 1-4 million will be considered as one health district. Corporations having smaller than 1 million population will report to the district surveillance unit of the district head quarters along with rural sites of that district.

Each urban district will have 15 sentinel surveillance units / 10 lack population. including government and private sector reporting to the urban district surveillance officer (DSO). The number of sites may be doubled over the next 1 year. This will be further linked to the state level surveillance unit as with other district surveillance units.

Details of the flow of information will vary with the administrative structure of the urban health system in each situation. The overall framework has been specified above. Thus for urban surveillance in the country there will be approximately 1000 sentinel units of which 500 will be from the government sector (District hospital, ESI, Railway, Medical colleges etc) and 500 will be private sentinel sites (Private hospitals, Private laboratories, Private practitioners, Private medical colleges etc).

The sentinel sites under government sector will undertake outbreak investigations and other preventive action in response to surveillance information. The private sentinel sites will be largely data gathering sites to increase the sensitivity of the system to changing trends.




| | | | |
|---|---|---|---|
| Number of Mega Cities with more than 8 million Population | = 3 | Sentinel sites | = 3 x 8 x 15 = 360 |
| Number of Very Large Cities with 4-8 million Population | = 3 | " | = 3 x 4 x 15 = 180 |
| Number of Large Cities with 2-4 million Population | = 4 | " | = 4 x 2 x 15 = 120 |
| Number of Moderately large Cities 1-2 million Population | = 21 | " | = 21x1 x 15 = 315 |

## 11.3 Administrative structure of IDSP

There is increasing recognition of the fact that the surveillance activities involve actions at multi-sectoral levels, which need to be closely coordinated. In many states the activities of surveillance and their coordination have so far been restricted to mainly the health department, despite the fact that the control over the causes that give rise to epidemic prone diseases are in the hands of other departments of the Government. For example, water quality and supply and sanitation are under the departments of urban and rural development. In urban areas, issues related to water supply, water quality and sanitation are dealt with by the municipal corporations, which have no direct coordination with the health authorities in the state. Therefore, in the present project an effort has been made to evolve an administrative structure, taking into account the peculiar circumstances of each state, which further takes into account the multi-sectoral nature of the activity.

It is proposed to set up **Steering Committees** at Central, State and District levels to perform coordination functions between various stakeholders, review the surveillance activities at regular intervals (monthly), identify trouble shooters and suggest mechanisms to rectify them, initiate internal and external evaluations of the IDSP activities at different levels. These committees will advise the Surveillance Officers (i. e. the nodal officer) at all the three levels to operationalize the suggestions of the steering committees and also manage the programme on a day to day basis.

### 11.3.1 Administrative structure at district level

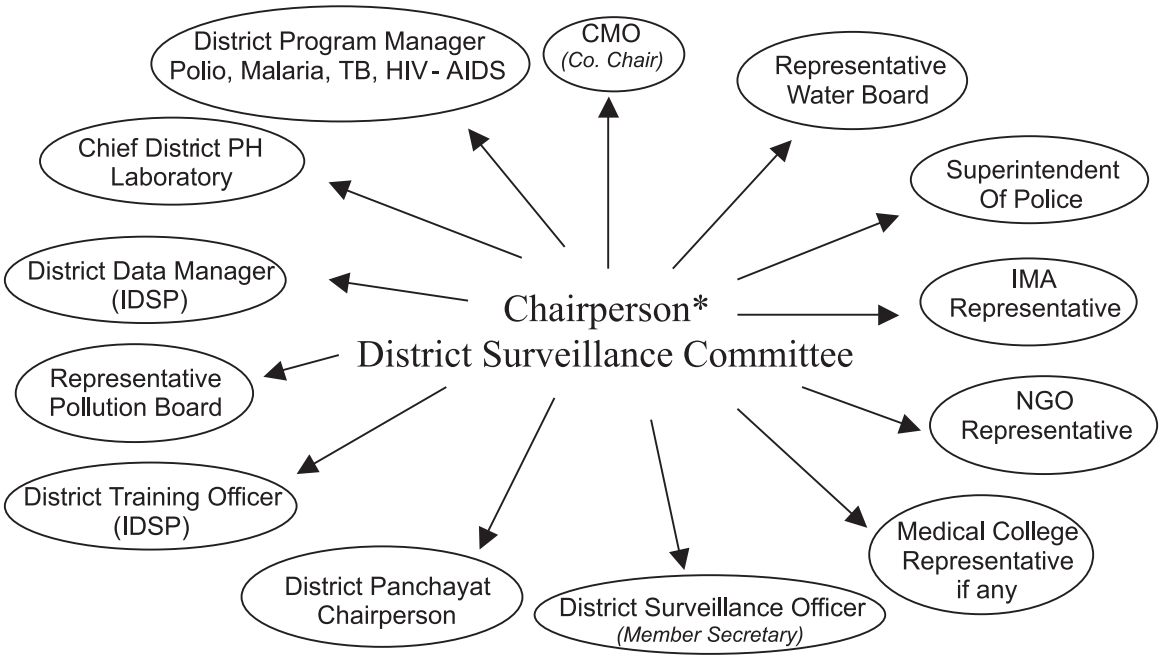
**District Surveillance Committee**:

