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INTEGRATED DISEASE SURVEILLANCE PROGRAMME (IDSP)

Draft Operational Manual. (2002)

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Dear All
Am attaching the draft version of the operational manual for your comments. The individual disease components will be added - we have developed 2 just as an example.

With regards

Deva <<Final version1.pdf>> <<Disease Wise Summary1.pdf>>

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Surveillance

Detecting disease and its distribution in time and space offers clues to the silent background phenomena of amplification and transmission of infectious agents, which is essential for disease control. Surveillance is the first step in intervention and serves to detect early outbreaks of diseases. Surveillance is essential for the early detection of emerging (new) and re-emerging (resurgent) diseases. Emerging infectious diseases encompasses those diseases caused by new pathogens (e.g. HIV/AIDS, V. cholera O139, Hanta virus and Ebola virus). Re-emerging diseases are due to reappearance of pathogens previously under control (e.g. Yersinia pestis), diseases increasing in incidence/prevalence (e.g. malaria, leptospirosis), recognized diseases appearing in new territories (e.g. Dengue Hemorrhagic Fever), zoonotic diseases affecting humans (eg anthrax), and diseases due to pathogens showing newly acquired anti-microbiological resistance (e.g. typhoid fever). The outbreaks of plague in 1994, cholera in 1995 and dengue hemorrhagic fever in 1996 highlighted the urgent need for disease surveillance system so that early warning signals are recognized and appropriate control measures are initiated in a timely manner.

Communicable diseases surveillance

Communicable diseases are still the most common causes of death, disability and illness in the country. They are the major causes of hospital admissions in the health facilities and account for high mortality and morbidity in children. Earlier only disease specific surveillance was being carried out in the country. The success of the smallpox eradication programme was basically due to a strong surveillance component. The present AFP surveillance (acute flaccid paralysis) for polio is also reaping good results but has been very labour intensive which would be required for diseases under eradication/ elimination. TB, HIV/AIDS and malaria also have well-organized vertical surveillance systems. The first multiple disease surveillance system in the country was the NSPCD (National Surveillance Programme for Communicable Diseases) which having started in 5 districts in 1997-98, now extends to 100 districts in 28 states/UT's in the country. It has laid the foundation for basic surveillance activities and reporting and responding to outbreaks in the selected districts. Based on this multi-disease surveillance model, Orissa and Gujarat also have strengthened surveillance in their states following the recent disasters.

Non Communicable Disease surveillance

During the last decade of the 20th century it has been increasingly recognized that non-communicable diseases (NCDs) also constitute a major health challenge to economic and social development by imposing a tremendous strain on national health budgets and curative health services in the country. This epidemiological transition characterized by a rapid increase in NCDs has almost outweighed the

burden due to communicable diseases. Major NCDs like cardio-vascular diseases, cancers and diabetes are linked to lifestyle changes. High prevalence of common risk factors namely tobacco use, alcohol abuse, obesity, unhealthy diet, physical inactivity, etc have compromised the health of people. Thus community-based strategies to prevent and control the risk factors are gaining importance. The strategy therefore targets common risk factors to lower the prevalence of NCDs.

One very successful surveillance programme for NCDs that already exists is the Population based Cancer Registries. Other than this there are surveillance systems for blindness, iodine deficiency, iron deficiency anaemia etc. Risk factor surveillance for NCDs is still in the nascent phase.

Integrated Disease Surveillance Programme

Keeping in mind the disintegrated fashion in which current surveillance programmes exist, the Govt. of India is proposing to implement the 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 and 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 emphasis on community participation.
- Integrates communicable and NCDs since many of the principles of surveillance traditionally applied to communicable diseases also apply to them. 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 urgently to be bridged.
- Integration with the medical colleges (both private and public) would also qualitatively improve the disease surveillance especially through involvement of the departments of community medicine, microbiology, medicine and paediatrics. They would also serve as sentinel centres for disease surveillance.

Objectives

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 is available for health decision making at district, state and national levels.

Operational Manual

To facilitate the implementation of the IDSP, this operational manual has been developed. It basically informs each of those who are involved in the IDSP

- What to do.
- How to do it. However, further details of this will be given in the training manuals.

This manual is intended for all those involved in the IDSP, especially for those in the States and District level. However, being a generic manual it is not State specific. So each State needs to modify the roles of the individuals keeping in mind their own systems of flow and designations. This is particularly true for the urban health services where there is tremendous variety between each State.

In this manual certain terms are used which may need to be explained e.g.

- Private sector includes Private practitioners (both registered and unregistered) of all systems of medicines, Private nursing homes, hospitals, clinics, dispensaries, corporate hospitals and NGO dispensaries and hospitals.
- Urban health services includes Urban link workers, dispensaries and Hospitals belonging to the Municipalities and the Municipal Corporations.
- CHC includes Block PHC, rural hospitals, cottage hospitals at the Block level.
- District Hospital will include any sub district hospitals in the region.

The operation manual is provided in a modular manner, especially the disease summaries. This will enable a state to add or delete specific diseases and then do the needful vis-à-vis the manual.

It is hope that this manual will be of use to the workers who have to actually carry out the various surveillance tasks.

WHO - India

ACUTE DIARRHOEAL DISEASES

Clinical case description:

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

Laboratory criteria for diagnosis:

Not necessary

Case classification

Suspect case:	As per clinical case description.
Probable case:	Not applicable
Confirmed case:	Not applicable

ACUTE BLOODY DIARRHOEA

Clinical case description:

Acute diarrhoea with visible blood in the stool.

Laboratory criteria for diagnosis:

Lab culture of stools maybe used to confirm possible outbreaks of specific diarrhoea, such as S. dysenteriae type 1, but is not necessary.

Case classification

Suspect case:	as per clinical case definition.
Probable case:	Not applicable
Confirmed case:	Not applicable

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]

In an area where there is a cholera epidemic:

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

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] Choleradoesappearinchildrenunder5years;however,theinclusionofallcasesofacute waterydiarrhoeainthe2-4yearagegroupinthereportingofcholeragreatlyreducesthespecificityof reporting.Formanagementofcasesofacutewaterydiarrhoeainanareawherethereisacholera epidemic,cholerashouldbesuspectedinallpatients.

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
- 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 >_1280, 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).

Confirmed: A case compatible with the clinical description and laboratory-confirmed.

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
    - Petechiae, ecchymoses or purpura
    - Bleeding: mucosa, gastrointestinal tract, injection sites or other
    - 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.

ACUTE VIRAL HEPATITIS

Clinical case description:

Acute illness typically including acute jaundice, dark urine, anorexia, malaise, extreme fatigue, and right upper quadrant tenderness. Biological signs include increased urine urobilonogen and >2.5 times the upper limit of serum alanine aminotransferase[2].

Laboratory criteria for diagnosis:

Hepatitis A:	IgM anti HAV positive
Hepatitis B:	Positive for HbsAg or IgM anti-HBc[3]
Hepatitis C:	Positive for anti-HCV
Hepatitis D:	Positive for HbsAg or IgM anti-HBc Plus anti-HDV
Hepatitis E:	Positive for anti-HEV

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].

2Mostinfectionsoccurinearlychildhood.Avariableproportionofadultinfectionsisasymptomatic.

3Theanti-HBclgMtest,specificforacuteinfection,isnotavailableinmostcountries.HbsAg,oftenavailable,cannotdistinguishbetweenacutenew infectionsandexacerbationsofchronichepatitisB,althoughcontinuedHBsAgseropositivity(>6months)isanindicatorofchronicinfection.

[4]Confirmationbyasecondserologicaltestisnecessaryonlyinsettingswhereestimated HIV prevalenceisknowntobe<10%

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 candidacies

Laboratory criteria for diagnosis:

HIV positive serology (ELISA)
Confirmation should be a second ELISA[5].

Case classification

Suspect case:	A case that meets the clinical case definition.
Probable case:	?
Confirmed case:	A suspect case that is lab confirmed.

[5]Confirmationbyasecondserologicaltestisnecessaryonlyinsettingswhereestimated HIV prevalenceisknowntobe<10%

JAPANESE ENCAPHILITIS (JE)

Clinical case description:

A case of fever associated with neurological symptoms like

- Headache, meningeal signs, stupor, disorientation, coma
- Tremors, generalised paresis, hypertonia, loss of co-ordination.

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 neutralisation 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 IgM / IgG, ELISA, haemagglutination inhibition test or virus neutalization test, 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.

MALARIA

Clinical case definition:

A case of fever with or without

- Headache, backache, chills, rigors, sweating, myalgia, nausea and vomiting
- Splenomegaly and anaemia
- May be accompanied by generalised convulsions, coma, shock, spontaneous bleeding, pulmonary oedema, renal failure and death (untreated falciparum infection)

Laboratory definition of malaria:

Demonstration of malaria parasites in blood films (mainly asexual forms)

Case classification

Suspect case: as per the clinical case definition

Probable uncomplicated malaria: A person with symptoms and/or signs of malaria who receives anti-malarial treatment

Probable severe malaria: A patient who requires hospitalisation for symptoms and signs of severe malaria and receives anti-malarial treatment.

Confirmed uncomplicated malaria: A patient with symptoms and/or signs of malaria who received anti-malarial treatment with laboratory confirmation of diagnosis.

Confirmed severe malaria: a patient who requires hospitalisation for symptoms and/or signs of severe malaria and receives anti-malarial treatment with laboratory confirmation of diagnosis.

MEASLES

Clinical case description:

Any person with:

- Fever and
- Maculopapular rash, and
- Cough, coryza or conjunctivitis

Laboratory criteria for diagnosis:

- At least a fourfold increase in antibody titre or
- Isolation of measles virus or
- Presence of measles specific IgM antibodies.

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.

POLIOMYELITIS

Clinical case description:

Any child under fifteen years of age with acute, flaccid paralysis or any person with paralytic illness at any age when poliomyelitis is suspected.

Laboratory criteria for diagnosis:

- Isolation of the virus from stool samples

Case classification

Suspect case:	A case that meets the clinical case definition.
Probable case:	Not applicable
Confirmed case:	A suspect case that is lab confirmed[7]

[6] Only for outbreak confirmation and during elimination phase.
[7] a case is said to be compatible with Polio, if the lab result is negative due to inadequate specimen, but a National review committee feels that clinically there is evidence to suspect polio.

PLAGUE

Clinical case description:

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

- *Bubonic form:* extreme painful swelling of lymph nodes
- *Pneumonic form:* cough with blood-stained sputum, chest pain, difficult breathing
- *Septicaemic form:* toxic changes in the patient.

Laboratory criteria for diagnosis:

- Isolation of Y. pestis in cultures from lymph nodes, blood, CSF or sputum or
- Passive Haemagglutination (PHA) test, demonstrating an at least fourfold change in antibody titre, specific for F! antigen of Y.pestis as determined by the haemagglutination inhibition test (HI) in paired sera.

Case classification

Suspect case: A case that meets the clinical case definition.
Probable case: A suspect case with

- Positive direct fluorescent antibody (FA) test for Y. pestis in clinical specimen or
- PHA test with antibody titre of at least 1:10, specific for the F1 antigen of Y. pestis as determined by the HI test or
- Epidemiological link with a confirmed case.

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

TUBERCULOSIS

CASE DEFINITION (according to site and bacteriology).

Pulmonary tuberculosis, sputum smear positive (PTB+)

- Tuberculosis in a 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 and having one of the following:

- Three sputum specimens negative for acid-fast bacilli
- Radiographic abnormalities consistent with pulmonary tuberculosis and a lack of clinical response to one week of a broad-spectrum antibiotic
- Decision by a physician to treat with a full curative course of anti-tuberculous chemotherapy

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 diarrhea, and non-productive cough. 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 case that meets the clinical case definition.
Probable case:	a clinically compatible case that is epidemiologically linked to a confirmed case in an outbreak
Confirmed case:	a clinically compatible case that is laboratory confirmed

HYPERTENSION

Clinical case description:

The definition of hypertension has been reviewed by various authorities, including the World Health Organisation/International Society of Hypertension (WHO/ISH) and The Joint National Committee on the Detection, Evaluation and Treatment of High Blood Pressure (JNC). The definition and classification of high blood pressure is illustrated in the table below (Table 1) and is adopted from the Fifty Report of the JNC.

Table 1. Classification of Blood Pressure for Adults Aged 18 Years and Older

Category	Systolic, mmHg	Diastolic, mmHg
Normal	< 130	< 85
High Normal	130 - 139	85 - 89
Hypertension:		
Stage 1 (mild)	140 - 159	90 - 99
Stage 2 (moderate)	160 - 179	100 - 109
Stage 3 (severe)	180 - 209	110 - 119
Stage 4 (very severe)	≥210	≥120

The above table provides a new classification of adult blood pressure based on impact on risk. The traditional terms mild and moderate hypertension failed to convey the major impact of high blood pressure on risk of cardiovascular diseases (CVD). High-normal blood pressure is included as a category because persons with systolic blood pressure (SBP) and/or diastolic blood pressure (DBP) in these ranges are at increased risk of developing definite high blood pressure, and of experiencing non-fatal and fatal cardiovascular events, compared with otherwise similar persons with lower blood pressures. Individuals with high-normal blood pressure should be monitored yearly and counselled in regard to life-style modifications that can reduce their blood pressure pharmacological treatment is rarely if ever needed.

All stages of hypertension are associated with increased risk of non-fatal and fatal CVD events, stroke and renal disease. The higher the blood pressure, the greater is the risk. Stage 1 Hypertension is the commonest form of high blood pressure in the adult population and is responsible for a large proportion of the morbidity and mortality associated with hypertension. All stages of hypertension warrant effective long term therapy.

DIABETES MELLITUS

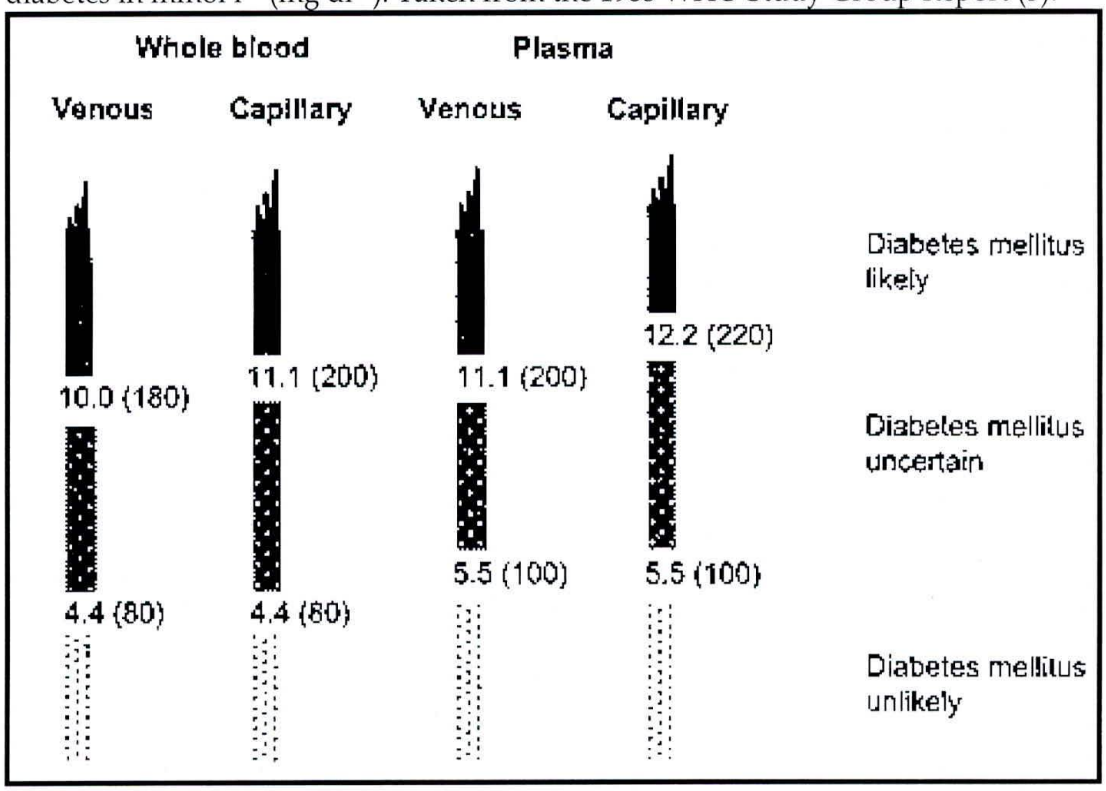
Clinical case description:

The clinical diagnosis of diabetes is often prompted by symptoms such as increased thirst and urine volume, recurrent infections, unexplained weight loss and, in severe cases, drowsiness and coma

Laboratory criteria for diagnosis:

A single blood glucose estimation in excess of the diagnostic values indicated in Figure 1 (black zone) establishes the diagnosis in such cases. Figure 1 also defines levels of blood glucose below which a diagnosis of diabetes is unlikely in non-pregnant individuals.

Figure 1: Unstandardized (casual, random) blood glucose values in the diagnosis of diabetes in mmol l^{-1} (mg dl^{-1}). Taken from the 1985 WHO Study Group Report (3).



For population studies of glucose intolerance and diabetes, individuals have been classified by their blood glucose concentration measured after an overnight fast and/or 2 h after a 75 g oral glucose load. Since it may be difficult to be sure of the fasting state, and because of the strong correlation between fasting and 2-h values, epidemiological studies or diagnostic screening have in the past been restricted to the 2-h values only (Table 1). Whilst this remains the single best choice, if it is not possible to perform the OGTT (e.g. for logistical or economic reasons), the fasting

plasma glucose alone may be used for epidemiological purposes. It has now been clearly shown, however, that some of the individuals identified by the new fasting values differ from those identified by 2-h post glucose challenge values (10,11). The latter include the elderly (12) and those with less obesity, such as many Asian populations. On the other hand, middle-aged, more obese patients are more likely to have diagnostic fasting values (10). Overall population prevalence may (13) or may not (7,10,14) be found to differ when estimates using fasting and 2-h values are compared.

Table 1: Values for diagnosis of diabetes mellitus and other categories of hyperglycaemia

	Glucoseconcentration, $mmoll^{-1}$ ($mgdl^{-1}$)		
	Wholeblood		Plasma*
Diabetes Mellitus:	Venous	Capillary	Venous
Fasting *or*	6.1 (110)	6.1 (110)	7.0 (126)
2-h post glucose load *or both*	10.0 (180)	11.1 (200)	11.1 (200)
Impaired Glucose Tolerance (IGT):			
Fasting (if measured) *and*	< 6.1 (< 110) and	< 6.1 (< 110) and	< 7.0 (< 126) and
2-h post glucose load	6.7 (120) <10.0 (<180)	7.8 (140) <11.1 (<200)	7.8 (140)
Impaired Fasting Glycaemia (IFG):			
Fasting	5.6 (100) and <6.1 (<110)	5.6 (100) and < 6.1 (< 110)	6.1 (110) and < 7.0 (< 126)
and (if measured) 2-h post glucose load	< 6.1 (< 110) < 6.7 (< 120)	< 6.1 (< 110) < 7.8 (< 140)	< 7.0 (< 126) < 7.8 (< 140)

* Corresponding values for capillary plasma are: for Diabetes Mellitus, fasting 7.0 (126), 2-h 12.2 (220); for Impaired Glucose Tolerance, fasting < 7.0 (< 126) and 2-h 8.9 (160) and < 12.2 (< 220); and for Impaired Fasting Glycaemia 6.1 (110) and < 7.0 (< 126) and if measured, 2-h < 8.9 (< 160).

For epidemiological or population screening purposes, the fasting or 2-h value after 75 g oral glucose may be used alone. For clinical purposes, the diagnosis of diabetes should always be confirmed by repeating the test on another day unless there is

unequivocal hyperglycaemia with acute metabolic decompensation or obvious symptoms.

Glucose concentrations should not be determined on serum unless red cells are immediately removed, otherwise glycolysis will result in an unpredictable under-estimation of the true concentrations. It should be stressed that glucose preservatives do not totally prevent glycolysis. If whole blood is used, the sample should be kept at 0–4 °C or centrifuged immediately, or assayed immediately.

OBESITY

Clinical case description:

A person above 15 years of age whose BMI is more than 30 is considered to be obese. If the BMI is between 25 to 30, then the person is considered to be overweight.

