MANUAL

FOR HEALTH SCIENCE STUDENTS

Investigation and Management of
Epidemic-Prone Diseases
In Ethiopia

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PREFACE

Manuals which entirely focus on epidemic investigation and management of epidemic prone diseases in the context of the country are scarce or if present may only provide concepts and ideas limited to a single disease outbreak. Thus, students, instructors and health professionals might be forced to search other materials/references for different outbreaks/epidemics when they are in need. This manual may reduce the problem of limited access to information on the principles of outbreak investigation, preparedness and response, management and monitoring of epidemic prone diseases in Ethiopia.

This manual is prepared primarily for health science and medical students in universities. However, such manuals are not also available at regional health professional training institutions and health facilities. Different categories of health workers who are working in these facilities directly or indirectly

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have also inspired the authors to write this manual with the support of Ethiopia Public Health Training Initiative of The Carter Centre.

The first chapter gives an overview of occurrence of disease and types of epidemics. The second chapter draws on the background given in chapter one and highlights and expatiates on the activities in epidemic investigation. In the same chapter management of epidemic is mentioned as one step leaving the detailed discussion of Epidemic management for the following chapter. Among the components of epidemic management, epidemic preparedness and response will make the initial part of chapter 3, followed by control measures during epidemics in the later part. Monitoring and evaluation of epidemic response is discussed in chapter 4. After all general principles have exhaustively been done, Chapter 5, then proceeds to the discussion of Epidemic investigation and management of specific epidemic prone diseases. Finally epidemic investigation and management in different special settings will be

discussed in the last chapter followed by important Annexes.

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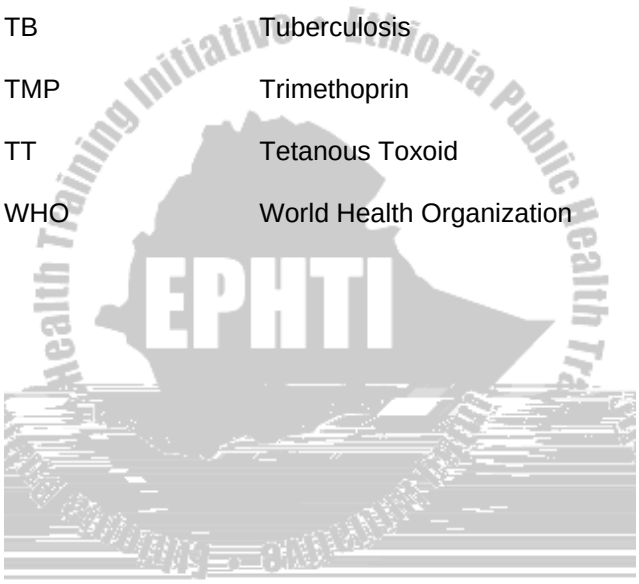
facilitated the process of the preparation of this Manual.

LIST OF ABBREVIATIONS

AHI	Avian Human Influenza
AI	Avian Influenza
BCG	Bacille Calmette-Guerin
CFR	Case Fatality Rate
CSF	Cerebro Spinal Fluid
DDT	Dichlorodiphenyl trichloro-ethane
DHN	Dehydration
DOB	Date of Birth
DOT	Direct Observed Therapy
ELISA	Enzyme-linked immunosorbent assay
EPHTI	Ethiopian Public Health Training Initiative
EPI	Expanded Program on

	Immunization
HIV	Human Immuno-deficiency Virus
HMIS	Health Information Management Systems
IC	Infection Control
IDSR	Integrated Disease Surveillance and Response
IgM	Immuno-Globulin M
IP	Incubation Period
IM	Intra-Muscular
IU	International Unit
IV	Intra-Venous
MDR	Multi-Drug Resistant
NGOs	Non-Governmental Organizations
NNT	Neonatal Tetanus
ORS	Oral Rehydration Solution

PO	Per Os
RF	Relapsing Fever
SD	Shigella Dysentariae
SMX	Sulpha-Methoxazole
TB	Tuberculosis
TMP	Trimethoprin
TT	Tetanous Toxoid
WHO	World Health Organization



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CHAPTER ONE
OCCURRENCE OF DISEASE AND TYPES OF EPIDEMICS

1.1 Learning Objectives: At the end of this chapter, the student will be able to:

- define common terms related to disease occurrence;
- identify Epidemic and types of Epidemic;
- describe the steps in the investigation of an outbreak/epidemic;
- describe the different approaches of outbreak management.

1.2 Introduction

Diseases occur in a community at different levels at a particular point in time. Some diseases are usually present in a community at a certain predictable level; this level is called the expected level.