The district surveillance committee will be responsible for the regular running of the programme. The district surveillance unit will be chaired by the District collector / District -Magistrate. The members of the DSU will include:

1. District Collector (Chair person)
2. Chief Medical Officer District (Co-Chair)
3. Programme officers of PH, TB, Malaria, HIV, Polio
4. Representative of Medical College
5. Representative of SPPs in the district
6. Police Superintendent
7. Representative from the Water Board
8. NGO representative
9. Chairman District Panchayat Board
10. Head of the District Public Health Laboratory
11. The District Surveillance Officer (DDPH) (Member Secretary)

The DSU will meet once a month regularly and as often as needed during an epidemic. 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.

**ORGANOGRAM FOR DISTRICT**




** District Collector or District Magistrate*

### 11.3.2 Mechanisms for vertical coordination between various levels

Vertical coordination will be as critical as the horizontal coordination mechanisms outlined above. While IDSP will be a decentralized district based programme, the following issues necessitate vertical coordination as well

- Existing vertical disease control / elimination / eradication programmes.
- Integration and coordination of regional and national reference laboratories.
- Management of national IDSP-IT network.
- Special training requirements by central, regional and state institutions and organizations.
- Response to surveillance data.
- External quality control.
- Monitoring and evaluation.

- International commitments on disease control.
- Planning and resource allocation.

To fulfill the above objectives, regular interaction between the functionaries from different levels must take place. It is proposed that at the state level, a meeting is convened by the State Surveillance Unit once every six months for all district surveillance officers of IDSP to discuss the issues outlined above.

Similarly, the National Surveillance Unit will convene a meeting of State Surveillance officers once a year. During these meetings the problems faced in making progress by various states will be discussed based on quarterly meetings from State Surveillance cell and information generated from the IDSP database. Consultants and other stakeholders in the programme will provide their feedback during these meetings.

# INTEGRATED DISEASE SURVEILLANCE PROJECT

# OPERATIONS MANUAL FOR DISTRICT SURVEILLANCE UNIT


**Government of India**
**Directorate General of Health Services**
**Ministry of Health and Family Welfare**
**Nirman Bhavan, New Delhi**