Table 1:

Cut-off points for body mass index [8] proposed by a World Health Organization Committee for the classification of overweight (WHO Expert Committee. Physical Status: the use and interpretation of anthropometry. WHO Technical Report Series no. 854. Geneva: WHO, 1995) Cut-off points for body mass index [8] proposed by a World Health Organisation Committee for the classification of overweight(WHO Expert Committee. *Physical Status: the use and interpretation of anthropometry.* WHO Technical Report Series no. 854. Geneva: WHO, 1995)

body mass index	WHO classification	popular description
<18.5 kg/m^2	underweight	thin
18.5-24.9 kg/m^2	-	"healthy", "normal", or "acceptable" weight
25.0-29.9 kg/m^2	grade 1 overweight	overweight
30.0-39.9 kg/m^2	grade 2 overweight	obesity
>40.0 kg/m^2	grade 3 overweight	morbid obesity

ROLESOFTHEVARIOUSFUNCTIONARIES

Introduction

In any system, it is important that the 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 1.

Table 1 - Role of the various functionaries in the IDSP.

LEVEL	FUNCTIONARIES	DATA COLLECTION	ANALYSIS	INVESTIGATION	RESPONSE	SUPERVISION	TRAINING	FEEDBACK
SUB DISTRICT LEVEL	COMMUNITY INFORMANTS	+	-	+	+	-	-	-
	MPW / HAs	++	-	+	+	-	-	-
	PHARMACISTS (PHC/CHC)	++	-	-	-	-	-	-
	MO (PHC / CHC)	+++	+	++	+++	++	+	+
	PRIVATE PRACTITIONER	++						
	Dt. SURVEILLANCE OFFICER	-	+++	+++	++	+++	+++	+++
DISTRICT LEVEL	MO (HOSPITALS)	+++	-	+	+	-	+	-
	LAB TECHNICIAN (CHC/HOSP)	+++	-	++	-	+	++	+
	STATISTICIANS (CHC/Dt)	+++	+	-	-	-	++	-
	DISTRICT MAGISTRATES	-	+	-	-	-	-	-
	PRIVATE PRACTIONERS	+++	-	-	-	-	+	-
	PRIVATE HOSPITALS	+++	-	-	-	-	+	-
	PRIVATE LABS	+++	-	+	-	-	+	-
	MUNICIPAL HEALTH OFF.	+	+++	+++	+++	+++	++	++
	MUNICIPAL MOs	+++	+	++	++	-	-	-
	NGOs	+++	-	+	+	-	+	-
STATE LEVEL	STATE DIRECTORATE	-	+++	++	++	+++	+++	+++
NATIONAL LEVEL	NICD / ICMR / NIE	-	-	++	+	-	+++	-

ACTIVITIES OF THE COMMUNITY INFORMANTS

These include people like teachers, AWWs, Panchayat members, Ward members, SHG leaders, Health club / Youth club / Farmer's club leaders etc.

Case detection

Their main role is in the detection of potential outbreaks. In the event that they suspect any unusual health event[8] occurring in their village, they must take the responsibility of informing the nearest PHC. In urban areas, they can inform the nearest Municipal Dispensary or other designated institution.

Investigation

They can help the investigation team in investigating the outbreak, identifying the households with the cases

Response

Similarly they can help the response team in containing the outbreak by mobilising the community to take the necessary preventive measures.

ACTIVITIES OF THE MPWs / Urban Link workers and the HEALTH ASSISTANTS

These are the Male and Female Multi-Purpose workers and their supervisors the Health Assistants (M & F). In the urban areas, they would be the link workers. They form the most peripheral unit of the formal government health services. This group may also include the trained field workers of the NGOs who are participating in disease surveillance activities.

Case detection

They can help in case detection through various ways

- Identify patients during the home visits
- The diseases that they would be able to identify would be diarrhoeal diseases, jaundice, suspected malaria, measles, suspected dengue, suspected JE and suspected TB.
- Trace the contacts of these patients especially in contagious diseases
- Use key informants (see above) to identify cases occurring in the community

[8] Unusual health event may be described as '*a clustering of cases with diarrhoea or jaundice or fever or altered consciousness*'.

- For NCD surveillance, if the sample falls in their area, they should sensitise the village about the surveillance and with the help of the community leaders, mobilise the community to participate in the surveillance activity

Data collation and transmission

Once the cases are detected, they need to enter the details in the register. The data is then compiled once a week or once a month (depending on the disease), entered into the relevant form, which is then transmitted to the PHC / Municipal dispensary. This may be done manually, or by telephone.

However, if the disease detected is one that has outbreak potential, e.g. cholera, measles, dysentery, suspected dengue s/he needs to inform the appropriate MO immediately (by telephone or special messenger).

Investigation and response

They should help the investigation / response teams in the investigation and response mechanism. Some of the roles that they can perform are:

- Identify the households where the cases have occurred
- Identify the contacts
- Identify some of the risk factors, e.g. contaminated water sources, mosquito breeding sites, local events that may have potentiated the event like a marriage leading to food poisoning etc.
- Mobilising the community to actively participate in the containment measures.

ACTIVITIES OF THE PHARMACISTS (PHC / CHC / Hospitals)

These are the pharmacists in the PHCs and the CHC or Block PHCs. They are the personnel usually entrusted with the responsibility of compiling the statistics from the OP / IP registers. In states, if others are designated for this activity, then this section applies to them. In urban areas, the pharmacists of the Urban dispensaries would be responsible for this activity. Similarly, in Private hospitals / nursing homes / NGO hospitals, the designated person for doing the above duties will have to perform these activities.

Data collection and compilation

They should go through the OP registers every day and segregate the diagnosis (as made by the MO) into the various diseases and age wise (i.e. < 5 and > 5). This should then be aggregated on a weekly / monthly basis and entered into the reporting form and sent to the appropriate level.

MO - PHC / CHC

People responsible

Public Sector		Private sector	
Rural	**Urban**	**Rural**	**Urban**
MO of PHC / CHC	MO in Dispensary	Practitioner in clinic	

Case detection

They are the key qualified person to detect cases from the community level. They can do this by

- Documenting clearly the patients that attend their Outpatient or are admitted.
- Identify patients while on a field visit / camp.
- The diseases that they would be able to identify would be diarrhoeal diseases, jaundice, suspected malaria, suspected typhoid, measles, suspected dengue, suspected JE, suspected TB and suspected HIV/AIDS.
- For Non-communicable diseases, the MO in the PHC would head the team that would collect the data in the community.
- Maintain a rumour register at the institution and investigate any reports there
- Monitor the press daily and investigate any reports published in the newspapers.

Data collation and transmission

The MO will be primarily responsible for ensuring that the data is compiled and transmitted in the frequency that it is supposed to be transmitted.

Analysis

The MO at the CHC / Urban dispensary is responsible for conducting some preliminary analysis. This will include

- Monitoring the completeness of the reporting units. This will include reports from the PHCs / Link workers, the Private practitioners and the labs if any.
- Monitoring the timeliness of the reporting units
- Monitoring the secular trends of those diseases with outbreak potential. This may be done manually or maybe computerised.
- All this analysis maybe done separately for the public sector and private sector. However the trends maybe compared to identify any misreporting.
- Comparing the current year's data with that of the corresponding period for the previous year(s).
- Making spot maps to identify any clustering of cases.

All this maybe done using the existing Health Mapper software.

Investigation and response

The MO of the PHC/CHC/Urban dispensary is responsible for investigation and response mechanism. The detection of outbreaks can be done

- From analysis of routine data
- From the media
- From the rumour register

The thresholds for definitions of outbreaks are given below.

In the event of an outbreak the MO from the CHC / Urban dispensary will have to

- Make a preliminary visit to the area to confirm the outbreak.
- If confirmed, then s/he will have to ensure that
  - specimens are collected for lab diagnosis,
  - containment measures are initiated and
  - an initial report is sent to the District level if there are more than 25 cases or if there is mortality.

S/he can use the help of the MO and staff of the local PHC.

Threshold levels

CHOLERA If a single suspect case is confirmed **MEASLES** If a single suspect case is confirmed. **DENGUE/ DHF/ DSS** If a suspect case is confirmed. **JAPANESE ENCEPHALITIS** If a single suspect case is confirmed. **VIRAL HEPATITIS** If the number of new cases exceeds the upper limit of cases seen in a previous non-epidemic period in previous years.	**DYSENTERY** If a single suspect case is confirmed **ACUTE DIARRHOEAL DISEASES** If the number of new cases exceeds the upper limit of cases seen in a previous non-epidemic period in previous years. **MALARIA** If the number of new cases exceeds the upper limit of cases seen in a previous non-epidemic period in previous years.

The investigation and response measures are given in further detail in the subsequent chapters

Supervision and monitoring

The MO of the PHC / CHC / Urban dispensary are expected to supervise the MPWs. The main objectives of the supervision are to

1) To support the MPWs in their work
2) To understand the gaps in the field and to bridge them
3) To provide on the job training

Before making a supervisory visit, the MO will prepare for it by reviewing the past notes relevant for that centre and also the programme achievements of that centre.

The MO will then visit the field staff and interact with them and use the following tools

- Observation
- Checklist (see Annex)
- Review of records and registers

At the end of the visit, the MO will share the finding of his/her visit with the MPW and make a report that is filed for subsequent use.

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

Indicator	Freq 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.

Training

The MO of the PHC / CHC will be responsible for ensuring that all the staff under him/her as well as the staff of the private sector reporting units are properly trained. S/he may conduct the training directly or may request the District team to help with the training.

Feedback

The MO will provide regular monthly feedback to the MPWs using the forum of the Monthly meeting. S/he should also share any feedback that s/he has received from the District/State. Other than this, as mentioned earlier, the MO should give feedback during the supervisory visits.

In the case of the private sector, feedback on a monthly basis should be sent to the private practitioners who are involved in the surveillance activities. This maybe in the form of a written note.

ACTIVITIES OF THE HEALTH ASSISTANT - DISTRICT SURVEILLANCE OFFICE

This is basically the person responsible for collating all the data at the District Surveillance office or the Municipal / 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.) This may be manually or electronically
- Entering the data into the master format at the District / Municipal / Corporation office.
- 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 include

    - Completeness of reporting units
    - Timeliness of reporting units (disaggregated for private and public sector and for labs)
    - The trends over time for each disease - comparing it with the previous weeks
    - The trends over time for each disease - comparing it with the corresponding period in the previous years
    - Comparison of the trends for each disease - comparing the public - private - lab sector.
    - Comparison of the trends for each disease - comparing the data of the various CHCs.
    - The Spot maps using the GIS software.

- 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.

ACTIVITIES OF THE DISTRICT SURVEILLANCE OFFICER

This includes the DSO in the rural areas and the MHO / Corporation Health Officer in the urban areas.

S/he is the crucial person in the IDSP surveillance system. His main responsibility is to analyse the data that is coming in, identify areas of potential outbreak and ensure that these are contained before they grow out of control. Other support functions include supervision, monitoring, training and providing feedback to the lower levels. And finally the DSO is supposed to have strong links with the state surveillance officer and other programme managers.

The main activities of the DSO / MHO are

- Calling for the disease surveillance reports on a weekly/monthly basis
- These reports will include
    - Completeness of reporting units
    - Timeliness of reporting units (disaggregated for private and public sector and for labs)
    - The trends over time for each disease - comparing it with the previous weeks
    - The trends over time for each disease - comparing it with the corresponding period in the previous years
    - Comparison of the trends for each disease - comparing the public - private - lab sector.
    - Comparison of the trends for each disease - comparing the data of the various CHCs.
    - The Spot maps using the GIS software.

- Review the above reports and
    - Review the validity of the data
    - Identify any reporting units that are not functioning satisfactorily
    - Detect any outbreaks

- In the event of any outbreak (potential or existing), inform the concerned reporting unit for investigation and response.
- Submit a summarised monthly report to the State Surveillance officer and relevant programme managers.

- Provide feedback to the CHCs / Private providers about the performance of the district vis-à-vis the surveillance activities. This maybe in the form of a talk in the monthly meeting, a newsletter or even a website.
- If the outbreak is confirmed, then the DSO/MHO should initiate a full-fledged investigation with the help of the Epidemic Investigation Team.
- If the CHC/PHC or Urban dispensary needs any help in the response and containment measures, then the DSO/MHO needs to mobilise additional staff and resources to support them.
- If the outbreak is of a large magnitude, then the DSO/MHO needs to immediately also alert the State Surveillance officer for support.

Other than this the DSO / MSO will **supervise** the reporting units under his/her area. The main objectives of the supervision are to

- To support the MOs and lab technicians in their work
- To understand the gaps in the field and to bridge them
- To provide on the job training

Before making a supervisory visit, the DSO / MHO will prepare for it by reviewing the past notes relevant for that centre and also the programme achievements of that centre.

The DSO / MHO will then visit the field staff and interact with them and use the following tools

- Observation
- Checklist (see Annex)
- Review of records and registers

At the end of the visit, the DSO/MHO will share the finding of his/her visit with the MOs / LT and make a report that is filed for subsequent use.

The DSO / MHO will also **monitor** the following indicators on a regular basis. The source of data will be varied and are given in the table below.

Indicator	**Freq 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 MOs with Case definitions and using them	Annual	Supervisory reports
Percentage of MOs 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 detected	Annual	Outbreak reports
No of outbreaks prevented	Annual	Comparison of previous year's reports.
Percentage of labs whose reports are in concurrence with their registers	Annual	Supervisory reports

ACTIVITIES OF THE MOs IN THE 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 Hospital.	MO in the Department of Medicine, Pediatrics, Infectious diseases and Casualty of the Private / NGO Hospitals.	

Case detection

They would be able to detect all cases, which attend their hospital as OP or IP. They can do this by

- Documenting clearly the patients that attend their Outpatient or are admitted.
- The diseases that they would be able to identify would be clinical cases / confirmed cases of diarrhoeal diseases, viral hepatitis, malaria, typhoid, measles and TB, suspected cases of JE, dengue and HIV/AIDS.
- From lab results which are sent to them.
- Monitor all cases of death (including brought-in-dead) to see if any case fits the description of diseases under surveillance
- For Non-communicable diseases, these MOs could assist the MOs in the PHC/CHC during the surveys for the biochemical investigations and other facilities as well as providing sentinel information about the results of their labs as far as blood sugar and blood cholesterol is concerned.

The specialists in medicine, paediatrics and microbiology (or senior lab tech) may be co-opted as a team member of the EIT to investigate an outbreak and support the MO PHC/CHC in management of the cases.

- The medical specialist/paediatrician will clinically examine the cases to make a clinical diagnosis of the cases and also outline the standard case management protocol to be implemented by the MO PHC.
- The microbiologist/lab technician will guide the MO PHC in what samples are to be taken and methodology of collection, storage and transportation of specimens. They will also rapidly process the specimens in their labs and give the confirmatory diagnosis and antibiotic sensitivity of the implicated organism.

Training

The specialists in the district / private hospitals would assist in the training conducted by the DSO and act as resource persons.

Activities Of 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 / Corporate Hospital	Lab technicians / lab in-charge from accredited and identified labs	

Data collection

The nodal person in the lab is responsible for reporting confirmed cases of the diseases under surveillance to the District Authorities. S/he would

- Take note of any samples that have tested positive.
- Personally recheck all the samples/reports of stool, blood, CSF, etc for confirmatory diagnosis of cases of cholera, diarrhoea, dysentery, malaria, viral hepatitis, etc.
- Be alert to any clustering of diseases of outbreak potential.
- Report immediately to the appropriate authorities if any sample is tested positive for cholera or shigella.

- Report all other positive samples on a routine weekly / monthly basis as per form XXX
- Take the responsibility of organising further investigations at identified regional labs for diagnosing dengue, JE and AFP.
- Also closely monitor the lab results of water quality testing samples and immediately intimate the DHO/DSO/SSO of unfit results.
- Also check the condition of specimens received from the field and informs they are not well preserved/desiccated, poor quality of slides, etc.

Investigation

The lab technician will be a part of the EIT to investigate outbreaks. S/he will

- will supervise the collection of lab samples and guide the PHC staff on how to store and transport further samples.
- also ensure rapid processing of the specimens so that a confirmatory diagnosis is immediately available.
- also collect water samples from the area of outbreak if a waterborne outbreak is suspected.
- Monitor the Antimicrobial resistance patterns and share the information with the treating physician.

Supervision

The District lab in charge would also supervise the work of the lab technicians of the other labs i.e. PHC/CHC, urban dispensary labs, private labs etc. They will set up a quality assurance mechanism.

Training

The lab technician will be involved in training the junior lab technicians in basic lab procedures and also in providing on-the-job training. They will also be involved in training peripheral staff in proper collection, storage and transportation of specimens.

Feedback

The lab tech will provide feedback of their lab results to all concerned both to the next higher level as well as to the lower level who have provided the samples for immediate action at the local level.

Data collection involves detection of cases for which surveillance is being carried out, documentation or recording details of these cases, reporting on the relevant formats and transmitting this information to the next higher level. This is one of the fundamental activities in public health surveillance and the success of any surveillance programme depends on the quality of data collection.

Based on the public health importance, the outbreak potential and the feasibility of interventions, the following diseases have been short listed for surveillance

Diseases of outbreak potential (Weekly monitoring)	**Diseases of public health importance** (Monthly monitoring)	**Non-communicable diseases** (Monitoring once in 3 years)
Acute diarrhoeal disorders	TB	Tobacco use
Cholera	HIV	Alcohol use
Typhoid	AFP	Height
Hepatitis	Malaria	Weight
Measles	Water quality monitoring	Blood Pressure
Dengue	Air quality monitoring	Blood Glucose
Japanese Encephalitis	Road traffic accidents	
Plague		

Types of surveillance

While detecting the cases, one must keep in mind the type of surveillance that needs to be employed. There are various types, e.g.

- Active or passive,
- Comprehensive or sentinel,
- Regular or survey,
- Disease based or entomological or lab based surveillance

Each disease has its own peculiarities and may warrant a different approach, but keeping in mind the multi disease approach to surveillance, one must optimise the existing resources and develop as far as possible a common surveillance programme. Table XXX gives some suggestions on how surveillance can be undertaken for various diseases within a multi-disease framework.

In general the communicable diseases will be detected in a passive manner, by routine comprehensive surveillance (i.e. all the reporting units will include these diseases in their list and report regularly). All of it will be disease based and some will be supported by lab based / entomological surveillance also. On the other hand non-communicable diseases will be detected in an active manner by special surveys conducted periodically (every 3 to 5 years) in the same population.

The above suggestion does not take away from the fact that in some cases sentinel surveillance maybe the most efficient method, e.g. neurologists for JE, laboratories for hepatitis etc. Each State needs to decide what type of surveillance it needs to undertake to detect the cases.

TableXXXSuggestedsurveillancemethodologies

Disease	Active or Passive	Comprehensive or Sentinel	Routine or Survey	Disease / ento / lab
Acute Diarrhoeal diseases	P	C	R	D
Cholera	P	C	R	D+L
Typhoid	P	C	R	D + L
Hepatitis	P	C and S	R	D + L
Dengue	P	C and S	R	D+E+L
Jap Encephalitis	P	C and S	R	D+E+L
Measles	A + P	C	R	D
AFP	A + P	C and S	R	D + L
TB	P	C	R	D + L
Malaria	A + P	C	R	D+E+L
HIV	P	S	S	L
Air pollution	A	S	R	L
Water quality	A	S	R	L
RTA	P	S	R	D
Risk Factors	A	S	S	L

Case detection

For surveillance to be effective the cases in the community must be correctly diagnosed and detected as early as possible. There are various methods of case detection:

- A patient seeks care at a health facility
- The MPW detects cases during his/her routine home visit
- The Mobile team identifies cases during village visits
- Active case finding as in Malaria
- Surveys to identify certain risk factors e.g. risk factors for Cardio vascular diseases,

- A community member reports a suspect case of an epidemic prone disease e.g. measles.
- The media report clustering of cases in a community or area e.g. outbreak of diarrhoeal diseases in a village.
- Sentinel surveillance sites e.g. for HIV
- Labs may detect cases when they get positive results
- Other departments like "Water Board", Pollution Control Board or the Police may detect water pollution, air pollution and Road traffic accidents respectively.

Usually most of the health events will be detected at the reporting units. Some of the reporting units are given in Table 3.2. The staff of the reporting units should use the standard case definitions (suspect, probable, confirmed and community definitions) to identify cases (refer chapter 2) to ensure uniformity of detection. How the functionaries at various levels would carry out case detection is outlined in table 3.3.

Ensure that all the reporting units have a copy of the case definitions and that the concerned staff - MPWs, MOs, Nurses, Pharmacists, Lab technicians are familiar with it and are using it regularly to diagnose and detect cases.