Terms for occurrence of disease at expected level include:

- Endemic,
- Hyper/hypo/meso- endemic

But at times diseases may occur in excess of what is expected**.**

Terms for occurrence of disease at excess of the expected level include:

- Epidemic
- Pandemic
- Outbreak
- Cluster

A term for irregular and occasional occurrence of disease:

- Sporadic

1.3 Definition of common terms

a. <u>Occurrence of disease at expected level include</u>:

An **endemic** disease is a disease that occurs in a population with predictable regularity and with only minor deviations from its expected frequency of occurrence. It is vital to note that a disease may be

endemic in a population at any frequency level, provided that it occurs with predictable regularity.

Additional terms can be used to describe endemic diseases according to their frequency of occurrence:

Hyperendemic is an endemic disease that affects a high proportion of the population at risk.

Mesoendemic is an endemic disease that affects a moderate proportion of the population at risk.

Hypoendemic is an endemic disease that affects a small proportion of the population at risk.

b. Occurrence of disease at excess of the expected level include:

Epidemic refers to the occurrence of disease or health related condition in excess of the usual frequency in a given area or among a specified group of people over a particular period of time.

The following points are worth noting.

The term epidemic can refer to any disease and health related condition

E.g. Epidemic of Measles, epidemic of obesity, epidemic of drug addiction, epidemic of rape etc

The minimum number of cases that fulfils the criteria for epidemic is not specific and the threshold may vary

E.g. One case of Small pox or Avian Human Influenza may constitute an epidemic

Knowledge of the expected numbm/2s202450036fdbrthe .g.2brthe 04 0n6fdbrthe . clabela Ao5.24n0n6fd(c)urren5.24n0eof Se epidemic

sExcess ocowil phavenot meaning if

Outbreak is an epidemic of shorter duration covering a limited area. It is usually used interchangeably with Epidemic.

E.g. Outbreak of gastroenteritis after sharing a common meal at an event

A **cluster** is an unusual aggregation of health events in a given area over a particular period. The emphasis in case of a cluster is aggregation in a certain locality than the actual number of cases. For instance, three or four cases of a certain illness might occur in a certain kebele, while no cases occur in all other kebeles of a certain district. In this case, the number of cases might not be sufficient to constitute an epidemic. But, the occurrence in the particular kebele may be better referred to as a 'cluster'.

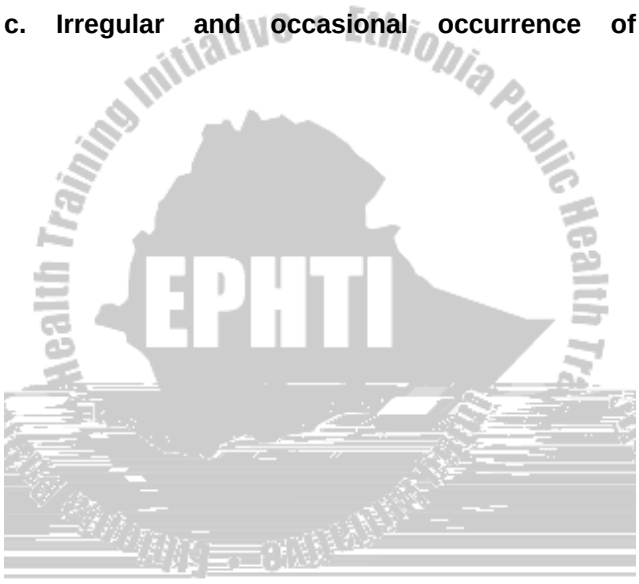
Other examples include: the cluster of cases of cholera in London investigated by John Snow, the

Pandemic is an epidemic involving several countries or continents affecting a large number of people.

E.g. - the influenza pandemic

- the HIV pandemic

c. Irregular and occasional occurrence of



meningococal meningitis often occur as epidemics in Ethiopia. Examples of sporadic diseases in Ethiopia include colonic cancer, Parkinson's disease, etc.

1.4. Types of epidemic

Three types are well recognized:

- Common source
- Propagated/progressive and
- Mixed.

1.4.1. Common source epidemics

Common source epidemic is a type of epidemic caused by exposure of a group of people to a

outbreak of Acute Gastro Enteritis in attendants of a wedding feast.

ii- Continious/ Intermitent common source

- If the source of an outbreak remains for a longer time, days, weeks or longer either continuously or intermittently, it is called Continuous or intermittent common source epidemic. A waterborne outbreak that is spread through a contaminated community water supply can be an example

1.4.2. Propagated or progressive epidemics

Outbreak of this type occurs from transmission of an infectious agent from one susceptible an infected host to another. It can be through:

- Direct person-to-person transmission or
- Indirect transmission: through a vector, vehicle, etc.

Examples: epidemics of measles, yellow fever, malaria, etc.

1.4.3. Mixed Epidemic

Mixed epidemics is an epidemic which shows the

ongoing outbreaks and in preventing additional cases. Outbreak investigation is, however, a challenging task for a number of reasons. First there is great urgency to find out the source and prevent additional cases and also a substantial pressure to conclude rapidly, particularly if the outbreak is ongoing, which may lead to hasty decisions regarding the source of the outbreak with negative consequences on the success of control measures. Second the involvement of many agencies and the fact that outbreak investigation is carried out at many levels pose a threat to undertake a well coordinated work. In many outbreaks, the number of cases available for study is limited; therefore, the statistical power of the investigation is also limited.