# TABLE OF CONTENTS

# APPENDIX

# FORMS AND FORMATS

## SUMMARY SYNDROMIC WEEKLY REPORTING FORMAT

| Name | | | | | | | Name of the supervisor | | | | | | | Name of the reporting unit | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ID No./unique identifier | | | | | | | Date of reporting | | | | | | | Reporting week | | | | |
| Syndrome Definition | Cases | | | | | | Total | Deaths | | | | | | Total | Specific action taken | | | No. of slides collected |
| | M | | | F | | | | M | | | F | | | | | | | |
| | < 5 yr | ≥ 5 yr | Total | < 5 yr | ≥ 5 yr | Total | Total | < 5 yr | ≥5 yr | Total | < 5 yr | ≥ 5 yr | Total | Total | E | L | O | |
| Only fever less than 7 days | | | | | | | | | | | | | | | | | | |
| Fever less than 7 days and With rash | | | | | | | | | | | | | | | | | | |
| Fever less than 7 days and With bleeding | | | | | | | | | | | | | | | | | | |
| Fever less than 7 days and with altered consciousness | | | | | | | | | | | | | | | | | | |
| Fever more than or equal to 7 days | | | | | | | | | | | | | | | | | | |
| **Total** | | | | | | | | | | | | | | | | | | |
| Short duration cough (less than 3 weeks) | | | | | | | | | | | | | | | | | | |
| Long duration cough (more than 3 weeks) | | | | | | | | | | | | | | | | | | |
| Total | | | | | | | | | | | | | | | | | | |
| Acute diarrhea With dehydration | | | | | | | | | | | | | | | | | | |
| Acute diarrhea Without dehydration | | | | | | | | | | | | | | | | | | |
| Total | | | | | | | | | | | | | | | | | | |
| Acute jaundice | | | | | | | | | | | | | | | | | | |
| AFP | | | | | | | | | | | | | | | | | | |
| Unusual severe syndrome | | | | | | | | | | | | | | | | | | |
| All others | | | | | | | | | | | | | | | | | | |
| TOTAL | | | | | | | | | | | | | | | | | | |

Total no of cases of Male < 5 years; with fever and bleeding

Total number of deaths among males with fever more than 7 days

Only for fever cases

Total of all cases with acute diarrhea and without dehydration

0 = Action not taken
1 – Action taken
2= No cases in this category – so no action necessary

E – Epidemiological workup , L – Laboratory workup, O - Out break response initiated

# Reporting Format for the Health Worker for Specific Action Taken

| Name | Name of the supervisor | Name of the reporting unit |
|---|---|---|
| ID No./unique identifier | Date of reporting | Reporting week |

**1 Fever**

| **Specific Action Points for Health Worker** | | | Action Taken | | Remarks |
|---|---|---|---|---|---|
| | | | Y | N | |
| **Fever with rash TRIGGER POINT Two similar cases** | Epidemiological workup | 1 Active search for similar cases | | | |
| | | 2 Collect details of age/sex/location and immunization status of all cases | | | |
| | | 3 Inform MO PHC on the same day (health worker to record date/time/mode of communication to MO PHC) | | | |
| | Sample Sent | ONLY If required, as per the instructions of the Rapid Response Team | | | |
| | ORI | Outbreak response initiated as per guidelines on the instructions of MO PHC | | | |
| **Fever with bleeding/ with altered sensorium TRIGGER POINT Two similar cases** | Epidemiological workup | 1 Active search for similar cases | | | |
| | | 2 Collect details of age/sex/location and immunization status of all cases | | | |
| | | 3 Inform MO PHC on the same day and refer the patient for examination by MO PHC | | | |
| | Sample Sent | | | | |
| | ORI | Outbreak response initiated as per guidelines on the instructions of MO PHC | | | |
| **Fever > 7 days** | Referral to the next level to rule out or confirm Typhoid. | | | | |

2 Cough

| **Specific Action Points** | | Action Taken | | Remarks |
|---|---|---|---|---|
| | | Y | N | |
| **Cough < 3 weeks** | Follow ARI guidelines as per RCH programme | | | |
| **Cough > 3 weeks** | 1 Refer the case to PHC for work up as per RNTCP protocol. | | | |

**3 Loose watery Stools of less than 2 weeks duration**

| **Specific Action Points for Health Worker** | | | Action Taken | | Remarks |
|---|---|---|---|---|---|
| | | | Y | N | |
| **TRIGGER POINT A single case of Severe dehydration/ death in a patient of > 5 yr of age. OR More than 10 houses having at least one case of loose stools irrespective of age per village or an urban ward** | Epidemiological workup | 1 Active search for similar cases | | | |
| | | 2 Collect details of age/sex/location and immunization status of all cases | | | |
| | | 3 Report the cases to the MO PHC within 48 hours. | | | |
| | Sample Sent | | | | |
| | ORI | Outbreak response for waterborne disease initiated as per guidelines on the instructions of MO PHC | | | |