TableXXXReportingunitsfordiseasesurveillance

	Public health sector	**Private health sector**
Rural	Sub centres, PHCs, CHCs, Sub-District Hospitals	Private Clinics (formal and informal sector),
Urban	Urban dispensaries, Urban Hospitals, ESI / Railway / Defence Hospitals, Medical college hospitals. Water boards, Pollution control boards, Police stations	Private clinics, Nursing homes, Hospitals, Private laboratories, Medical college hospitals, NGO hospitals

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

Make a list of all the reporting units in your district and divide them into public / private - urban / rural. You will need to update this on a regular basis - once in a year at least so that the representativeness of the surveillance system is maintained (see Annex 3.5)

TableXXXCasedetectionbyfunctionariesatvariouslevels

Sub district Level	Functionary	Frequ ency	How cases will be diagnosed and detected	Diseases which can be detected
Community	Lay person	On occur-ence of event	By information from other members in the community like barbers, dais, teachers, etc.	Cases of diarrhoea, fever, measles and jaundice as per the community case definition
Sub centre	MPWs	Daily	OP contacts, house visits, community informs	Suspect cases of diarrhoea, cholera, malaria, hepatitis, measles, JE and dengue.
PHC	MO/pharmacist	Daily	Out patients, mobile camps, contact tracing, etc[9]	Suspect, probable or confirmed cases of ADD, cholera, typhoid, hepatitis, measles, Dengue, JE, TB, AFP, HIV, and Malaria,
	MO and his team	Once in three years	Special surveys for risk factors - BMI, tobacco, alcohol, BP, blood cholesterol, blood sugar	To monitor trends of these risk factors in the community
District Level	**Functionary**	**Frequ ency**	**How cases will be diagnosed and detected**	**Diseases which can be detected**
CHC, Private dispensary, Corporation / Municipal council dispensary	MO/lab technician	Daily	Out patients, inpatients, mobile camps, Lab results, etc	Suspect, probable or confirmed cases of ADD, cholera, typhoid, hepatitis, measles, Dengue, JE, TB, AFP, HIV, and Malaria,
District hospital, Private practitioner s, Private hospitals/ Nursing homes,	Doctors and specialists working in the OP/IP and paediatric wards, medical, neurological, and other wards	Daily	Outpatients and inpatients.	Suspect, probable or confirmed cases of ADD, cholera, typhoid, hepatitis, measles, Dengue, JE, TB, AFP, HIV, and Malaria,

[9]TheMOofthePHC/CHCshouldalsofollowupanyinformationonoutbreaksprovidedbykey informants,theMPWs,rumourregistersandmediareports.Confirmationofthesecaseswouldalso helpinearlydetectionofcases.

Medical colleges (public/private)Corporation hospital, NGO hospitals				
District lab, Private labs	Microbiologists and lab technicians	Daily	Positive lab results.	Lab confirmed cases of diarrhoea, cholera, Typhoid, Hepatitis, Dengue, JE, TB, Malaria, and HIV

Case recording

Documentation or case recording is vital for effective surveillance. The doctors/pharmacists/nurses must ensure that they maintain clear and legible records of all the cases seen in the OP/IP registers (sample of OP / IP register is given in annexure 3.1). Also, records of deaths (brought-in-dead, deaths in hospital, etc) must be meticulously maintained. The person in charge of the lab should also record all the details in the register (see sample in Annex 3.1). The register is self-explanatory.

It is important to write legibly in the OP / IP register, especially the diagnosis so that it is clear to all the people concerned.

Case reporting (compilation) & transmission of data

The cases that have been detected and recorded need to be compiled and transmitted to the next level on a regular basis. Diseases of outbreak potential are reported on a weekly basis while the other diseases or health conditions may be reported on a monthly basis. Finally the Risk factor surveillance is reported once in three years.

The forms A, B, C D, and L are in the Annex 3.2 and the flow in the IDSP is illustrated in Annex 3.7

For all forms, the original to be sent to the higher level while a copy to be maintained at the reporting unit from where it originated.

Private sector involvement in Disease surveillance
There is very little experience on the involvement of the private sector in disease surveillance.

The NADHI model uses postcards to get information on new cases of common communicable diseases from private practitioners. The latter are asked to send a pre-printed postcard to the District authorities whenever they see patients with disease x, y or z.

The NPSP model uses informers, who are sentinel private practitioners who inform the District Immunisation officer the moment they see a case of AFP

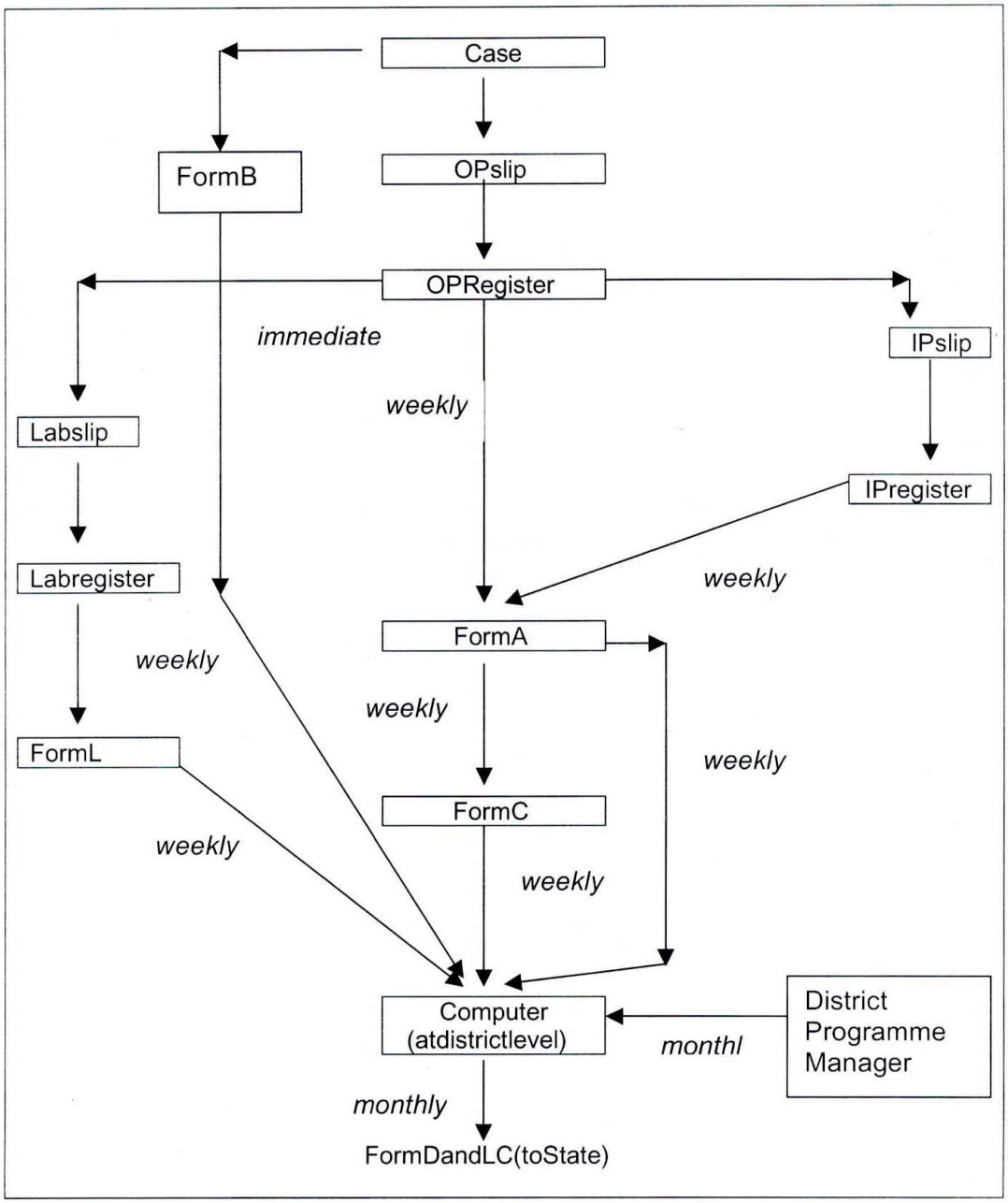
One can use other methods, e.g. requesting clinics or hospitals to share the information in the OP / IP registers on a weekly basis.

For Risk factor analysis

A separate questionnaire has been developed. Sample populations will be surveyed once in 3 years to understand the trends.

Data must be transmitted to the next level and this may be done manually using forms, or electronically using e-mails (through computers) or by telephone/fax (where computers are not available). Data must be compiled and collated at each level before submission to the next higher level. A possible flow of information in the IDSP for rural and urban areas is shown in Annex 3.3. After the forms are filled up they need to be checked by a senior staff and then only transmitted.

Registers – Forms – Reports in the IDSP



Form A from reporting units where there is primary collection of data e.g. SC, Hospitals,
Form B from reporting units when an outbreak is suspected
Form C from units where data is consolidated e.g. PHCs, CHCs, DSO
Form L from Labs which do the tests e.g. PHC labs, District labs
Form LC from units where data is consolidated e.g. DSO

Remember for epidemic prone diseases[10] or diseases which are in eradication mode (AFP) the first case should be immediately reported to the higher authorities (within 24 hours of seeing the case).

Also 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

Conclusion

Data collection is the first and most important step of an effective disease surveillance system. If case detection is properly carried out, and all functionaries are doing recording and reporting of cases in a proper manner then the surveillance would be efficient. The later activities would strongly depend on the quality of this component of surveillance.

For case detection to be of good quality,

- **All concerned should be trained in the use of case definitions**
- **Copies of case definitions should be easily available**
- **Registers and forms should be available at all levels**
- **Logistics of transmission should be working (telephone, fax, email)**

[10] **Cholera,Measles,Dengue,Plague,LeptospirosisandJE**

Table 3.4 Procedure for reporting by various functionaries at various levels.

From	To	Functionary	Frequency*	Source / Forms	Diseases
Sub centre	PHC	MPWs	Weekly	From OP register to Form A	Suspect cases of diarrhoea, cholera, typhoid, hepatitis, dengue, JE, measles, AFP, malaria
PHC / CHC	District Surveillance officer	MO / pharmacist	Weekly	From OP / IP register and Form A (of SCs) to Form C	Probable cases of diarrhoea, cholera, typhoid, hepatitis, dengue, JE, measles, AFP, malaria
Private dispensary / Sub district Hospital / Urban dispensary	District Surveillance officer	MO / pharmacist	Weekly	From OP / IP register to Form A	Probable cases of diarrhoea, cholera, typhoid, hepatitis, dengue, JE, measles, AFP, malaria
Urban dispensary	Corporation Hospital	MO / Pharmacist	Weekly	From OP / IP register to Form A	Probable cases of diarrhoea, cholera, typhoid, hepatitis, dengue, JE, measles, AFP, malaria
CHC	District Surveillance officer	Lab technician	Weekly	From Lab register to Form L	Confirmed cases of malaria, TB
PHC	District Surveillance officer	MO	Once in 3 years	From Survey forms	Risk factors for CVD
Corporation Hospital	MOH	MO / Nurse / Pharmacist	Weekly	From OP / IP register and from Form A (of Urban Dispensar to	Probable or confirmed cases of diarrhoea, cholera, typhoid, hepatitis, den ue, JE, measles, AFP,

				Form C	malaria, TB and HIV.
District hospital / Medical colleges / NGO hospitals	District Surveillance officer	MO / Nurse / Pharmacist	Weekly	From OP / IP register to Form A	Probable or confirmed cases of diarrhoea, cholera, typhoid, hepatitis, dengue, JE, measles, AFP, malaria, TB and HIV.
Police stations	District Surveillance officer	Nodal officer	Monthly	From their register	Road traffic accidents
District lab / Private labs	District Surveillance officer	Nodal lab technician	Weekly	From Lab register to Form L	Confirmed cases of ADD, Cholera, Typhoid, Viral hepatitis, TB, Malaria, Water Quality.
Programme Managers (TB, Malaria, HIV, Immunisation)	District Surveillance officer	Programme managers	Monthly	From their forms	Confirmed cases of TB, Malaria, HIV, measles, Polio
District Surveillance officer	State Surveillance officer	DSO	Monthly	From Forms A, B, C to Form D From Forms L to Form LC	Suspect / Probable / Confirmed cases of ADD, Cholera, Typhoid, Viral hepatitis, Dengue, JE, Measles, Polio, TB, Malaria, HIV and Road Traffic Accidents. Also the water quality reports
Urban Hospitals / Private Hospitals	MOH	MO / Pharmacist	Weekly	From OP / IP registers to Form A	Suspect / Probable / Confirmed cases of ADD, Cholera, Typhoid, Viral hepatitis, Dengue, JE, Measles, Polio, TB, Malaria, HIV and Road Traffic Accidents. Also the water quality reports

From Private labs	MOH	Nodal lab technicians	Weekly	From the lab registers to Form L	Confirmed cases of ADD, Cholera, Typhoid, Viral hepatitis, TB, Malaria, Water Quality and Air Quality
Municipal Corporation	State Surveillance officer	MOH	Monthly	From Form A and Form L to Form C	Suspect / Probable / Confirmed cases of ADD, Cholera, Typhoid, Viral hepatitis, Dengue, JE, Measles, Polio, TB, Malaria, HIV and Road Traffic Accidents. Also the water quality reports and Air quality reports.

*Immediate reporting for suspect cases of cholera, dengue, measles, AFP, Plague and JE. This list may be increased according to local situations e.g. leptospirosis may be added in the coastal belt. Tel: no of person to be informed should be provided.

Note: For non communicable diseases during the surveys for risk factor surveillance which would be carried out in three year cycles covering the same community once in three years various functionaries will be involved as per their capacity in case reporting.

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

Sample OP register

No:	Name and address of patient	Age	Sex	Provisional Diagnosis	Lab tests	Lab results	Final Diagnosis	Treatment given	Remarks
1									
2									
3									
4									

Sample IP register

No:	Name and address of patient	Age	Sex	Provisional Diagnosis	DOA	Lab test results	Final Diagnosis	Treatment given	DOD	Outcome	Remarks
1											
2											
3											
4											

Sample Lab register

No:	Name and address of patient	Age	Sex	Provisional Diagnosis	Lab tests ordered	Lab results	Reported to authority on	Remarks
1								
2								
3								
4								

ANNEX 3.2

Form A

Integrated Disease Surveillance **Week No.:** ____

(Date: Sunday _____ to Saturday _____)

Weekly Reporting Form for all Reporting Units

Please fill-out this form on every Saturday, to reach Health Authorities on every Monday

Name & address of the Reporting Unit: _____

Name & designation of the person filling-out the report: _____

Estimated population covered by this Reporting Unit: < 5= _____ >5=_____

Sr. No.	**Suspected Diseases/ Syndromes** (New cases)	Patients treated							
		OPD		**IPD**		**Total**		**Death**	
		< 5	> 5	< 5	> 5	< 5	> 5	< 5	> 5
1	Diarrhoea								
2	Cholera								
3	Typhoid								
4	Acute Viral Hepatitis								
5	AFP (in less than 15 years of age)								
6	Dengue								
7	JE								
8	Measles								
9	Malaria								
10	Fever (not included elsewhere)								
11	Unusual Syndrome								
Total new cases (Communicable & Non-communicable)									

Signatureoftheauthority:_____Telephone:_____

Nameanddesignationoftheauthority:_____

Diseases/syndromesofpublichealthimportancelike AFP, Cholera, Dengue Fever, Japanese Encephalitis, Measles, Plague, Leptospirosis, Whooping Cough, etc must bereportedtotheDistrictHealthAuthoritiesimmediately.

FillinginFormA

The nodal person in each reporting unit should summarize the data on a weekly basis and enter it into the corresponding form (Form A or Form L).

- The source of information for filling up Form A is the OP / IP registers at the reporting units
- Data should be aggregated, disease wise, into 4 categories OP and IP, under five and five and above.
- Only new cases should be aggregated. Include those who have been referred to another level also.
- In the case of two communicable diseases for the same consultation, record the most important disease - vis-à-vis outbreak potential
- Total cases is the total cases seen at the OP / IP during the week.
- The week number is as per the "Universal week" - see Annex 3.6
- The estimated mid year population for the reporting unit needs to be entered. This is applicable only for government reporting units.
- Form A should then be transmitted to the next level by Monday.
- In the event of a suspect case of AFP, Cholera, Dengue, JE, Measles, Plague the local MO should immediately inform the concerned health authority. Subsequently s/he should fill Form B and send it to the next level.

Annex3.2

Form B

Case based reporting for diseases of epidemic potential

AFP Cholera Dengue JE Measles Plague Others_____
(please specify)

Suspect Probable Confirmed

Name and address of patient_____

_____

Age Sex Date of onset_____ Immunisation status_____
(if applicable)

Present status – alive / dead / admitted /

If admitted – name and address of health facility_____

Signature of the authority

Name and designation of the reporting authority

Name and address of the reporting unit (with telephone no:)

Final diagnosis (to be filled by the District Surveillance Officer)

AFP Cholera Dengue JE Measles Plague Others_____
(please specify)

Suspect Probable Confirmed

Date of diagnosis_____

Filling Form B

This is filled and reported only when a case is suspected and is a case based reporting. The source of data will be from the patient's.

- One form for one patient
- If there are more than 5 patients, then the details of the first 5 patients maybe filled up and the details of the rest maybe included in the line listing.
- Circle the suspected disease
- Circle whether it is suspect, probable or confirmed
- The detailed name and address of the patient is required
- Age and sex of the patient should be recorded. In the event of a child less than 5 years, the date of birth would be preferable
- The date of onset indicates the date on which the patient developed the initial symptoms
- If it is a vaccine preventable disease, then the immunization status for that disease including the date of the last dose should be recorded
- The current status of the patient should be recorded.
- Following the investigations by the concerned authorities, the district health authority will confirm the outbreak. This will then be entered into the bottom half of the form and filed (after entering into the computer).

ANNEX 3.2

Form C

Integrated Disease Surveillance **Week No.:** ____

(Date: Sunday _____ to Saturday _____)

Weekly Reporting cum Consolidation Form

Please fill-out this form on every Saturday, to reach Health Authorities on every Monday

Name & address of the Reporting Unit: _____

Estimated population covered by this Reporting Unit: < 5= _____ >5=_____

Sr. No.	Suspected Diseases/ Syndromes* (New cases)	Patients treated							
		OPD		IPD		Total		Death	
		< 5	> 5	< 5	> 5	< 5	> 5	< 5	> 5
1	Diarrhoea								
2	Cholera								
3	Typhoid								
4	Acute Viral Hepatitis								
5	AFP (in less than 15 years of age)								
6	Dengue								
7	JE								
8	Measles								
9	Malaria								
10	Fever (not included elsewhere)								
11	Unusual Syndrome								
Total new cases (Communicable & Non-communicable)									

	Public health sector		Private Health sector		
	Rural	Urban	Rural	Urban	TOTAL
No of reporting units					
No: & %age of reporting units that reported this month					
No: of reporting units that have reported on time					

*Diseases/syndromesofpublichealthimportancelikeAFP,Cholera,DengueFever, JapaneseEncephalitis,Measles,Plague,Leptospirosis,WhoopingCough,etcmust bereportedtotheDistrictHealthAuthoritiesimmediately.

Signature of the authority: _____ Telephone: _____

Name and designation of the authority: _____

Filling Form C

Form C is filled in by reporting units where data is consolidated e.g. PHCs, CHCs and the MOH. It is on a similar pattern to the Form A. The additionality is the report on the completeness of data.

Form D

Integrated Disease Surveillance **Month:____**

Monthly Reporting Form for the DSO

Please fill-out this form by the first week of every month and submit it to the State Surveillance Officer

Name of the District: _____

Estimated population covered by this District: _____

Name & designation of the person filling-out the report: _____

Sr. No.	New Cases	Patients treated							
		Suspect / Probable		Confirmed		Total		Death	
		< 5	> 5	< 5	> 5	< 5	> 5	< 5	> 5
1	Diarrhoea								
2	Cholera								
3	Typhoid								
4	Acute Viral Hepatitis								
5	AFP (in less than 15 years of age)								
6	Dengue								
7	JE								
8	Measles								
9	Malaria								
10	Fever (not included elsewhere)								
11	TB								
12	HIV								
13	RTA								
14	Unusual Syndrome								
Total new cases (Communicable & Non-communicable)									

	Public health sector		Private Health sector		
	Rural	Urban	Rural	Urban	TOTAL
No of reporting units					
No: & %age of reporting units that reported this month					
No: of reporting units that have reported on time					

Signature of the authority: _____ Telephone: _____

Name and designation of the authority: _____

Filling Form D

Form D is filled by the District Surveillance Officer and sent to the State Surveillance Officer on a monthly basis. It is proposed that at the district level, the programme managers (e.g. the District TB officer, the District Malaria officer etc, The SP of Police, the Pollution control Board etc.) will share their data with the District Surveillance Officer on a monthly basis. This data will then be incorporated into Form D. This will contain the aggregate data for the entire month. The source of information for this Form will be the Form 1 (suspect), the Form L (confirmed) and data from the Programme Managers.

Form L

Integrated Disease Surveillance **Week No.:** _____

(Date: Sunday _____ to Saturday _____)

Weekly reporting format for Laboratory Surveillance
Please fill-out this form on every Saturday to reach the Health Authorities on every Monday

Name of the reporting Lab.: _____

Address: _____

Disease		**No: of tests done**			**Positive**			**Remarks**
		<5	>5	T	<5	>5	T	
Cholera								
Typhoid								
Hepatitis	A							
	E							
	B							
	Others							
Malaria	(*P. falciparum*)							
	(*P. vivax*)							
Dengue Fever								
Japanese Encephalitis								
Tuberculosis								
HIV								
Others (Please specify)	1.							
	2.							

Signature of the authority: _____ Telephone: _____

Name and designation of the authority: _____

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

Filling Form L

This is to be filled by the nodal person in the lab. The source of data are the Lab registers. The data should be dis-aggregated disease wise as well as according to the age. Both total tests and the positive results are noted.

Form LC ANNEX 3.2

Integrated Disease Surveillance **Week No.:** _____

(Date: Sunday _____ to Saturday _____)

Weekly reporting format for Laboratory Surveillance
Please fill-out this form on every Saturday to reach the Health Authorities on every Monday

Name of the reporting Lab.: _____

Address: _____

Disease		**No: of tests done**	**Positive**	**Remarks**
Cholera				
Typhoid				
Hepatitis	A			
	E			
	B			
	Others			
Malaria	(*P. falciparum*)			
	(*P. vivax*)			
Dengue Fever				
Japanese Encephalitis				
Tuberculosis				
HIV				
Others (Please specify)	1.			
	2.			

	Public health sector		Private Health sector		
	Rural	Urban	Rural	Urban	TOTAL
No of reporting units					
No: & %age of reporting units that reported this month					
No: of reporting units that have reported on time					

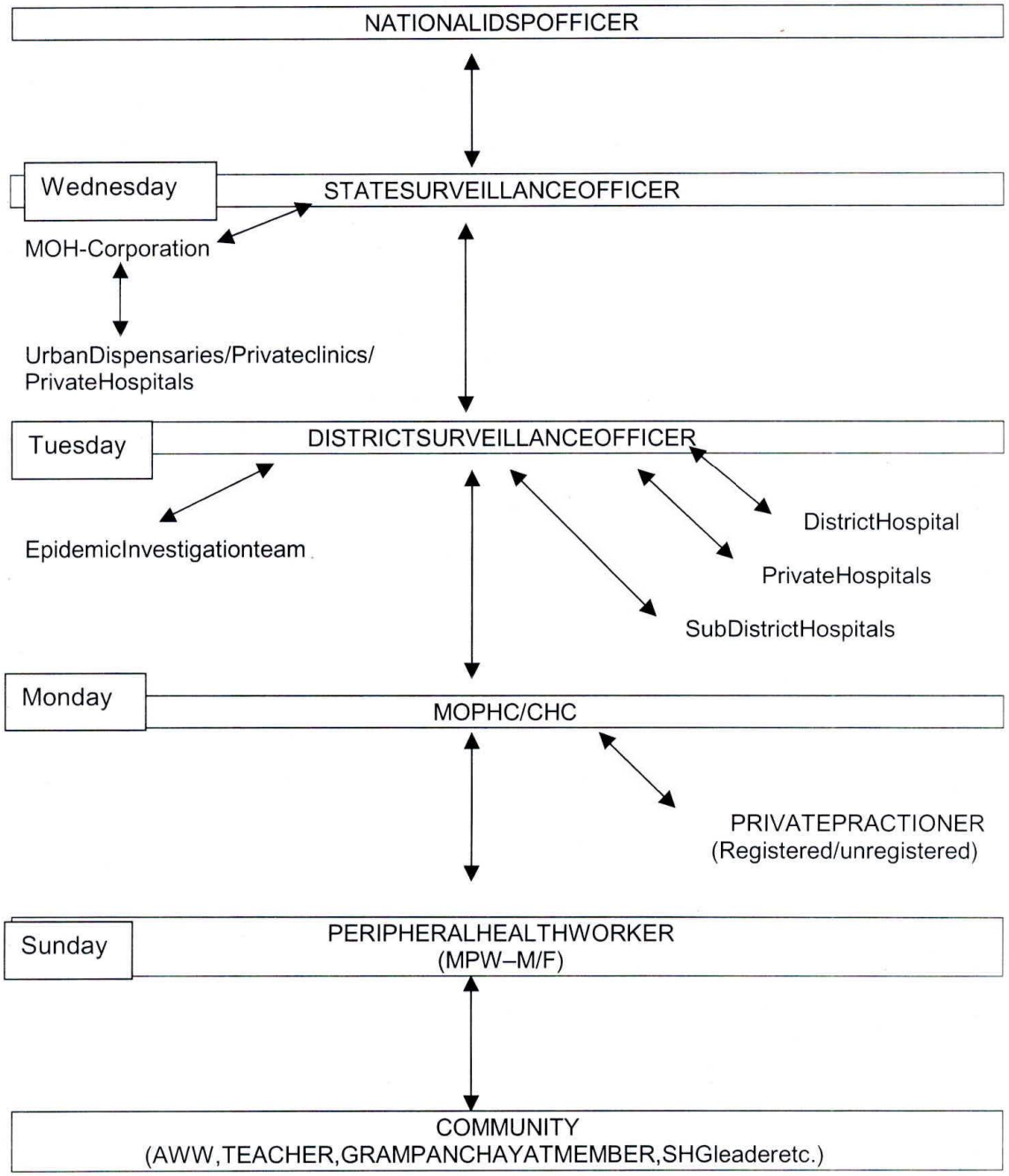
Signature of the authority: _____ Telephone: _____

Name and designation of the authority: _____

Annexure3.4

INTEGRATED DISEASE SURVEILLANCE PROGRAMME –

TRANSMISSION OF INFORMATION



List of reporting units

Includes health facilities, laboratories,

	Name of Reporting unit	Address of Reporting unit	Name of nodal person who is responsible for surveillance data	Tel No / Fax No: and email address of nodal person
Public - Rural				
Public - Urban				
Private - Rural				
Private - Urban				

IDSP WEEKLY SURVEILANCE CALENDAR: 2002

Week No.	Starting Monday	Ending Sunday	Reporting Monday
1	31.12.01	06.1.02	07.1.02
2	07.1.02	13.1.02	14.1.02
3	14.1.02	20.1.02	21.1.02
4	21.1.02	27.1.02	28.1.02
5	28.1.02	03.2.02	04.2.02
6	04.2.02	10.2.02	11.2.02
7	11.2.02	17.2.02	18.2.02
8	18.2.02	24.2.02	25.2.02
9	25.2.02	03.3.02	04.3.02
10	04.3.02	10.3.02	11.3.02
11	11.3.02	17.3.02	18.3.02
12	18.3.02	24.3.02	25.3.02
13	25.3.02	31.3.02	01.4.02
14	01.4.02	07.4.02	08.4.02
15	08.4.02	14.4.02	15.4.02
16	15.4.02	21.4.02	21.4.02
17	21.4.02	28.4.02	29.4.02
18	29.4.02	05.5.02	06.5.02
19	06.5.02	12.5.02	13.5.02
20	13.5.02	19.5.02	20.5.02
21	20.5.02	26.5.02	27.5.02
22	27.5.02	02.6.02	03.6.02
23	03.6.02	09.6.02	10.6.02
24	10.6.02	16.6.02	17.6.02
25	17.6.02	23.6.02	24.6.02
26	24.6.02	30.6.02	01.7.02

Week No.	Starting Monday	Ending Sunday	Reporting Monday
27	01.7.02	07.7.02	08.7.02
28	08.7.02	14.7.02	15.7.02
29	15.7.02	21.7.02	22.7.02
30	22.7.02	28.7.02	29.7.02
31	29.7.02	04.8.02	05.8.02
32	05.8.02	11.8.02	12.8.02
33	12.8.02	18.8.02	19.8.02
34	19.8.02	25.8.02	26.8.02
35	26.8.02	01.9.02	02.9.02
36	02.9.02	08.9.02	09.9.02
37	09.9.02	15.9.02	16.9.02
38	16.9.02	22.9.02	23.9.02
39	23.9.02	29.9.02	30.9.02
40	30.9.02	06.10.02	07.10.02
41	07.10.02	13.10.02	14.10.02
42	14.10.02	20.10.02	21.10.02
43	21.10.02	27.10.02	28.10.02
44	28.10.02	03.11.02	04.11.02
45	04.11.02	10.11.02	11.11.02
46	11.11.02	17.11.02	18.11.02
47	18.11.02	24.11.02	25.11.02
48	25.11.02	01.12.02	02.12.02
49	02.12.02	08.12.02	09.12.02
50	09.12.02	15.12.02	16.12.02
51	16.12.02	22.12.02	23.12.02
52	23.12.02	29.12.02	30.12.02

ANALYSIS 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

DATA ANALYSIS & INTERPRETATION

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

Analyses - at which level?

Analysis should ideally be done at all level from the periphery upwards. 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. S/he should then be able to inform the MPW with details of how many people, what are the symptoms, where are they located etc. Similarly other functionaries at various levels would be able to carry out analysis as outlined in table 1.

Data analysis should ideally be done at each level

Who will do the analysis?

There should be a designated officer at each level who is responsible for the analysis and interpretation of the data. That person may then co-opt other members to form a 'technical committee' who will assist him. E.g. at a District level, it should be the District Surveillance Officer who may constitute a TC by inducting relevant

programme managers, the Para-medical worker who is involved in data compilation and generation of reports, the Municipal Health Officer and interested volunteers from the private sector. This Committee should meet weekly to review, analyse and interpret the reports generated.

A smaller committee is more effective than a large and cumbersome one

When should analysis be done?

Analysis is done at various frequencies - daily, weekly, monthly, annually. See Table XXX. Reports should be generated, either manually or computerized according to this frequency.

Table XXX: Frequency of reports and analysis

No	Reports	Daily [12]	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.

When analysing the data some key points need to be kept in mind by the Technical committee

1. The strength 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

[12] Intheeventofanoutbreak

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.

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

- **Cases - the number of New cases that have occurred in the specified period**
- **Deaths - the number of deaths that have occurred in the specified period**
- **Incidence Rate - the number of new cases that have occurred in a 1000 population over a fixed period of time.**
- **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.**
  - **The effectiveness of the health services in terms of case management e.g. poor case management itself will increase the CFR, while good case management will reduce the CFR.**

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.

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. 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.
5. 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 XXX.

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.

There are various scenarios possible:

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. S/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.

Table 1: Data analysis by functionaries at various levels

Level and (functionary)	Frequency	Analysis	Action
Community (Lay person, key informants etc)	**On occurrence of event**	o Isalerttocasesofmeasles,AFPorunnaturaldeathsinthe community. o Looksoutforobviousincreaseincasesoffever,diarrhoeaand jaundice,clearlyinexcessofthenormaloccurrence	**Informs MPWs / Link workers / Mos** **Assists the medical team in the investigation and action**
Sub center (MPWs / Urban Link workers)	**On occurrence of event** **Weekly**	o Is alert to single cases of suspect cholera, measles, AFP or unnatural deaths in the community. o **Reviews the list of cases seen to pick up any increasing trends in diarrhoeal diseases, fever cases, jaundice cases** o **Is alert to a sudden increase in cases**	**Informs MO PHC / MO Urban dispensary Immediately if there is anything unusual.** **Assists the medical team in the investigation and action**
PHC / CHC / Urban dispensary (MO / Pharmacist)	**On occurrence of event** **Weekly.** **Monthly** **Daily in the event of an outbreak**	o **Is alert to single cases of probable cholera, measles, AFP, dengue, JE or plague.** o **Is alert to any unnatural deaths in the institutions or community.** o **Reviews the weekly and monthly reports and monitors the timeliness and completeness of reports; and the trends in individual diseases especially diarrhoeal diseases, typhoid, jaundice, malaria, TB and HIV.** o **Is alert to any sudden increase in a particular disease, especially if it is in clear excess of previous weeks / months / years.** o **Is able to describe the status of the disease in the community vis-à-vis the people affected, the time when affected and the site affected.** o **Monitor the quality of data by comparing it with sentinel sites.**	**Forwards the analyses to the DHO/DSO by quickest means i.e. by Phone / Fax / e-mail / courier.** **In Urban areas, forwards the analysis to the MHO.** **Investigates, confirms and takes necessary action**
Private sector (MO)	On occurrence of event	o **Is alert to single cases of probable cholera, measles, AFP, dengue, JE or plague.** o **Is alert to any unnatural deaths in the institutions or community.** o **Is alert to any sudden increase in a particular disease**	Immediately informs the MO - CHC / DSO / MHO
District	On	o **Is alert to single cases of probable cholera, measles, AFP,**	Submits the reports to the

Hospitals / Municipal Corporations Hospitals /	occurrence of event Weekly. Monthly Annually Daily during an outbreak.	dengue, JE or plague. o Is alert to any unnatural deaths in the institutions or community. o Reviews the weekly and monthly reports and monitors the timeliness and completeness of reports; and the trends in individual diseases especially diarrhoeal diseases, typhoid, jaundice, malaria, TB and HIV. o Is alert to any sudden increase in a particular disease, especially if it is in clear excess of previous weeks / months / years. o Is able to describe the status of the disease in the community vis-à-vis the people affected, the time when affected and the site affected. o Monitor the quality of data by comparing it with sentinel sites.	DSO / MHO Investigates, confirms and takes necessary action
Level	Frequency	Analysis	Action
District / Municipalities / Municipal Corporations (DSO / MHO)	On occurrence of event Weekly. Monthly Daily in the event of an outbreak	o Peruses all the reports received from all levels and all sectors (public and private), as well as from the labs. o Monitors the completeness and timeliness of the reports of the reporting units. o Compares the previous weeks reports to identify any increasing trends. o Compares the weekly data with that of the corresponding week in the previous year. o Compares data from different blocks, labs, sentinel centres, sentinel labs to identify any discrepancies o Compares the trends in the public / private / lab data to identify any discrepancy. o Check to see if the threshold is crossed. o Keeps a watchful alert on disease outbreaks in neighboring districts/states to prevent spillover to his district o Makes GIS maps using Health Mapper ✓	Submits the report to the DHO and State Nodal officer on a monthly basis. In the event of an outbreak ✓ Alerts the EIT and requests them to investigate the outbreak ✓ Monitors the progress of the outbreak ✓ If necessary, inform the State surveillance officer for support and help.
State (SSO)	Monthly. Daily during epidemics	o Compile and analyze the district profiles and alert the DSOs to any suspected outbreaks or when neighboring districts are affected o Analyze the data of the entire state for person, time and place distribution and make suitablepredictions/disease trend	Central health authority

		analyses o **Makes GIS maps using Health Mapper** o **Identify high risk districts/towns/cities in the state** o **Compare data from different districts, district labs, Public health Institutes, sentinel centres, medical colleges, etc to identify any discrepancies in data** o **Keep a watchful alert on disease outbreaks in neighboring states to prevent spillover to his state** o **If outbreak is of epidemic proportion then alerts the central health authorities for assistance** o **Provides feedback of the analyses to the districts through monthly bulletins**	

Report 2 - Descriptive 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 XXX.
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

As can be seen, the tables are cumbersome to read and interpret. However it is necessary for the sake of records. 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.

Incidence rate of disease A:

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

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 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 occuring
- 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 XXX. 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 XXX

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

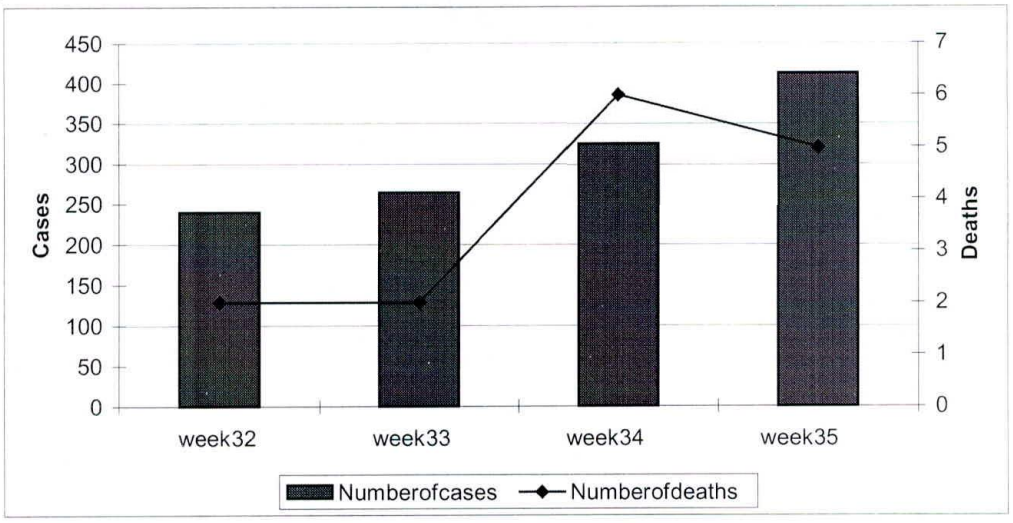
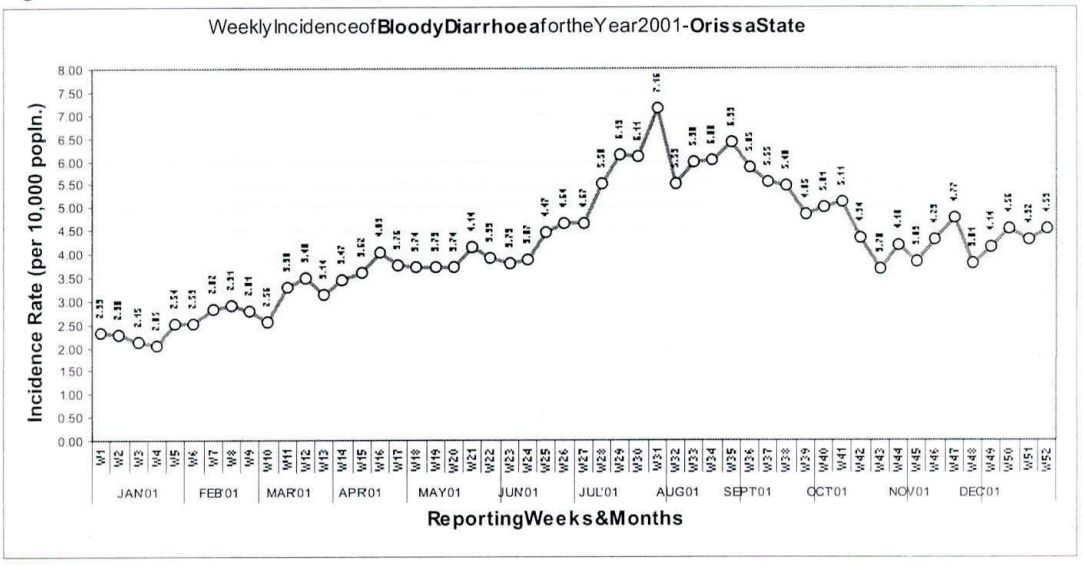


Fig XXX – Incidence rate of dysentery in Orissa - 2001



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 o Could be better reporting o Could be a change in the detection and reporting

Decreasing trends	o Could indicate improved control measures o Could indicate under reporting because of incomplete reports o Could indicate a change in the detection and reporting
Plateau of the graph	o Could indicate stable situation 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 XXX

Table XXX - Threshold levels for common epidemic prone diseases

Threshold level	Disease	Action to be taken
A single suspect case of	Cholera Dengue JE Measles Plague AFP	• Immediate reporting the next level to alert them. • Investigation and confirmation of the existence of case • Lab confirmation where possible • 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 Typhoid Hepatitis Malaria Water pollution Air pollution	• Immediate reporting the next level to alert them. • Investigation and confirmation of existence of cases • Check for epidemiological linkages • Reviewing the past data • Lab confirmation where

		possible • 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 Typhoid Hepatitis Malaria TB HIV Water pollution Air pollution	• Immediate reporting the next level to alert them. • Investigation and confirmation of existence of cases • Check for epidemiological linkages • Reviewing the past data • Lab confirmation where possible • Specific response if confirmed epidemiologically and/or by lab.