4 Jaundice cases of less than 4 weeks duration

| Specific Action Points for Health Worker | | | Action Taken | | Remarks |
|---|---|---|---|---|---|
| | | | Y | N | |
| **TRIGGER POINT More than 2 similar cases of Jaundice in different households irrespective of age per thousand population** | Epidemiological workup | 1 Active search for similar cases | | | |
| | | 2 Collect details of age/sex/location and immunization status of all cases | | | |
| | | 3 Report the cases to the MO PHC within 48 hours. | | | |
| | | 4 case of Jaundice in pregnant woman and any other patient with bleeding/with altered consciousness are referred to district hospital | | | |
| | Sample Sent | | | | |
| | ORI | Outbreak response initiated as per guidelines on the instructions of MO PHC | | | |

**5 Acute Flaccid Paralysis cases in less than 15 years of age.**

| Specific Action Points | | Action Taken | | Remarks |
|---|---|---|---|---|
| | | Y | N | |
| **TRIGGER POINT Single case of AFP** | 1 Inform MO PHC / DIO/ SMO- NPSP within 48 hours. | | | |

6 Unusual symptoms leading to death or hospitalization not conforming to the above syndromes

| Specific Action Points for Health Worker | | | Action Taken | | Remarks |
|---|---|---|---|---|---|
| | | | Y | N | |
| **Cases of unusual symptoms leading to death or hospitalization not conforming to the above syndromes Two similar cases of unusual symptoms** | Epidemiological workup | 1 Active search for similar cases | | | |
| | | 2 Collect details of age/sex/location and immunization status of all cases | | | |
| | | 3 Report the cases to the MO PHC / MO CHC on the same day | | | |
| | Sample Sent | Appropriate samples sent to District lab. as per the instruction of MO PHC/ MO CHC/ RRT | | | |
| | ORI | Outbreak response initiated as per guidelines on the instructions of MO PHC/ MO CHC/ RRT | | | |

## Reporting format for the MO PHC OPD

Japanese B encephalitis

Fever

| | Cases | | | | | | Grand Total | Deaths | | | | | | Grand Total | No. of slides collected | Specific Action | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | M | | | F | | | | M | | | F | | | | | | | |
| | < 5 yr | >5 yr | Total | < 5 yr | > 5 yr | Total | | < 5 yr | >5 yr | Total | < 5 yr | > 5 yr | Total | | | Epi work up | Sample sent | Out-break response |
| **Fever < 7 days** | Suspect cases | | | | | | | | | | | | | | | | | |
| 1 only fever | | | | | | | | | | | | | | | | | | |
| 2 With rash | | | | | | | | | | | | | | | | | | |
| 3 With bleeding | | | | | | | | | | | | | | | | | | |
| 4 With altered consciousness | | | | | | | | | | | | | | | | | | |
| **Fever ≥ 7 days** | | | | | | | | | | | | | | | | | | |
| | Probable cases | | | | | | | | | | | | | | | | | |
| **JE Case (Epidemiologi-cally linked)** | | | | | | | | | | | | | | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Fever with with altered sensorium/ convulsions TRIGGER POINT2 similar cases** | Epidemiological workup | 1 Instruct the corresponding Health Worker determine clustering of cases in his/her area. | | | |
| | | 2 Collect details of age/sex/location and immunization status of all cases | | | |
| | | 3 Alert all health workers in the PHC area. | | | |
| | Sample | Collect blood sample/s of the case/s and send to District Lab as per guidelines. | | | |
| | ORI | Outbreak response initiated as per guidelines | | | |