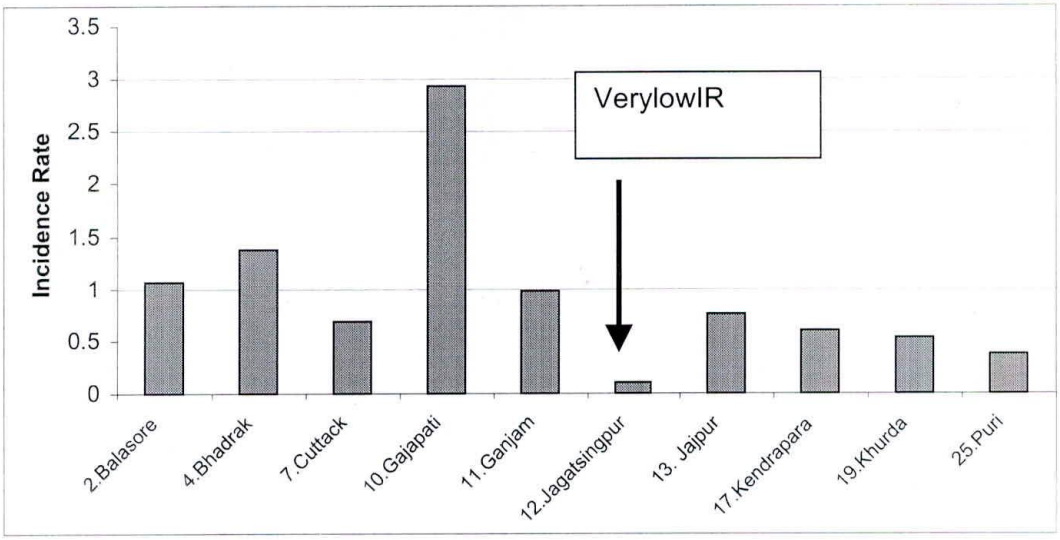
Interpretations that are possible are:

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

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 2.3

Fig 2.3 Comparison of the Incidence rate for malaria for the week 27 (2001) for the 10 coastal districts of Orissa.



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.

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.

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

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

Based on the review, a summary should be prepared which should be sent to the next level on a weekly basis alongwith the compiled data. At the district level, only the weekly summary will reach the State level.

On a monthly basis, at least 7 reports need to be generated and reviewed. The technical committee maybe the same and the purpose would be the same. However, here the Reports 5 - 7 would help the MO to better review the performance of the surveillance system.

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.

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.

- **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.**

Annexure XXX

Sample form for recording Timeliness and Completeness of weekly reports
(to be used from Block upwards)

Block / District / State: Date by which report should have received:

Reporting units: / Week	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th	Total
RU 1													
RU 2													
RU 3													
RU 4													
Total No. of reports expected (N)													
Total no: of reports sent on time (T)													
Total no: of complete reports ©													
Timeliness of reporting = 100*T/N													
Completeness of reporting = 100*C/N													

Key												
Both Complete and timely report				*Timely but incomplete*						*Late but complete*		
Neither complete nor timely report				*No report within a specified period*								

RAW COLLATED DATA OF ORISSA MDSS

Week ending	District	Disease	Cases < 5	Deaths < 5	Cases > 5	Deaths > 5	Cases - Total	Deaths - Total
03.05.2002	ANGL	Simple diarrhoea	292	0	480	0	772	0
03.05.2002	ANGL	Severe diarrhoea	45	1	49	0	94	1
03.05.2002	ANGL	Dysentery	142	0	349	0	491	0
03.05.2002	ANGL	Jaundice	18	0	19	0	37	0
03.05.2002	ANGL	Sus. Malaria	719	0	2236	2	2955	2
03.05.2002	ANGL	ARTI	533	0	887	1	1420	1
03.05.2002	ANGL	Measles	10	0	9	0	19	0
03.05.2002	ANGL	NNT	0	0	0	0	0	0
03.05.2002	ANGL	Sus Meningitis	2	0	0	0	2	0
03.05.2002	ANGL	Heat stroke	0	0	1	0	1	0
03.05.2002	ANGL	Unusual syndrome	11	0	22	1	33	1
03.05.2002	ANGL	Others	1480	1	5099	18	6579	19
03.05.2002	BLSR	Simple diarrhoea	458	0	1131	0	1589	0
03.05.2002	BLSR	Severe diarrhoea	20	0	68	0	88	0
03.05.2002	BLSR	Dysentery	201	0	632	0	833	0
03.05.2002	BLSR	Jaundice	2	0	3	0	5	0
03.05.2002	BLSR	Sus. Malaria	247	0	1429	0	1676	0
03.05.2002	BLSR	ARTI	617	0	1456	0	2073	0
03.05.2002	BLSR	Measles	1	0	1	0	2	0
03.05.2002	BLSR	NNT	0	0	0	0	0	0
03.05.2002	BLSR	Sus Meningitis	0	0	0	0	0	0
03.05.2002	BLSR	Heat stroke	0	0	3	0	3	0
03.05.2002	BLSR	Unusual syndrome	0	0	0	0	0	0
03.05.2002	BLSR	Others	3397	8	13100	14	16497	22
03.05.2002	BRGR	Simple diarrhoea	388	0	1042	0	1430	0
03.05.2002	BRGR	Severe diarrhoea	75	0	202	0	277	0
03.05.2002	BRGR	Dysentery	159	0	404	0	563	0

Data according to Districts

Orissa State Disease Surveillance Report for the Week ending 03.05.2002

DISTRICT	ANGUL					
	< 5 Years		>= 5 Years		Total	
DISEASE	Cases	Deaths	Cases	Deaths	Cases	Deaths
Simple Diarrhoea	292	0	480	0	772	0
Severe Diarrhoea	45	1	49	0	94	1
Dysentry	142	0	349	0	491	0
Acute Jaundice	18	0	19	0	37	0
Susp. Malaria	719	0	2236	2	2955	2
ARTI	533	0	887	1	1420	1
Measles	10	0	9	0	19	0
NNT	0	0	0	0	0	0
Susp. Meningitis	2	0	0	0	2	0
Heat Stroke	0	0	1	0	1	0
Unusual Severe Synd.	11	0	22	1	33	1
Others	1480	1	5099	18	6579	19
					0	0
Total	**3252**	**2**	**9151**	**22**	**12403**	**24**

DISTRICT		BHADRAK					
		< 5 Years		>= 5 Years		Total	
DISEASE		Cases	Deaths	Cases	Deaths	Cases	Deaths
Simple Diarrhoea		606	0	1070	0	1676	0
Severe Diarrhoea		31	0	82	0	113	0
Dysentry		375	0	818	0	1193	0
Acute Jaundice		0	0	4	0	4	0
Susp. Malaria		304	0	1092	0	1396	0
ARTI		1020	1	2066	0	3086	1
Measles		5	0	1	0	6	0
NNT		0	0	0	0	0	0
Susp. Meningitis		0	0	0	0	0	0
Heat Stroke		0	0	1	0	1	0
Unusual Severe Synd.		0	0	0	0	0	0
Others		3539	5	9544	13	13083	18
						0	0
Total		**5880**	**6**	**14678**	**13**	**20558**	**19**

Data according to Disease

NUMBER OF CASES OF REPORTED DISEASES IN THE DISTRICTS OF ORISSA DURING THE WEEK ENDING 03.05.02:

< 5 YEARS AGE GROUP

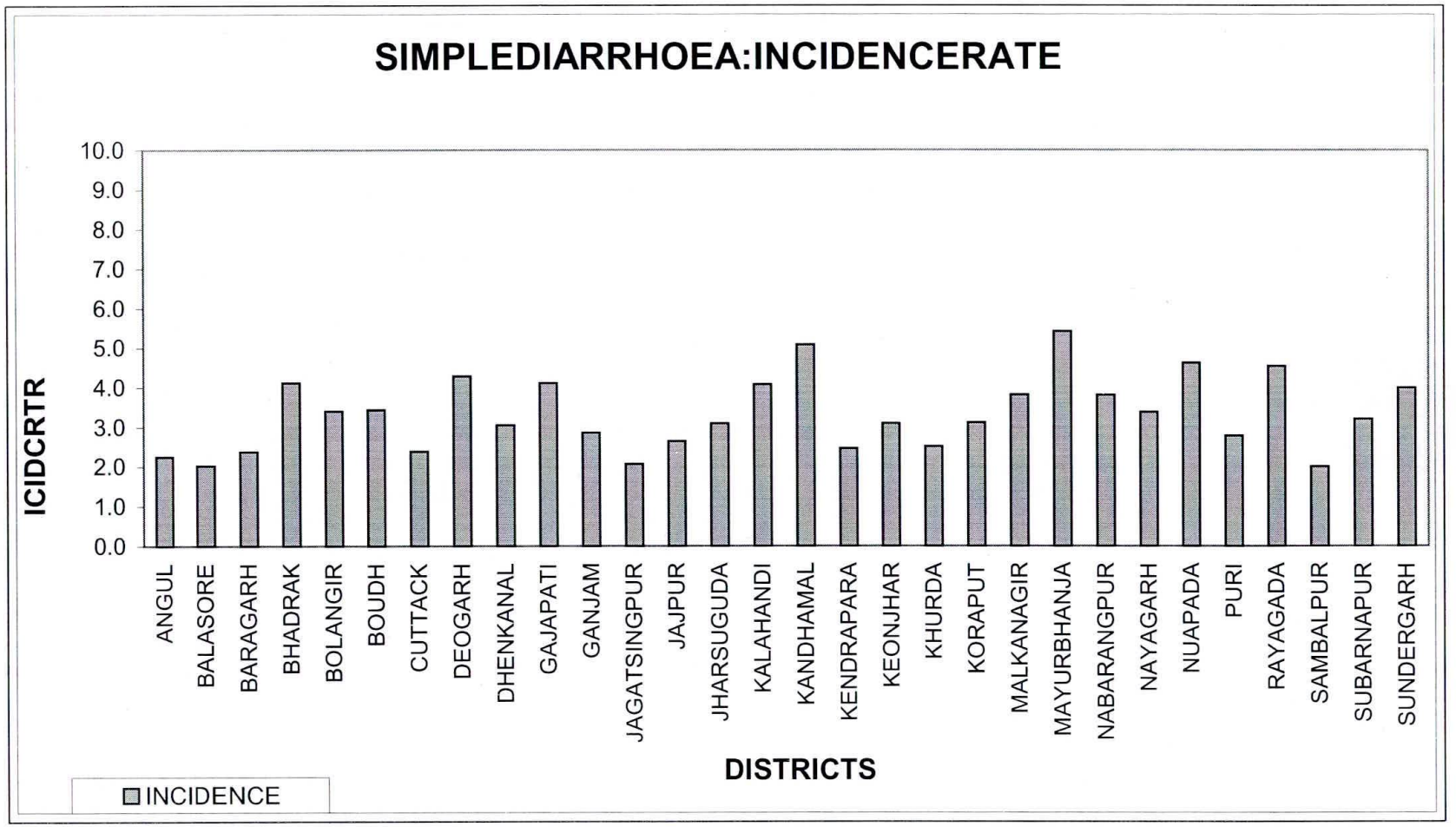
DISEASES >>>>	SIMP DIAR	SEVR DIAR	DYSENT	ACUTE JAUN	SUSP. MALR	ARTI	MSLS	NNT	SUSP. MENI	HEAT STRK	UNSV SYND	OTHR	ALL
DISTRICTS													
ANGUL	292	45	142	18	719	533	10	0	2	0	11	1480	3252
BALASORE	458	20	201	2	247	617	1	0	0	0	0	3397	4943
BARAGARH	388	75	159	3	417	497	3	0	0	0	0	1949	3491
BHADRAK	606	31	375	0	304	1020	5	0	0	0	0	3539	5880
BOLANGIR	567	48	189	11	454	552	1	0	0	0	1	1788	3611
BOUDH	148	3	55	0	208	169	4	0	0	0	0	984	1571
CUTTACK	626	8	335	3	540	1133	5	0	0	0	0	4010	6660
DEOGARH	136	3	29	0	426	145	0	0	0	0	0	560	1299
DHENKANAL	385	14	247	0	600	864	1	0	0	0	0	2741	4852
GAJAPATI	251	13	92	0	361	353	3	0	0	0	0	718	1791
GANJAM	1029	38	466	1	569	1654	1	0	0	0	0	4265	8023
JAGATSINGPUR	279	7	90	0	38	416	3	0	0	0	0	1810	2643
JAJPUR	490	17	211	0	257	1035	0	0	0	0	2	2018	4030
JHARSUGUDA	187	24	45	6	209	378	0	0	0	0	4	908	1761
KORAPUT	435	11	150	0	875	626	2	0	0	0	1	1196	3296
MALKANAGIR	218	5	93	6	281	236	0	0	0	4	0	377	1220
ORISSA TOTAL	13598	681	5459	71	15527	20986	78	1	2	6	29	59349	115787

Incidence rate according to District

INCIDENCE RATE OF REPORTED DISEASES IN THE DISTRICTS OF ORISSA DURING THE WEEK ENDING 03.05.02:
(PER 1000 POP)
< 5 YEARS AGE GROUP

DISEASES >>>> DISTRICTS	SIMP DIAR	SEVR DIAR	BLDY DIAR	ACUTE JAUN	SUSP. MALR	ARTI	MSLS	NEO. TETN	SUSP. MENI	HEAT STRK	UNSV SYND	OTHR
ANGUL	2.24	0.35	1.09	0.14	5.53	4.10	0.08	0.00	0.02	0.00	0.08	11.37
BALASORE	2.03	0.09	0.89	0.01	1.09	2.73	0.00	0.00	0.00	0.00	0.00	15.03
BARAGARH	2.37	0.46	0.97	0.02	2.55	3.04	0.02	0.00	0.00	0.00	0.00	11.92
BHADRAK	4.12	0.21	2.55	0.00	2.07	6.94	0.03	0.00	0.00	0.00	0.00	24.07
BOLANGIR	3.40	0.29	1.13	0.07	2.72	3.31	0.01	0.00	0.00	0.00	0.01	10.73
BOUDH	3.44	0.07	1.28	0.00	4.84	3.93	0.09	0.00	0.00	0.00	0.00	22.88
CUTTACK	2.38	0.03	1.27	0.01	2.05	4.31	0.02	0.00	0.00	0.00	0.00	15.25
DEOGARH	4.29	0.09	0.91	0.00	13.43	4.57	0.00	0.00	0.00	0.00	0.00	17.66
DHENKANAL	3.06	0.11	1.96	0.00	4.76	6.86	0.01	0.00	0.00	0.00	0.00	21.75
GAJAPATI	4.11	0.21	1.51	0.00	5.92	5.79	0.05	0.00	0.00	0.00	0.00	11.77
GANJAM	2.86	0.11	1.29	0.00	1.58	4.59	0.00	0.00	0.00	0.00	0.00	11.85
JAGATSINGPUR	2.07	0.05	0.67	0.00	0.28	3.08	0.02	0.00	0.00	0.00	0.00	13.41
JAJPUR	2.65	0.09	1.14	0.00	1.39	5.59	0.00	0.00	0.00	0.00	0.01	10.91
JHARSUGUDA	3.09	0.40	0.74	0.10	3.46	6.25	0.00	0.00	0.00	0.00	0.07	15.01
KALAHANDI	4.08	0.22	1.23	0.00	3.82	5.05	0.00	0.00	0.00	0.00	0.00	15.78
KORAPUT	3.12	0.08	1.08	0.00	6.27	4.49	0.01	0.00	0.00	0.00	0.01	8.58
MALKANAGIR	3.82	0.09	1.63	0.11	4.92	4.13	0.00	0.00	0.00	0.07	0.00	6.60
ORISSA STATE	3.20	0.16	1.28	0.02	3.65	4.94	0.02	0.00	0.00	0.00	0.01	13.96

Bar graph of Diarrhoea incidence rate in Orissa



OUTBREAKINVESTIGATION,RESPONSE& CONTROL

This section covers

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

WHY AN OUTBREAK HAS TO BE INVESTIGATED?

Analysis of the data reveals 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
- Identify and treat additional cases that have not been reported or recognised
- Collect information and lab specimens for confirming the diagnosis
- Identify the source of infection or cause of the outbreak
- Describe how the disease is transmitted
- Select appropriate response activities to control the outbreak.
- Strengthen preventive activities to prevent future recurrence of the outbreak.
- It is also an excellent opportunity for training of staff.

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).

DETECTING AN OUTBREAK:

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

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 in Box XXX

Box XXX - 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

Rumour register

The rumour register (sample in Annex XXX) 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.

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.

WHO RESPONDS 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 level and the Central level special Rapid Response Teams need to be formed whose prime responsibility is to investigate outbreaks.

The Rapid Response Teams (RRT):

The RRT is a multi faceted team that looks into the various aspects of an outbreak. IA suggested composition of this team is

1. The Epidemiologist - the team leader. Usually with public health training and experience. In districts, this should be a programme manager with public

health experience. It should **not** be the District Surveillance officer as the DSO should be overall in charge and not limited to a specific function.

2. The Clinician - either a physician or a paediatrician who is able to make a clinical diagnosis from the cases. At the district level, this could be the clinician from the District hospital or a Medical college.
3. The Microbiologist - to collect the specimens and to transport it appropriately. Many districts may not have a microbiologist and so a Lab technician may be substituted. Where necessary, the State team should also include an entomologist in the team.
4. Two Health Assistant - his role is to assist the team in the community, do surveys, make community contacts and mobilise the community when necessary. He would also be responsible for organising the logistics.

It is to be noted that the RRT is not a permanent team who are 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. Ideally many staff in each category should be nominated as a RRT member and at the time of an outbreak, the available people should be called to form a truly Rapid response team. The members of this team will be constituted from within the public health sector, but if there are motivated personnel in the private sector or a nearby Medical college, then the District Health Officer may utilise their services.

The main role of the RRT will be to investigate and confirm outbreaks. 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 contol 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 RRT will need some resources to be effective. At the least, they will need

- Training in investigating an outbreak and instituting preliminary control measures
- A dedicated and functioning vehicle so that they are able to visit the site at short notice. Fuel and driver should be also available.
- Drugs so that they can start the preliminary treatment
- Diagnostic reagents and kits for doing preliminary diagnosis
- Reagents to transport the samples
- Effective communication channels between the RRT and the district health authorities.

The names, addresses and telephone numbers of the RRT members should be available with the District 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.

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.**

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.

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. If there is evidence of an outbreak, then next step is initiated.

Step 2 - Sending the RRT

The RRT members should be immediately contacted and a RRT 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 alongwith 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. S/He will advise on what samples are required, mode of collection and method of transportation and also to which lab it has to be sent. S/He will be responsible for the lab confirmation of the outbreak. If the outbreak warrants entomological investigation, this will also be carried out by the microbiologist.

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. He will also recommend prevention and control measures - like provision of safe water supply, reduction in vector density, immunization against further spread of measles, etc. to be implemented by the MO of the peripheral health institution. The detailed steps in the epidemiological investigation are given in Annex XXX:

- Formulation of hypothesis: The RRT will 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

- 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 need any support, then they will request the District to provide the necessary help. Similarly

Call the State or Centre if:

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

- 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 after further analysis. In some cases where the cause cannot be easily identified 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 Box XXX

Box XXX: Investigate or control?

ETIOLOGY	SOURCE / TRANSMISSION: Known	SOURCE / TRANSMISSION: Unknown
Known	**Control +++ Investigate +**	**Control + Investigate +++**
Unknown	**Control +++ Investigate +++**	**Control + Investigate +++**

- 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 XXX.

- 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.

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:

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

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

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 need to be rectified.

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
- Minimising transmission and so further exposure as soon as possible
- Effective case management

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 enrol their help in containing the outbreak.

Health Education: Health education and public awareness and co-operation are important to control an outbreak. Simple key messages for the selected diseases must be made available in the local language and these must be displayed whenever an epidemic occurs or threat persists. Recognition of early features of the disease by the community members and the importance of early treatment for effective management needs to be emphasised. Vigorous IEC activities diffuse the fear and confusion, if any in the community. Household contacts, particularly those sleeping in the same room as the patient, should be warned about the need to obtain immediate medical attention at the first sign of symptoms. Few sample health education messages are shown in annexure XXX

- 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.

- 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.**

- **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.

- **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.

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 XXX and each individual disease is tackled in Chapter XXX.

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 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.

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:
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 XXX

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.

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.

Final report:

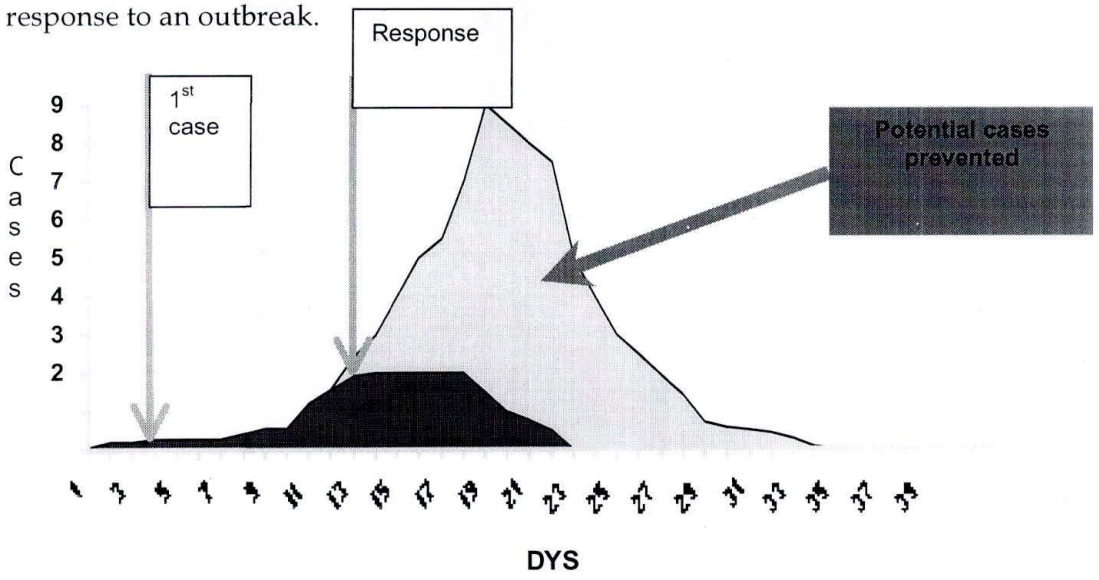
Within one week after the outbreak has ceased (double the incubation period of the disease without a single case) a final outbreak investigation report must be submitted by the local health authorities. This report must be comprehensive and give a complete picture of the multi-factorial causes of the 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.

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.

Box XXX gives the sequence of events if there is a successful investigation of and response to an outbreak.



Annexure XXX

Rumour Register

Record verbal or written information from lay reporters (community representatives, Anganwadi workers, teachers) about suspected outbreaks, rumours, or reports of unexplained events.

Date of notification	Suspected Disease (signs and symptoms if diagnosis is not available)	Location	No. of cases	Date of 1st case	No: of deaths	Treatment centres	Comments

Annexure XXX

LINE LISTING OF CASES

No	Name	Age	Sex	Father's name	Address	Date of onset of illness	SYMPTOMS & SIGNS					Treatment received	Lab reports	OUTCOME	Exposure to risk factor	Comments
							1	2	3	4	5					

Key to the form

No: serial number
Name: of all the suspected cases
Age: if there are small children involved, then better to record the age in months for ALL
Father's name: if identification is a problem through name only
Address: as detailed as possible so that later there is no problem while mapping
Date of onset of symptoms: as accurate as possible as this gives an idea of the incubation period.
Symptoms and signs: list the common symptoms and signs in each column. It should be filled as yes and no
Treatment received: the details as well as the place at which it was received. Details include the medicines received
Lab reports: the details as and when they are available. Till then, the samples taken should be filled into this column
Outcome: whether the person is alive and well or whether the person is dead or whether the person is still sick
Exposure to risk factors: Initially this may not be clear, but as risk factors are identified, exposure to them needs to be checked. This may necessitate going back to the initial cases and checking.
Comments: any comments related to the outbreak

Annexure XXX

SAMPLE MESSAGES FOR HEALTH EDUCATION

Message:

ARE YOU PROTECTED FROM DYSENTERY (blood diarrhoea)?
Washing you hands protects yourself and other from disease.

Always wash:
- After defecation
- After cleaning a child who has defecated
- After disposing of a child's stool
- Before and after eating
- Before preparing of handling food

Message:

ARE YOU READY FOR HAND WASHING?

Do you have:
- Clean water
- Soap (or if you do not have soap, use ash or earth to scrub your hand)
- Clean cloth for drying

Message:

DO YOU PREPARE FOOD SAFELY?

Cooking kills germs:
- Thoroughly cook all meats, fish and vegetables
- Eat cooked meats, fish and vegetables while they are hot

Washing protects from disease:
- Wash you *hands* before preparing or serving food
- Wash your *dishes and utensils* with soap and water
- Wash your *cutting board* especially well with soap

Peeling protects from disease:
- Only eat fruits that have been freshly peeled (such as bananas and oranges)

KEEP IT CLEAN: COOK IT, PEEL IT, OR LEAVE IT.

17. Stock position

Sr. No.	Name of the medicine	Stock
1	Furazolidine	
2.	Tetracycline	
3.	O.R.S. packets	
4.	Ringer's lactate	
5	I.V. Normal saline	
6	IV sets	
7	Bleaching Powder	
8	Halogen tablets	
9	Tab. Co-trimoxazole	

18. Information of control measures :

Sr. No.	Control Measures	Action taken
1	Place of the treatment	
2	Names/s of the attending staff	
3	If isolation ward is opened, please mention date of opening and place where opened	
4	Date of starting active surveillance	
5	Name/s and designation/s of the staff involved in the active surveillance	
6	Date-wise information of the patients detected in Active surveillance along with population surveyed	
7	Date-wise water sample collection after beginning of the outbreak	

Signing Authority

Age - sex distribution of the cases and deaths.

Age Group	Male		Female		Total	
	Attacks	Death	Attacks	Death	Attacks	Deaths
0 to 1						
2 to 5						
6 to 14						
Above 15 Yrs.						
Total						

Dates of visits to the affected town in the previous month before the outbreak

M.P.W. (Male)	A.N.M.	Health Assistant		M.O.
		Male	Female	

Information of any outbreak reported within last one year from the same town / village

Type of outbreak	Duration	Attacks	Deaths	Cause of outbreak

Information of water sources in the affected town / village

Sr. No.	Type of water supply	In the affected area	In the remaining part of the town / village
1.	Water Supply scheme		
2.	Public Wells		
3.	Private Wells		
4.	Bore-wells		
5.	Lakes		

6.	River / springs		
7.	Others		

Information of water examination in the preceding month

Date	Sample tested	Samples contaminated	Action taken

- Name and designation of the person responsible for water dis-infection
- Water dis-infection is regularly done by Grampanchayat (Yes / No)
- Water dis-infecttion was done for 8 days prior to the date of onset of outbreak (Yes / No)

Stock of Medicine

Sr. No.	Name of the medicine	Stock available on the first day of the outbreak	District level supply during the outbreak
1.	I.V. Ringer's lactate		
2.	I.V. Normal saline		
3.	Tab. Furazolidine		
4.	Cap. Tetracyline		
5.	Cap. Ampicillin		
6.	Tab. Paracetamol		
7.	Tab. Co-trimoxazole		
8.	O.R.S. Packets		
9.	Bleaching Powder (Kg.)		
10.	Liq. Chlorine		
11.	C.B. Media		

Formato.2

Detailedinformationoftheoutbreak(InformationandVisits)

Nameofthe placeinforming theoutbreak	Whogavethe informationand how	Dateof information	Datesofvisit		
			Medicalofficer	Districtlevel officer	Stateleveloffícer
PrimaryHealth Center					
DistrictHealth Office					
StateHealth officer					
Others					

-Reason-

Causeoftheoutbreak(Detailinformationofthereasons ofwatercontamination)	MeasurestakenforPortablewatersupply(Repairsto leakages/valves,waterdis-infection,useoftankersfor portablewatersupply)

Signature

Formato.3
InformationofLaboratoryxamination

Date	WaterSamples		StoolSamples		Bloodsamples		OtherSamples		Informationof contaminatedstool samples		
	Tested	Contam-inated	Tested	Contam-inated	Tested	Contam-inated	Tested	Contam-inated	Vibrio Cholerae	Non-0-1	Total

Signature

Formato.4

Spotmapoftheaffectedtown

Formato.5

Informationofactivesearchforcasesandmanagement

Date-wisereportingof cases		*Isolation ward / Special ward / Treatment ward*					
Date	Cases	Placeoftheward		Duration	InformationofthePatients		Total
					O.P.D.	I.P.D.	
		Information of case distribution according to treatment center					
		Isolation ward	P.H.C.	C.H.C.	District Hosp.	Private Practitioner	No treatment
		TotalNo.ofcontacttreatment			Detailsofthetreatment		

Formato.6

DetailInformationofthepatients

Sr.No.	Nameofthe Patient	Age	Sex	Dateof onsetof illness	Dateof recovery	Dateof Death	Placeofthe treatment

Signature

Format No. 7

Report of Dealth Investigation

1. Name of the diseased :
2. Age : Sex :
3. Complete address :
4. Symptom :
5. Date of onset illness :
6. Treatment received from whom and where :
7. If admitted, and date and time of admission :
8. Date and time of onset of treatment :
9. Condition of the patient at the time of the admission :
10. Details of the treatment :
11. Date and time of death :
12. Place of death (Home / Hosp, etc.) :
13. Whether stool sample was taken ? :
    (If yes, result)
14. Medical Officer's opinion :

Signature

15. District Health Officer's opinion :

Signature

Format No. 7

Detail Information on the patient

Sr. No.	Nameof thePatient	Age	Sex	Dateof onsetof illness	Dateof recovery	Dateof Death	Placeof the treatment

Signature

DETAILS OF INVESTIGATION

- **Description of the** existing cases in terms of person, place and time. That is - who is affected (age, sex, occupation etc), where do the affected people stay and when did they get affected.
- Based on this **a working case definition is developed** e.g. During an outbreak investigation in Bangladesh, the following case definition was made

  "Anybody with fever and cough / vomiting / reduced consciousness between the 15th of April and the 30th of May 2001"

  Ideally a case definition initially must be sensitive enough to pick up as many cases as possible that remotely resemble a true case. So initially there may be many false positives. This can be later pruned to identify the true positives. Initially the case definition will be of 'suspect' category, as the investigation progresses, the case definition maybe further refined to probable and even confirmed category.
- **Active search for all cases** in the community using this case definition. The search should include health institutions (private and public), laboratories as well as active search in the community.

Active Case Search:

The team will perform a quick house-to-house search by enquiring from the community and attempt to identify additional cases. They would require to cover the entire village or at least the surrounding 300 households, if the village is too large. They will also make enquiries from all the surrounding health facilities (medical shops, nursing homes, practitioners of all systems of medicine, etc) institutions and laboratories to identify cases that were missed. During the period of the outbreak, all the cases of the disease under consideration occurring in that area should be identified and listed. This may include visits or telephone calls to the medical facilities or private practitioners that might expect to admit or attend cases of the disease. Active surveillance through peripheral health personnel from other government departments, NGO's and key community representatives provides additional information about cases that may not have been seen at govt. health facilities. Valuable information can be obtained by contacting key community representatives.

- **A line listing** should be made of all the cases identified (annexure XXX). The list basically contains information about the patient's identification, date of onset of illness, important signs and symptoms, lab samples taken and its details, the outcome of the illness and exposure to any relevant risk factors. In the event of a

Vaccine preventable disease, immunisation status is important. It is the database on which the epidemiological diagnosis is made.

- **Analysis of the line listing** helps in describing the outbreak in further detail. Usually one describes the outbreak in terms of person - place and time. This is described in detail in Section 2 but mentioned briefly here.

  Distribution by Person: Cases should be described in terms of age, sex, caste, occupation, socio-economic status, migration, immunisation history, etc. It is usually sufficient to group cases by age groups- 0-11 months,1-4 years, 5-14 years, 15-44 years and 45 years and above. Other groupings can also be done depending on the disease and the age group involved. While preparing tables the population characteristics should be grouped accordingly (e.g. age and sex). This would give an idea of who are the high risk groups, whether it is the children, whether it is women, whether it is people belonging to a particular community, whether it is people who rear pigs etc. E.g. in an outbreak in Siliguri, one of the risk factors discovered was a visit to a nearby nursing home.

  Distribution by Time: The onset of illness of the cases should be graphed by hours, days, weeks or months, as appropriate. This is commonly referred to as an epidemic curve. The curve helps in identifying the index (first) case, in calculating an approximate incubation period and may even suggest patterns or modes of transmission. It also documents the trend of the epidemic and helps to monitor the effectiveness of the containment measures. While analysing, also look into the time lag at each level, between the date of onset and the date of detection, the declaration of an outbreak, the initiation of response mechanism and the last case. This will give an idea about the effectiveness of the surveillance and response system.

  Distribution by Place: A spot map of the area (even a rough sketch) should be drawn to show where each case resides to indicate geographical distribution of cases and to identify high-risk pockets (showing clustering in space). In some situations serial spot maps by week or by month, may provide insight into the pattern of spread of disease over time. It also helps to identify the source of the infection.

  Calculation of Attack rate and Case Fatality Ratio: these indicators give an idea of the virulence of the agent, its spread and also is an indication of the effectiveness of the control measures. In areas where the health services are effective, attack rates are low and so is Case fatality.

Attack rate = No: of new cases during that outbreak X 1000
Total number of susceptibles to that disease

Case fatality ratio = No: of patients who died due to the disease X 100
Total no: of patients suffering from that disease.

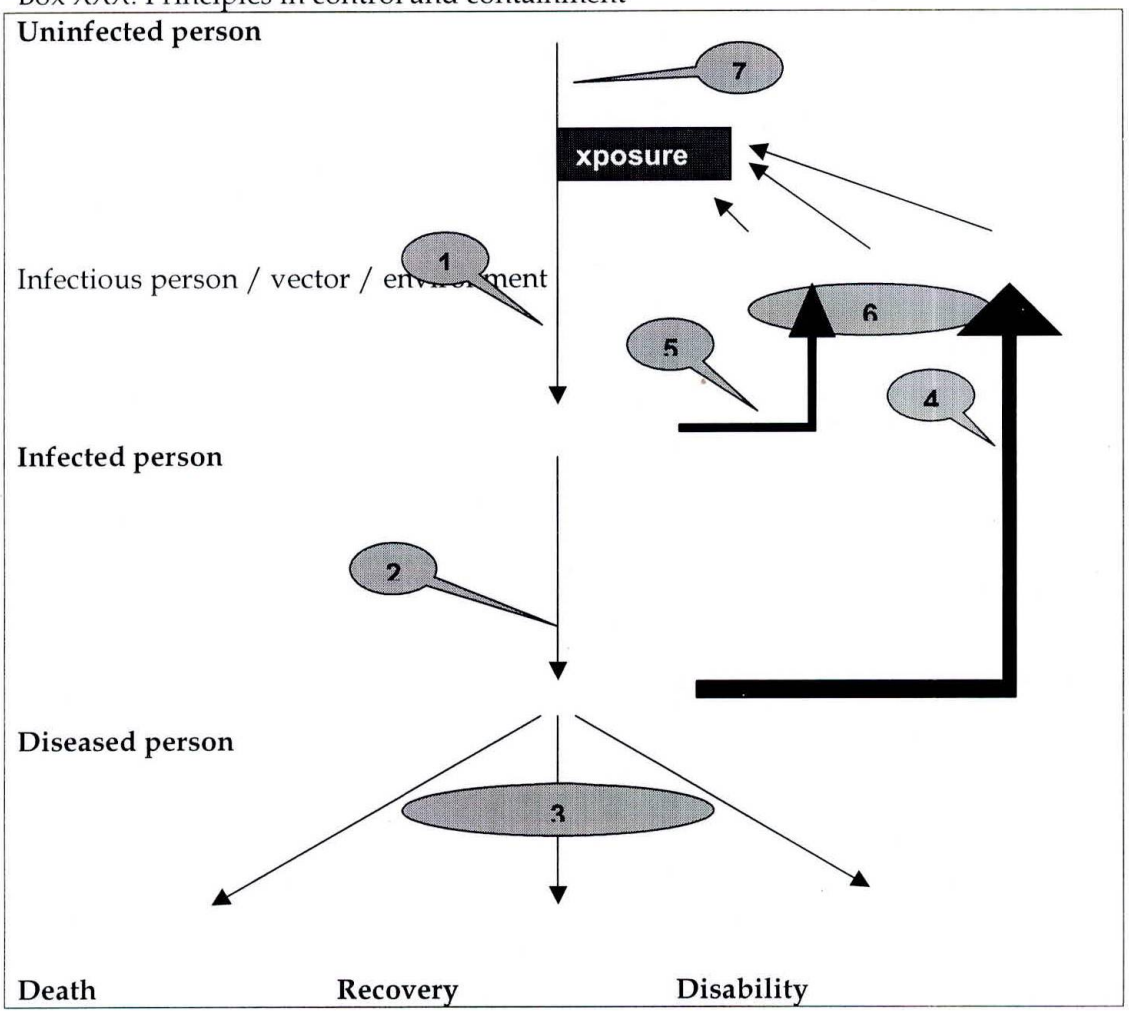
- Make an epidemiological diagnosis based on the analysis. This diagnosis should keep in mind the locale, the prevalence of the disease in the region, the natural history of the disease and the conditions that exist. At the end, one should have answers to the following questions:

Description of Environmental Conditions: The study of environmental conditions and the dynamics of it's interaction with the population and causative agents will help in the formulation of the hypothesis on genesis of the epidemic, which will be the basis for control measures to be taken. Data on rainfall, humidity, and temperature must be immediately accessed from the meteorological department. Information about recent floods, drought, earthquakes, cyclone also needs to be collected. Information on sources of drinking water and environmental sanitation is also vital.

Laboratory Investigations: Lab investigations are vital for confirming the diagnosis of the cases. Results of lab investigations should be included in the outbreak investigation. Results of some tests would be available locally and should be included (water testing, microscopy, etc), Other tests will have to be carried out at the district (either District Lab or selected Private lab/ Microbiology department of Medical college). Differentiation of strains would be done at the regional lab. Details are covered in Section 4.

Entomological Investigations: Where an outbreak is suspected due to a vector borne disease entomological investigations are vital. The entomologist would look at all the likely water collections (natural and artificial) for larvae and also carry out catching of adult mosquitoes for identification of the species. Various mosquito indices will be calculated to give an indication of the vector involved, vector density and vector bionomics. High vector density is a warning signal for outbreaks and vigorous control measures would be required to control the outbreak. Vector surveillance should continue even after the epidemic has been controlled.

Box XXX: Principles in control and containment



Depending on the disease, the most effective specific measures are instituted.

No:1, 2 - Strengthen the host

The various steps under this heading are:

1. Immunisation to protect the susceptible from being infected, e.g. in measles, ring immunisation protects the susceptibles and prevents further new cases from developing.
2. Chemoprophylaxis is also a measure that is commonly used to protect the vulnerable. In meningitis, rifampicin is used to protect the exposed from developing disease.

These measures prevent the susceptible from being infected or diseased

No: 3 - Prevention of mortality and disability.

The various steps under this are

1. Effective Treatment e.g. effective treatment of typhoid will prevent deaths
2. Rehabilitation e.g. early rehabilitation will minimise disability in polio

These measures prevent death and disability.

No: 4 and 5 - Control the source of pathogen

The various steps under this heading are

1. Early detection and treatment as in TB
2. Isolate or treat the infected person e.g. in measles or in typhoid

These measures reduce the possibility of further transmission

No: 6 and 7 - Interrupt transmission

The various steps under this are

1. Interrupt environmental transmission – e.g. replace the infected water source
2. Control vector transmission – e.g. vector control
3. Improve personal sanitation – e.g. hand washing by food handlers
4. Personal protection e.g. bed nets

This will also prevent the uninfected from being exposed.

SPECIMENCOLLECTIONANDTRANSPORTATION

Thissectioncovers

- Teststhatshouldbeconductedatvariouslaboratories
- Collection,PreservationandTransportationofspecimen

INTRODUCTION

Confirming diagnosis of communicable diseases is an essential component of disease surveillance. The lab results are used to accurately diagnose the patient so that appropriate therapy can be given, as well as verify the cause of suspected outbreaks.