## Reporting Format for Sentinel Sites & Medical Colleges

| **District Code Number:** | | | **Unique identifier for Reporting unit:** | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Sr. No. | Suspected Diseases/ Syndromes (New cases) | | Patients treated | | | | | | | |
| | | | **OPD** | | **IPD** | | **Total** | | **Death** | |
| | | | < 5 | > 5 | < 5 | > 5 | < 5 | > 5 | < 5 | > 5 |
| 1 | Acute Watery Diarrhoea /Cholera | M | | | | | | | | |
| | | F | | | | | | | | |
| | | Tot | | | | | | | | |
| 2 | Typhoid | M | | | | | | | | |
| | | F | | | | | | | | |
| | | Tot | | | | | | | | |
| 3 | AFP (in less than 15 years of age) | M | | | | | | | | |
| | | F | | | | | | | | |
| | | Tot | | | | | | | | |
| 4 | Measles | M | | | | | | | | |
| | | F | | | | | | | | |
| | | Tot | | | | | | | | |
| 5 | Malaria | M | | | | | | | | |
| | | F | | | | | | | | |
| | | Tot | | | | | | | | |
| 6 | Tuberculosis | M | | | | | | | | |
| | | F | | | | | | | | |
| | | Tot | | | | | | | | |
| 7 | Unusual syndromes causing death or hospital admission | M | | | | | | | | |
| | | F | | | | | | | | |
| | | T | | | | | | | | |
| 8 | Japanese B Encephalitis | M | | | | | | | | |
| | | F | | | | | | | | |
| | | T | | | | | | | | |
| 9 | Others Specify | M | | | | | | | | |
| | | F | | | | | | | | |
| | | T | | | | | | | | |
| 10 | Others Specify | M | | | | | | | | |
| | | F | | | | | | | | |
| | | T | | | | | | | | |

If no cases are seen '0' will be marked against the corresponding disease and the results submitted to the DSO. Each sentinel site will record 1 – 3 disease conditions by prior agreement but will sent regular weekly report including zero reporting. If there are more than expected number, Inform DSO and initiate epidemic investigation . Refer to Epidemic Investigation section

# Form L

**Weekly reporting format for Participating Laboratories :** **Integrated Disease Surveillance**

Week No.: _____ Please fill-out this form on every Saturday to reach the Health Authorities on every Monday

| **Unique identifier reporting Laboratory:** | | | | | | | | | | | | | | Specific Action<br>0-Action not taken<br>1-Action taken<br>2-Action required but not taken | | | | **Samples not tested 1-3** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Disease** | | **No of tests done** | | | | | **Positive** | | | | | | | | | | | | |
| | | <5 | | >5 | | T | <5 | | | >5 | | T | | Line list of +ves sent | QA Activi-ties | Sample to next level | Feed-back to RU | No. | Reason |
| | | M | F | M | F | M | F | M | F | M | F | M | F | | | | | | |
| Cholera | | | | | | | | | | | | | | | | | | | |
| Typhoid | | | | | | | | | | | | | | | | | | | |
| Measles | | | | | | | | | | | | | | | | | | | |
| Hepatitis | A | | | | | | | | | | | | | | | | | | |
| | E | | | | | | | | | | | | | | | | | | |
| | B | | | | | | | | | | | | | | | | | | |
| Malaria | (*P. falciparum*) | | | | | | | | | | | | | | | | | | |
| | (*P. vivax*) | | | | | | | | | | | | | | | | | | |
| Dengue Fever | | | | | | | | | | | | | | | | | | | |
| Japanese Encephalitis | | | | | | | | | | | | | | | | | | | |
| Tuberculosis | | | | | | | | | | | | | | | | | | | |
| HIV | | | | | | | | | | | | | | | | | | | |
| Others | 1. | | | | | | | | | | | | | | | | | | |
| (Please specify) | 2. | | | | | | | | | | | | | | | | | | |

Signature of the authority: _____ Telephone: _____Diseases of public health importance like Cholera, Dengue Fever, Diphtheria, Japanese Encephalitis, Leptospirosis, Plague, Whooping Cough, etc must be reported to the District Health Authorities immediately

| Specific Action Taken | Action | | Remarks |
|---|---|---|---|
| | Yes | No | |
| A. Dispatched line list of positive case to appropriate person (MO-PHC/CHC, DSO, SSO) | | | |
| B. Quality Assurance activities (as specified under specific disease conditions) | | | |
| C. Sample sent to next level for further work up/confirmation | | | |
| D. Feedback given to reporting units for case based management | | | |

Reasons for samples not tested

0-(i.e all samples tested)
1- Sample List
2- Equipment not functioning
3- Reagents not available
4- Manpower not available
5- Other (Specify reasons)