NETWORKING OF LABORATORIES

The peripheral labs are located at the point of first major contact of patients with the healthcare services. These are available at primary health centres (upgraded) / Community health centres. These labs are capable of only carrying out basic microscopic diagnostic tests like blood slides for malaria parasite or AFB in sputum and usually have a single lab technician.

The district labs are expected to undertake tests of public health as well as clinical relevance. Tests for confirmation of epidemic prone diseases and also water quality testing are carried out at these labs. The district lab should be able to perform the tests listed in Box 4.1 for effective surveillance. If the tests mentioned in the box are not available at the district laboratories then arrangements need to be made with the nearest microbiology department of the medical colleges or private laboratories. In the meantime the district lab should be upgraded so that the listed tests may be performed. List of reference laboratories should be available at all health facilities so that they are aware of how and where to send the required samples for lab confirmation. Modalities of reimbursement of expenses incurred for carrying out testing of samples received from the field needs to be worked out.

The regional labs are usually located at the state headquarters and are able to confirm the diagnosis from the lower level labs as well as conduct sero-typing and strain identification. Where possible, use of the medical and private sector labs should also be used so that reference labs are available as close as possible to the outbreaks and minimum time is lost in transportation.

It should be ensured that the labs at all levels provide results which are reliable, sensitive, specific, rapid, easy to perform and cost effective.

The lab specimens should arrive in the lab in good condition. Specimens should be collected safely, stored in appropriate media, and kept within a specific temperature range. The reference chart (annexure 4.1) lists the recommended tests for the selected diseases and contains information about:

- The diagnostic test for confirming the disease
- The specimen to be collected
- When to collect the specimen
- How to prepare, store and transport it
- When to expect the results

BOX 4.1: LABORATORY CONFIRMATION

The district laboratory should be able to perform the following confirmatory tests:

1. Bacteriological culture of stool
   - Cholera (including sero-typing)
   - Acute Diarrhoeal Diseases
   - Dysentery
2. Confirmatory testing of blood slides for Malaria.
3. Estimation of serum bilirubin and Alanine amino-transferase (ALT) for Acute Viral Hepatitis and further typing of types A to E.
4. Rapid diagnosis by detecting elevated serum antibody titres (IgG or IgM, by ELISA or non -ELISA) in
   Measles
   Japanese Encephalitis
   Dengue Fever
5. Water quality Testing

COLLECTION, STORAGE AND TRANSPORTATION OF SPECIMENS

For labs to be effective, the appropriate specimens must reach them safely and in good condition. This implies that the correct sample should be collected and transported to the correct lab. This matching of specimen and lab is very important, else much time is wasted and sometimes even precious specimens have to be discarded for want of correct handling.

In Keonjhar – Orissa, there were 5 children who died under mysterious conditions in 2000. The MO of the local PHC finally did an autopsy of the 5th child and sent the organs to the District Hospital in too little formalin. This meant that chemical analysis of the organs could not be done. Worse the District Hospital did not know what to do with the samples and left it in a corner, leading to many days delay. And finally this was important as the provisional diagnosis by a special team from the State capital was 'Homicidal poisoning'. And by the time the organs were discovered and sent to the Capital, they had undergone putrefaction and could not be analysed.

Specimen collection:
Specimens obtained in the acute phase of the disease, preferably prior to administration of anti-microbial drugs, are more likely to yield detectable concentrations of antibody, antigen or infective pathogen. Before specimen collection the procedure should be explained to the patient and relatives. Avoid contamination and take sufficient quantity of material. Appropriate precautions for safety during collection and processing of samples should be done so as to protect the collector. Lab specimens required for selected diseases are given in annexure 4.1

For stool samples, the health worker should collect a specimen of stool. If this is not readily available, then a rectal swab will suffice. The specimen is then placed in a cold box and transported to the lab as soon as possible (using reverse cold chain as in AFP surveillance).

Blood slides can be prepared by the health worker, and other blood samples can be taken by the MO/Lab technician/health worker at the peripheral health facility.

Labelling and identification of specimens:

The lab form should be filled and accompany every sample collected. The collecting person could give each patient a unique ID number. This No. should be a link between the specimen the patient, the line list and the lab result and used as a common reference.

Label specimen container /slide: Every specimen has to be properly labelled and permanently affixed to the container/slide. It should contain the

- Patient's name
- Unique ID number
- Specimen type, date, time and place of collection.
- Name/ initials of collector.

Storage of specimens: To preserve bacterial or viral viability in specimens for microbiological culture or inoculation, they should be placed in appropriate media and stored at recommended temperatures. These conditions must be preserved through out transport to the laboratory and will vary according to transportation time.

Transportation

The specimen needs to be transported to the nearest lab for processing and diagnosis. Each specimen has a separate technique as is given in Annex 4.1
The important principle to be remembered while transporting samples where biological agents are the probable causative agent is to maintain the cold chain.

Processing

??? Should one get into this here???

CONCLUSIONS

The lab component is important for confirmation of the diagnosis. This helps the public health managers in taking the necessary corrective action with confidence. It is not necessary to collect specimen from all cases, as it is not essential for the outcome of outbreak investigations and control measures. Collection of samples is only required to establish the diagnosis and hence after that is established only a few samples a day could be collected for identifying the end of the epidemic. Avoid placing a heavy load on the laboratory.

Annexure 4.1

SPECIMENS FOR LAB CONFIRMATION FOR SELECTED DISEASES

Suspect disease	Diagnostic test	Specimen	How to prepare, store & transport	Results	Send specimen to
Cholera	Isolate Vibrio cholerae from stool culture and determine O1 and O139 serotypes using polyvalent antisera for Vibrio cholerae.	Fresh stool specimen or rectal swab. Collect stool sample from the first suspected cholera case. If more than one suspected case collect from 5-10 cases. Collect stool from patients fitting the suspect definition and • Onset within last 5 days • Before antibiotics treatment has started. Specimens can be collected after rehydration.	Place specimen in a clean leak proof container and transport to lab within 2 hours. If more than 2-hour delay is expected then place in Cary-Blair transport medium. If Cary Blair not available transport under refrigeration (4-8 C).	Culture results usually take 2-4 days. Cary Blair medium is stable for up to one year and does not require refrigeration if kept in a properly sealed container.	The District lab.
Dysentery	Isolate shigella dysenterae type 1 (SD1) from stool culture to confirm outbreak. If SD1 is confirmed perform	Stool or rectal swab Collect sample from 5-10 patients of the suspected case having bloody diarrhoea.	Collect stool in a dry container (do not contaminate with urine) select portions with blood and mucus. Transport in	Culture results available 2-4 days. SD1 isolates should be characterised by antibiotic sensitivity tests.	The District lab

	antibiotic sensitivity tests for appropriate antibiotic.	• Onset within last 4 days • Before antibiotic treatment started	Cary-Blair medium or under refrigeration. .		
Acute Diarrhoeal Diseases (in cases above 5 years of age)	Isolate causative agent from stool culture to confirm outbreak.	Stool or rectal swab Collect sample from 5-10 patients of the suspected case having diarrhoea. • Onset within last 4 days • Before antibiotic treatment started	Collect stool in a dry container (do not contaminate with urine). Transport in Cary-Blair medium or under refrigeration. .	Culture results available 2-4 days.	The District lab
Malaria	Presence of malarial parasites in blood films for suspected cases	Blood Blood smear from all suspected cases	Collect blood directly onto clean and labelled microscopy slides and prepare thick and thin smears. • Allow smears to dry thoroughly • Stain using the appropriate stain and technique • Store stained and dried slides at room temperature out of direct sunlight.	Thick and thin smear results can be available within a few hours. Microscopic examination of malarial slides would reveal the malarial parasites (trophozoites and /or gametocytes stage)	The PHC / District lab
Dengue fever/DHF/DSS	4 fold increase in IgM and IgG antibodies against dengue	Whole blood or blood clot, serum or plasma Collect specimens	Refrigerate serum or clot	Results are usually available within one day.	The District / Medical College / Reference lab.

	viruses in serum	from 5-10 suspected cases			
Japanese encephalitis	4 fold increase in IgM and IgG antibodies against JE viruses in serum	Whole blood or blood clot, serum or plasma Collect specimens from 5-10 suspected cases	Refrigerate serum or clot	Results are usually available within one day.	The District / Medical College / Reference lab.
Measles	Presence of IgM antibodies to measles virus in serum.	Serum Collect blood samples on 5 suspected measles cases	For children collect 1-5 ml of venous blood depending on size of child. Collect into a test tube or capillary tube. Separate blood cells from serum: • Let clot retract for 30-60 minutes at room temperature. Centrifuge at 2000 rpm for 10-20 minutes and pour off serum into a clean glass tube. • If no centrifuge, put sample in refrigerator overnight (4-6 hours) until clot retracts. Pour off serum next morning. Transport serum	The specimen should arrive at the lab within 3 days after collection. Results are usually available within one day. Avoid shaking of specimen before serum has been collected. To prevent bacterial overgrowth use clean test tube (sterile tube not required) and transport in vaccine carrier.	The Reference lab

			samples in a leak proof container preferably at 4 C.		
Acute Hepatitis	s. bilirubin IgM antibodies against Hepatitis A - E	Whole blood or blood clot, serum or plasma Collect specimens from 5-10 suspected cases	Refrigerate serum or clot	Results are usually available within one day.	The District / Medical College / Reference lab.

MONITORINGANDSUPERVISION

Thissectioncovers

- **Supervisionofasurveillancesystem**
- **Monitoringsurveillanceactivitiesatalllevels**

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.

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.

Weekly indicators

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

- Timeliness of reports
- Completeness of reports
-

These are already dealt with in Section 2.

The above 2 indicators will apply for all the levels e.g. the PHC MO can monitor whether all his 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.

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

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

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:

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 EITs
- Percentage of districts with functional labs

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

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.

More examples of the indicators are given in 6.2,6.3 & 6.4
Performance indicators should be fed back to the local staff so that the quality of surveillance in areas performing poorly could be improved.

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.

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.

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 6.1 & 6.5. 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.

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.

Annexure 6.1

Checklist for supervising surveillance and response activities at the health facility

Health facility: Date of Supervisory visit:

Activity	Supervisory question	Answer	Comment
Identify suspected cases	How often do you collect information from the community about reports of suspected cases or deaths due to a selected disease?	----------	
Register cases	Are diagnoses of cases of selected diseases recorded in the clinical registers according to the standard case definitions?	Yes No	
Report	Do health staff use a standard case definition to report the suspected cases and outbreaks? Do you record information about large No. of cases of a selected disease on a case form or line list and report immediately?	Yes No Yes No	
Analyse and interpret	Do you plot the No. of cases and deaths for each selected disease on a graph? (check) Do you plot the distribution of cases on a spot map?(check)	Yes No Yes No	
Investigate and confirm reported cases and outbreaks	If an epidemic -prone disease was suspected, was it reported immediately to the district office? For the cases of selected diseases needing lab results (seen since the last visit) how many had lab results? Are appropriate supplies available for collecting lab specimens during an outbreak (check availability)	Yes No No. of results obtained/ expected	

		Yes No	
Respond	Are appropriate supplies available for responding to a confirmed case or outbreak? (Check supplies for recommended response.) Who is the outbreak co-ordinator for this facility? Is he aware of his responsibilities & role during outbreak? How often do you provide on-the- job training in outbreak response to staff of this facility?	Yes No Name Designation	
Provide feedback	How often do you report information to the community? Do you receive the quarterly surveillance bulletin? (check)	Report it---------- Yes No	
Evaluate and improve the system	Were the last 3 routine weekly reports sent to the district office, and whether on time?	Yes No	
Epidemic preparedness	What precautions do health staff (incl lab staff) take routinely while handling infectious cases? How do you estimate the amount of supplies required during an outbreak?	Minimum level of standard precautions------ ---------- How supplies are estimated:----------	

Annexure 6.2

Indicators for monitoring the quality of surveillance activities at district level (Performed by SSO)

(To evaluate the quality of surveillance functions listed in column 1 below, regularly monitor and observe the progress for the following indicators listed in column 2. When comparing several health facilities at the same level of the health system, use proportion or rates.)

For this surveillance function:	**Regularly monitor the number of districts that:**
Maintain readiness for epidemic response	• Have the District Surveillance Officers Effectively implemented the IDSP and are familiar with the plan for outbreak response. • Have kept in reserve emergency stocks of drugs and supplies for expected outbreaks. • Have earmarked special funds from the district for outbreak response. • Have a team trained to conduct an outbreak investigation.
Identify suspected cases	• Have been effectively co-ordinating surveillance activities. • Have the review of case registers, logs, rumour register, lab results, etc of reporting units and labs been done on a regular basis.
Investigate and confirm reported outbreaks	• Investigated all reported outbreaks during the last one year (list them). • Identified all the labs within the district that have the capacity to confirm suspected cases of the selected diseases (how many actual cases confirmed). • Confirmed the selected diseases within a reasonable time. • Able to demonstrate safe handling, packaging, storing, and transport of specimens from the periphery to the higher level lab.
Report data	• Have all RU's in the district reliable supply of recommended formats at all times, over the last six months. • Submitted all required reports to the next highest level, complete and on time, during the last 6 months.
Analyse data	• Analysed outbreak data by time, place and person. • Performed trend analysis by health facility as well as at the district level. • Have the threshold levels for each selected disease and a defined response action for each level been explained to all health staff and being followed.

Response	• Responded within 24 hours of confirming the case. • Met with community about their health problems at least once every 6 months • Kept the CFR within the acceptable limits during the recent outbreaks
Provide feedback	• Prepared and disseminated a written report of surveillance information at least quarterly during the last year to the reporting units. • Received from a higher level written report or bulletin containing information which the district reported during the last year. • Provided feedback to the community.
Supervision	• No. of health facilities that were visited by the DSO during the last 6 months and observations/ comments/ recommendations made.
Training	• No. of health personnel in the district that were trained in any surveillance activity during the last year.
Resource and personnel	No. of districts with: • Transportation and logistic support (vehicle or POL/allowance). • Supplies for carrying out data management (computers, Fax, statistical package, software, etc). • IEC materials (including VCR &TV). • Human resources (trained epidemiologist, microbiologist, lab techs, etc available in the district).

Annexure 6.3

District level indicators for monitoring quality of surveillance and response at the health facility (Performed by the DSO).

Function of surveillance	**Indicator: Regularly monitor the No. of reporting units that;**
Identify and record suspected cases	• Have and maintain a clinical register as per the case definitions. • Correctly record information in the register.
Confirm suspected cases	• Have access to a functioning lab that can reliably process specimens for confirming diagnosis of selected diseases. • Safely collect and properly package specimens for transport to higher level lab. • Submit specimens of selected diseases for confirmation in a timely way.
Review and analyse data	• Keep up-to-date trends for each selected disease. • Have been able to detect an outbreak. • Are familiar with the action threshold for each selected disease.
Report data	• Report number/case-based information for selected diseases. • Have a reliable supply of reporting formats. • Accurately record case register data on summary report forms. • Submitted reports on time during last 3 months. • Submitted the required No. of reports during last 3 months.
Response to outbreak	• Used local information to conduct community disease prevention and control activity during the last 12 months. • Implemented prevention and control measures based on local data for at least one outbreak/ disease.

Provide feedback	• Received a bulletin or report from district about data which the health facility reported to higher level during the year. • Met with community members to discuss investigation results during the last 6 months.
Maintain readiness for epidemic response	• Use standard case management protocols for selected diseases. • Use a minimum level of standard precautions with all infectious cases. • Maintains an emergency stock of drugs for outbreaks.
Supervision	• Used a supervision checklist for surveillance during at least one supervisory visit in last 6 months.
Training	• Conducted training for health staff on any aspects of surveillance.
Resources	• Have reliable transport with fuel. • Have access to reliable communications. • Have supplies for carrying out outbreak investigations. • Have funds for outbreak response.

Annexure 6.4

Process, Performance & Impact Indicators for monitoring of IDSP at the state level

Process indicators

1. No. of block level institutions strengthened with electronic connectivity every year.
2. No. of District level institutions strengthened with electronic connectivity every year.
3. No. of regional medical colleges strengthened with electronic connectivity every year.
4. Development of training material for PHC/Block/district./state/private sector.
5. No. of labs strengthened PHC/block/district/state.
6. No. of institutions provided with printed formats and registers at sub centre/PHC/Block/district/state/private sector.
7. IEC material development.
8. No. of PHC's connected with telephone.
9. No. of districts with EIT activity.
10. No. of municipal corporations strengthened.

Performance indicators

1. No. of village link workers reporting weekly/monthly surveillance data.
2. No. of sub centres /PHC/Blocks reporting in printed format.
3. No. of blocks/districts/regional medical colleges submitting monthly computerised analysis.
4. No. of epidemics reported within 24 hours.
5. No. of epidemics reported by village link workers/health personnel/private sector/community.
6. No. of epidemics investigated by district EIT every year.
7. No. of epidemics investigated by state EIT every year.
8. No. of selected diseases reported.
9. No. of diseases confirmed by lab investigation.
10. No. of PHC's/blocks/regions identifying early warning signals.

11. No. of meetings of technical/administrative committees organised every year state/district/corporation/blocks.
12. No. of bulletins published every year.
13. No. of circulars on surveillance issued by state /district/block/PHC every year.
14. No. of field surveys conducted in a year.

Impact indicators

1. Morbidity and mortality of selected communicable diseases.
2. Morbidity and mortality of other communicable diseases.
3. Morbidity and mortality of non-communicable diseases.
4. Percent population affected by high risk factors.
5. No. of epidemics suspected with the help of weekly/monthly monitoring.
6. Time lag between reporting system sub centre/PHC /block/district/state.
7. Yearly epidemic analysis block/district/state.
8. Time lag between information and action during epidemic sub centre/PHC/block/district/state.
9. Completeness of reporting weekly/monthly/epidemic.
10. Community awareness about early warning signals, selected diseases and containment measures.

Key Areas to be monitored at various levels

	State	**District**	**Hospital**	*PHC*	**SC**
Legislation					
Mechanism to implement it					
Focal point for Surveillance					
Is there a budget for surveillance					
Operational manuals					
Response manuals					
Case management manuals					
Case definitions					
Is the case definitions being used					
Register for case detection					
Training of the staff					
%age of MOs trained					
%age of PMWs trained					
%age of lab technicians trained					
Lab facilities available					
Tests done at the Labs					
Capacity to collect lab samples					
Lab guidelines for collection and transportation					
Transport media available					
Reporting forms					

%age of weeks that forms were not available					
Use of software for data entry					
Freq of reporting					
Mechanism of reporting					
Percentage of reports received in the past 3 months					
Percentage of reports received on time in the past 3 months					
Is the data analysed by person					
Is the data analysed by time					
Is there trend analysis					
Is there an action threshold defined for each disease					
Are there denominators					
Are denominators used					
Use of software for data analysis					
%age of suspected outbreaks investigated in the past one year					
Avg time lag between notification and response.					
Of those investigated, %age where the risk factor was identified					
Of those investigated, %age where the info was used to improve the system.					
Is there a plan for epidemic preparedness & response					

Availability of a EIT					
Vehicle for EIT					
Availability of drugs and supplies at all times of the year					
Availability of a budget line for epidemic response					
Availability of an Epidemic cell					
Any evaluation of the response					
Acceptable CFRs					
Feedback					
Newsletter					
No: of Visits of supervisors in the past 6 months					
Availability of a computer					
Availability of internet facilities					
Availability of fax					
Availability of phone line					

This section covers

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

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.

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.

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

- Newsletters
- Monthly review meetings
- Reports

- Informal feedback

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.

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 may be a demotivator.

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.

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.

CONCLUSIONS

Feedback is an important and often neglected aspect of surveillance and needs to be built up.

DISEASE-WISE SUMMARIES

CASE DEFINITION

Clinical case description:
Any person with:

- **Fever** and
- **Maculopapular rash,** and
- **Cough, coryza or conjunctivitis**

Laboratory criteria for diagnosis:

- **At least a fourfold increase in antibody titre** or
- **Isolation of measles virus** or
- **Presence of measles specific IgM antibodies.**

Case classification

Suspect case**: A case that meets the clinical case definition.**
Probable case**: Not applicable**
Confirmed case[1]**: A case that meets the clinical case definition and that is laboratory-confirmed or linked Epidemiologically to a lab-confirmed case.**

Epidemiology (see Fig 1)

1-Host: Common in children between 9 months to 3 years of age. Newborns and young infants are protected by maternal antibody transferred through placenta. Male = Female. Humans are the only known host.

2-Environment: It is a highly contagious disease and often responsible for epidemics, especially in conditions of overcrowding and poverty, where large numbers of non-immunized children are in close contact. In temperate and tropical climates, measles occurs primarily in the late winter and early spring (November-April).

3-Agent: Paramyxovirus (Morbillivirus)

4-Mode of transmission: human-to-human via airborne droplet spread, direct contact with nasal or throat secretions, etc.

5-Incubation period: The incubation period is usually about 10 days and varies from 7 to 18 days. Thus during an epidemic/outbreak immunization of susceptibles can avert more cases.

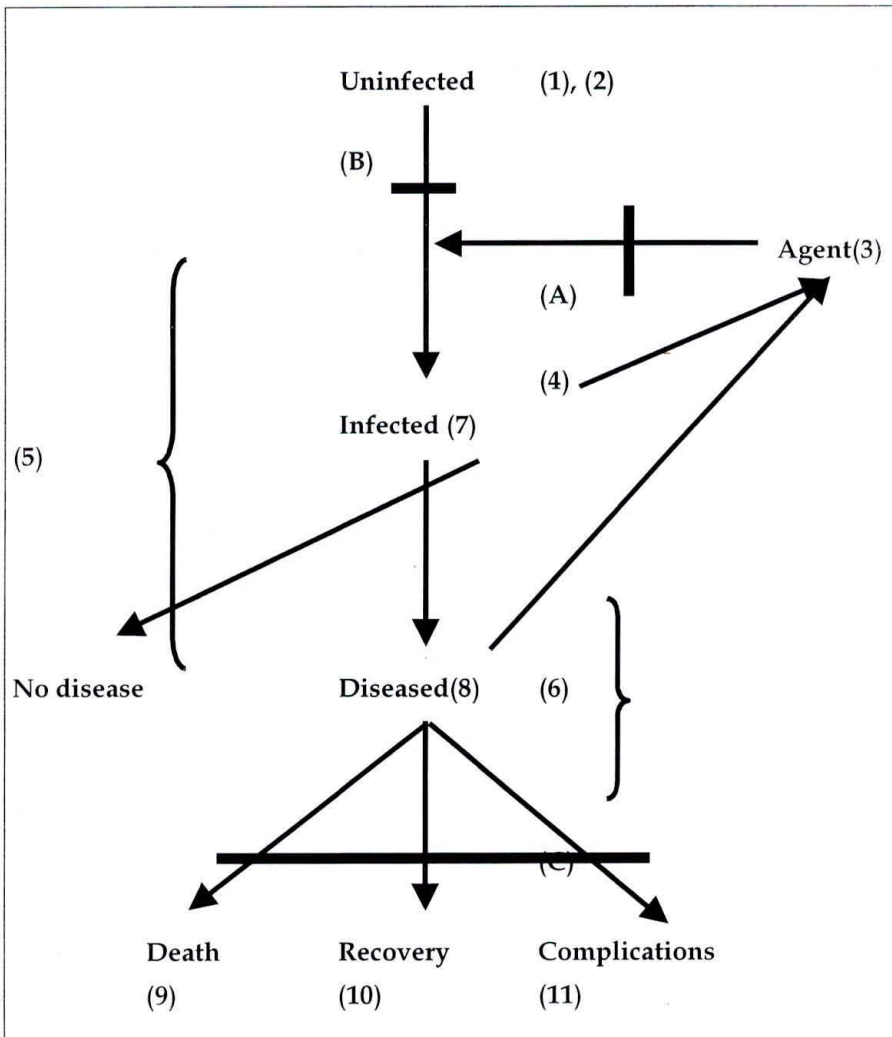
[1] Only for outbreak confirmation and during elimination phase.

6-Period of infectivity: An infected person can infect others from 4 days prior to onset of rash to 5 days after appearance of rash. The vaccine virus has not been shown to be communicable.

7-Infectivity rate: The agent is highly infectious and most susceptibles exposed to the agent acquire the disease.

8-Signs and symptoms: The first sign of infection is high fever lasting 1-7 days. During this period there may be running nose, cough, red and watery eyes and also Koplik's spots. After a few days (usually 4th day) a slightly raised erythematous rash develops

Fig 1 - Epidemiology of measles



which spreads over the face and upper neck down to the body, then to the hands and feet over a period of about three days. It lasts for 5-6 days and

fades successively from the same areas. There may also be loss of appetite and loose stools especially in infants.

9-Case fatality ratio: Deaths are common in developing countries ranging from 5 - 30% depending on the nutrition status of the patient and the effectiveness of the health services.

10-Recovery is usually associated with lifelong immunity.

11-Complications: In developing countries, complication rates can be as high as 75%. Complications occur particularly in children under 5 years and can be diarrhoea, pneumonia, malnutrition and Vit. A deficiency, otitis media, encephalitis (including sub-acute sclerosing pan-encephalitis, SSPE) and deaths.

Differential Diagnosis: Prickly heat, allergic rash, chickenpox, any other dermatitis.

Case management:

- There is no specific anti-viral drug against measles virus.
- Patients are managed symptomatically with supportive measures only, e.g treatment of fever.
- Vit. A 2 lakh IU for >1year olds and 1 lakh IU for infants <1 year, reduces severity of the disease and prevents further loss of Vit. A.
- Feeding of children should continue.
- Monitor for complications. Educate the mother about the dangers of complications and the early warning signs.
- Immunise close contacts if they are identified within 72 hours of exposure.
- Treatment of complications should be carried out vigorously.

Prevention: Immunisation with a live attenuated vaccine. 0.5 ml sc for children above 9 months of age.

Surveillance goal (see Fig 2):

- Detect outbreaks of fever with rash promptly.

  Thresholds
  - A single case of measles in a tribal or remote area
  - Clustering of cases

Response to an outbreak.

- Report suspected case to the next level. Also verify the case diagnosis by a clinician.
- Collect blood samples from five cases for confirming the outbreak. Send the material to Reference lab (Specific for each state).
- Do an epidemiological investigation

    - Active search for cases of measles - identify all cases by age, sex and immunization status. Also date of onset of illness and complications if any. Get the support of the community for this search.
    - Enumerate all the children in the area, including their age, sex and immunization status
    - Draw the epidemic curve and understand the dynamics of the outbreak, including the index case, the transmission and direction of spread and the susceptible population.
    - Analyse the data by time, place and person.
    - Calculate the attack rate and the case fatality ratio.

- Simultaneously institute control mechanism

    - (A) Isolation is impractical in the community at large; children with measles should be kept out of school for at least 4 days after appearance of the rash. Restriction of the affected children from moving out of the house till free of the illness should also be emphasized. Basically do not allow the diseased children to come in contact with susceptible children.
    - (B) Immunize all children who do not have the disease. Ring immunization, starting from outer circle and moving inner. Immunization of contacts: Live-virus vaccine, if given within 72 hours of exposure, may provide protection. Normally children between 6 months to 5 years is targeted, but if there is evidence that older children are affected, then one can increase the upper age limit to 15 years.
    - (C) Supportive treatment to all patients - including paracetamol.
    - (C) Give Vitamin A supplement to ALL children, whether diseased or not.
    - (C) Treat any child who has complications
    - Educate the community about "dos and don'ts" - example is given below.
    - Keep the higher authorities informed through daily updates and then a final report at the end of the outbreak (20 days after last case)

Post outbreak activities

- After the outbreak, analyse the information with the staff and understand the reasons why the outbreak occurred (poor immunization coverage, resistant population, poor socio-economic groups, tribal pockets, etc).

Sample messages for the community.

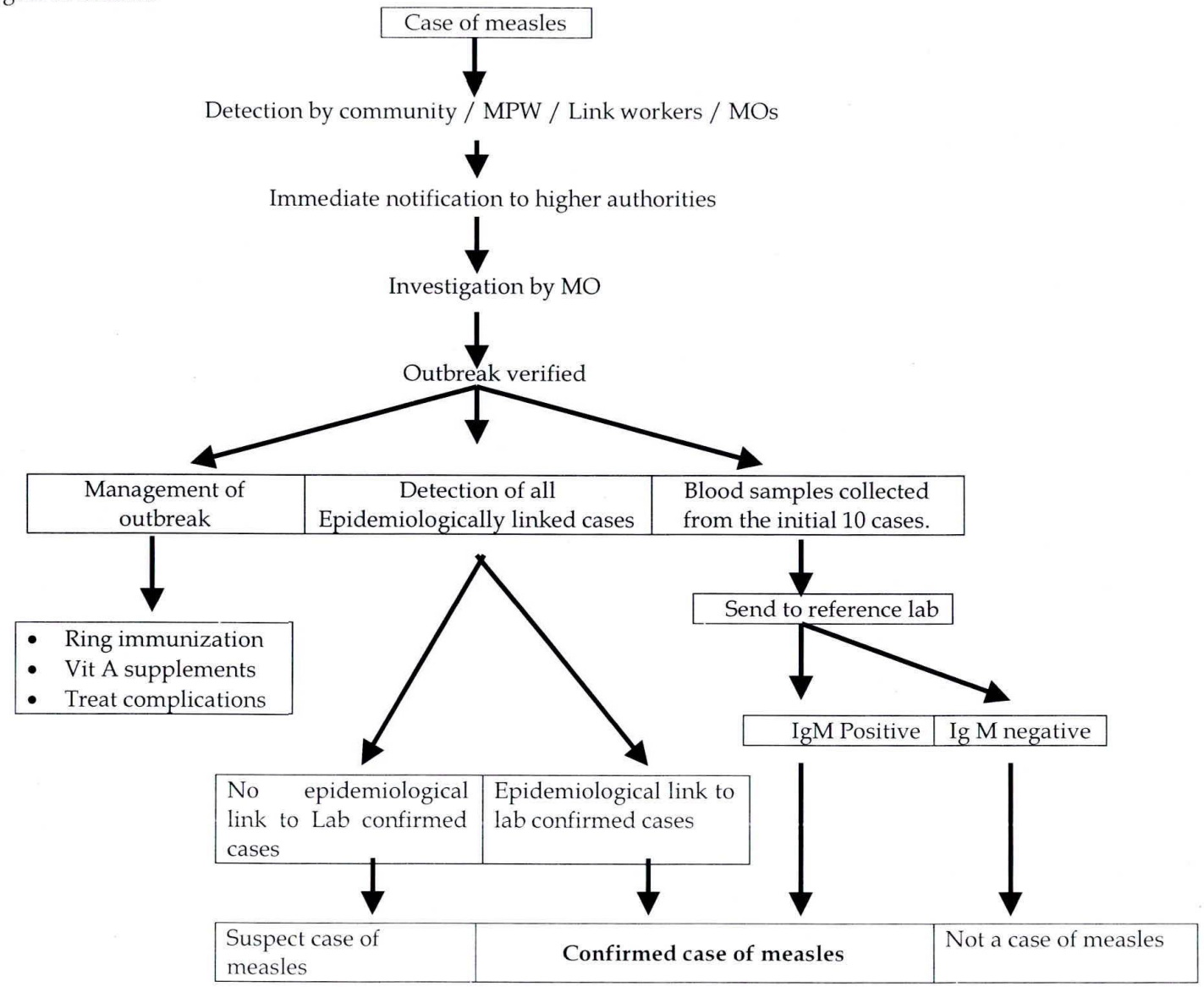
- Keep the child at home, do not expose the child to other children
- Give normal food to the child with measles
- Protect your child from measles by immunization
- Vitamin A will protect your child from getting complications
- If your child has measles and then develops cough, diarrhoea, drowsiness or pain in the eyes, immediately take to a doctor.

Conclusions:

Remember

- that measles is a killer in our country, especially among the poorer sections of the community and particularly among the malnourished.
- Prompt and effective action can reduce mortality considerably
- Be alert for complications
- Involve the community at all stages of the outbreak - they are your best allies.

Fig 2: Surveillance goal in measles



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
- leucopenia

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
- 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)

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 >_1280, 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).

Confirmed: A case compatible with the clinical description and laboratory-confirmed.

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
    - Petechiae, ecchymoses or purpura
    - Bleeding: mucosa, gastrointestinal tract, injection sites or other
    - 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 hypotension for age, cold, clammy skin and altered mental status.

Epidemiology

Agent: The viruses of dengue fever are flaviviruses and include serotypes 1, 2, 3 and 4. The same viruses are responsible for dengue hemorrhagic fever.

Host: Affects all age groups, but children usually have a milder disease than adults. Recovery from infection with one serotype provides lifelong immunity but does not provide protection against other serotypes, and instead may exacerbate subsequent infections

Environment: Outbreaks of dengue are usually reported after rainfall due to collection of water around peridomestic areas. The ambient temperature range for dengue transmission is 16 to 40 degrees C.

Reservoir: The viruses are maintained in a human-Aedes aegypti mosquito cycle.

Mode of transmission: Dengue is transmitted by the bite of infective mosquitoes, principally Aedes aegypti.

Vector: Aedes aegypti mosquito is a day-biting species with increased biting activity for 2 hours after sunrise and several hours before sunset. Both Ae. aegypti and Ae. albopictus are found in urban settings. The mosquito has characteristic white stripes on the back and legs and is also known as tiger mosquito. The mosquito is a domestic breeder and breeds in water containers, discarded tyres, coconut shells, desert coolers, overhead tanks, etc.

Incubation period: Three to fourteen days, commonly 5-7 days.

Period of communicability: Not directly transmitted from person to person. Patients are usually infective for mosquitoes from shortly before the onset of fever to the end of the febrile period, an average of about 6-7 days. The mosquito becomes infective 8-12 days after the viremic blood meal and remains so for life.

Basic Facts

Dengue is known to exist in India for over a century and causes significant morbidity and mortality. The first major outbreak occurred in Calcutta in 1963. Increasingly outbreaks are being reported all over India. During 1996 a large outbreak was reported from Delhi with 10,252 cases and 423 deaths. CFR is high in DHF and DSS Case-fatality rates in untreated or mistreated shock have been as high as 40%-50%; but with good physiologic fluid replacement therapy, rates should be about 3.5 % but low in dengue fever by itself.

Clinical signs & symptoms: An acute febrile viral disease characterized by sudden onset, fever for 3-5 days, intense headache, myalgia, arthralgia, retro-orbital pain, anorexia, GI disturbances and rash. Early generalized erythema occurs in some cases. A generalized maculo-papular rash usually appears about the time of defervescence, which is difficult to detect in Indian complexions. Minor bleeding phenomena, such as petechiae, epistaxis or gum bleeding, may occur at any time during the febrile phase. Dengue fever is a self limiting disease but in some cases with underlying pathologic changes, adults may have major bleeding phenomena, such as GI hemorrhage in peptic ulcer cases or menorrhagia. Recovery may be associated with prolonged fatigue and depression. Epidemics are explosive, but fatalities in the absence of dengue hemorrhagic fever are rare.

DHF/DSS recognized principally in children below 15 years (may also occur in adults) is characterized by abnormal vascular permeability, hypovolemia

and abnormal blood clotting mechanisms. In patients with severe or fatal dengue, shock is usually the principal pathophysiologic defect. Coincident with defervescence, the patient's condition suddenly worsens with marked weakness, severe restlessness, facial pallor and circumoral cyanosis. Extremities are cool, skin blotchy, pulse rapid and weak; patients may be hypotensive with a narrow pulse pressure. Hemorrhagic phenomena are seen frequently and include scattered petechiae, a positive tourniquet test, easy bruisability, and less frequently, epistaxis, bleeding at venipuncture sites, a petechial rash and gum bleeding. GI hemorrhage is an ominous prognostic sign that usually follows a prolonged period of shock. The liver may be enlarged, usually 2 or more days after defervescence.

Differential Diagnosis Differential diagnosis includes all epidemiologically relevant diseases listed under arthropod-borne viral fevers, measles, rubella and other systemic febrile illnesses, especially those accompanied by rash.

Lab investigation – see details in case definition

Case management

The management of dengue fever is symptomatic:

- Bed rest during the acute febrile phase
- Antipyretics (**avoid salicylates / ibuprofen**) and tepid water sponging if temperature above 39 degrees C
- Analgesics or mild sedatives if pain severe
- Increased fluid intake.

The management of DHF/DSS is similar to DF and includes:

- Oxygen therapy and rapid fluid and electrolyte replacement, by IV fluids (lactated Ringer's solution at 10-20 ml/kg/hour), Isotonics, plasma expanders if indicated, etc
- Fresh frozen plasma may be indicated in serious cases and rarely blood transfusion.

Surveillance goal (see Fig 2)

- Detect and respond promptly and appropriately to cases and impending outbreaks of Dengue Fever, DSS and DHF. Surveillance to include epidemiological, entomological and lab parameters.
- To confirm an outbreak, by collecting paired sera and sending for IgM and IgG antibodies to dengue virus.

- Immediate number/case-based reporting of cases and deaths when an outbreak is suspected.
- Appropriate management to reduce mortality
- Effective control measures to interrupt transmission and reduce new cases

Identification of an outbreak

- Any increase in fever cases should be investigated, especially in areas where dengue is endemic or known to exist.
- Report each case of DF/DHF/DSS to local health authorities immediately. Here the role of the private sector and labs is important as sentinel centers.
- Entomological surveillance should be able to detect increasing density of the vector and predict a potential outbreak.

Thresholds

If a single suspect case is reported:

Confirmation of an outbreak

- If an outbreak of dengue is suspected, send paired sera to the nearest reference lab for diagnosis. Blood for serological confirmation should be carefully collected using universal precautions. The sera should be separated and stored at 4 degree C and sent to the referral lab by quickest means preferably in ice (but not frozen). Samples would be accompanied with the detailed information about the cases. . HI, CF, IgG and IgM ELISA, and neutralization tests are diagnostic aids. IgM antibody, indicating current or recent infection, is usually detectable by day 6-7 after onset of illness.

Investigation of an outbreak

The MO PHC will investigate every dengue outbreak in the same way as any other epidemic prone disease. The health staff would alert the MO regarding large number of unexplained fevers in the community especially post monsoon or after fresh rainfall. S/he should arrange to collect serological samples from a few suspected cases for confirmation of the outbreak.

Time: Cases of fever in the area would be plotted daily (including deaths) and any significant peaks in time noted. In outbreaks an epidemic curve would be visible and would be constantly updated & observed till the curve shows a significant down trend and the outbreak is controlled.

Place: Each case would be plotted on a spot map of the village regularly and clustering of cases around particular areas would be looked for. The spot map would depict all major (rivers and lakes, etc) and minor water collections

(drains, storage tanks, etc) where mosquito breeding is likely to occur and any significant increase in cases around these areas would be monitored.

Person: A line list of cases, including age and sex would be maintained at the peripheral health centre and number based reporting to the district would be carried out daily/weekly depending on the number of cases. Active search for more cases would also be carried out around the neighboring houses of each detected case. Analysis of the age distribution and sex distribution of cases would be regularly carried out.

Vector surveillance for Aedes aegypti mosquitoes would be carried out in and around all habitations in the affected area.

Prevention & Control of an outbreak

The MO would:

- Organize community surveys to determine density of vector mosquitoes, to identify larval habitats (which for Ae. aegypti is usually in artificial or natural containers holding water close to or within human habitations, e.g., in old tyres, flower pots, water storage containers) and to promote and implement plans for their elimination.
- Indoor residual spray of dwellings with appropriate insecticide would be carried out.
- Prevent access of day-biting mosquitoes to patients by screening or using a mosquito bednet, preferably insecticide impregnated, for febrile patients, or by spraying houses with a knockdown adulticide or residual insecticide.
- Determine place of residence of patients for 2 weeks before onset of illness and search for unreported or undiagnosed cases.
- Search for and destroy Aedes species of mosquitoes in places of human habitation, and eliminate or apply larvicide to all potential larval habitats of Ae. aegypti.
- Ground applications of ultra-low-volume insecticides can effectively reduce vector populations, but fogging and aerial spraying with insecticides may help in aborting epidemics when used together with source reduction.

Health education of the community on

Prevention of breeding of mosquitoes:

- **Adopting personal measures for eliminating/destroying mosquito larvae habitats**
- Drain water from collections around their dwellings like coolers, buckets, tyres, flower vases, coconut shells, etc
- Cover all stored water containers

Prevent mosquito bites by:

- Protecting against day biting mosquitoes by using screening, mosquito nets, appropriate clothing and repellents.
- Wear suitable clothes covering arms and legs during outbreaks to prevent easy biting access by mosquitoes
- Permit indoor spray of their dwellings by the health workers

Encourage the community to identify cases and report to the health staff so that prompt treatment can prevent DHF/DSS.

Fig 2. SURVEILLANCE PROCESS IN DENGUE