How are out breaks recognized?

there is a strong and quality surveillance system in place

b.

the source of infection, we can prevent additional cases.

b. Because the results of the investigation may lead to recommendations or strategies for preventing similar future outbreaks, thereby improving long term disease prevention activities.

c. Other reasons include:

i. to describe new diseases and learn more about known diseases;
ii. to evaluate existing prevention strategies, e.g., vaccines;
iii. to address public concern about the outbreak.

When should outbreaks be investigated?

For some communicable diseases, a single suspected case might suffice to start the process of investigation. For instance diseases with a potential for massive epidemics or diseases caused by etiologic agents of high virulence need more attention and alertness than others. Such diseases need

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a. Verifying the diagnosis in the index case/s

In order to verify the suspected epidemic, one might start by verifying the diagnosis in the index case(s). This is done by reviewing clinical and laboratory findings in index cases to establish diagnosis.

NB: Index case(s) is/are the first case(s) to come to the attention of health authorities. Index cases are important because they indicate the possible start of an outbreak; the sooner the index case and other early cases are identified and diagnosed, the higher the chance of arresting the epidemic. However, it should be noted that the notion of index cases might not be valid in case of diseases which normally occur at a predictable regularity and that occasionally occur in excess of their expected frequency.

b. Compare current occurrence with the expected occurrence:

The other essential task of verifying an epidemic is to compare the current number of cases with the past levels of disease in that community, considering the seasonal variation in the occurrence of the disease.

This will help in determining whether an excessive number of cases have occurred or not.

c. Rule out artifactual changes in the occurrence of the disease:

Even if there seems to be an apparent excess in the number of cases or deaths due to a disease, still potential causes of a false-rise exist and should be looked for. These include:

- a change in case detection (e.g. more or less accurate diagnostic facility)
- a change in a case definition or reporting
- a change in the denominator

In majority of instances, partly because of incomplete data, the investigator might not be certain whether the existence of the epidemic is real or not. In such situations, the following three considerations should be done in order to declare an epidemic.

i. Is there a risk for wider transmission if left without intervention?

For example diseases like viral hemorrhagic fever pose a serious threat to the public because of extremely high risk for disease wider transmission in

step is to make the necessary preparations to launch further investigation.

these people and communicate with them to plan the investigation and management together. For example, using the already available data and with discussion with responsible persons, decide where to undertake the investigation taking the most affected geographical location as a starting place for the outbreak investigation.

c. Establish an outbreak investigation and management team

For a smooth execution of outbreak investigation and management, it is helpful to establish a team with clearly defined roles. In situations where there is epidemic preparedness, there will already be identified team members who will take part in the investigation and management as well. Team members should be well aware of their specific roles in the process of investigating the outbreak. In addition the team should plan and decide how communication among the team members will go during the outbreak investigation.

cause(s), e.g. contact with people with similar illness, travel history, immunization status etc.

e. Make administrative arrangements

This part of the preparation should not be neglected, as it is one of the major factors affecting success of outbreak investigations. Beginning from the start of the epidemic investigation, investigators should plan for adequate transportation, personnel, equipment and logistic supplies. For example, most outbreak investigations entail laboratory materials (e.g. serologic kits); every effort should be made to obtain essential materials well in advance of the beginning of the actual investigation activities.

2.3.3 Construct a suspected Case definition

Case definition is a set of criteria for deciding whether an individual should be classified as having the condition of interest. A suspected case definition includes clinical and epidemiologic criteria , (i.e. general description of the type of disease and description of the disease by Place, Person and

Time), and is used to identify all possible cases associated with the outbreak. Since case definitions used at this initial stage of the outbreak investigation lack specificity, they are labeled as suspected case definitions. Likewise, the cases identified are also referred to as suspected cases.

Example of suspected case definitions: fever, with or without vomiting, chills, myalgia, (for an Acute Febrile Illness), a new onset of diarrhea (

It is worth noting that standard suspected case definitions are available for most epidemic prone priority diseases. Making efforts to find these standard case definitions saves time and prevents bad consequences a poorly constructed case definition.

2.3.4 Collect laboratory specimens and obtain laboratory results

Laboratory tests are mandatory for most epidemics of infectious diseases, for the purpose of confirming diagnosis in the individual patient and also understanding the cause of the epidemic. Laboratory investigations usually include:

A. Microscopic demonstration or isolation by culture of the agent
B. Serologic studies (done two times, 4 weeks apart)

Based on additional information laboratory results, the cases who fit the suspected case definition can be classified as confirmed, probable, or possible.

- **Confirmed**/definite: a case with laboratory verification.
- **Probable**: a case with typical clinical features of the disease without laboratory confirmation.
- **Possible**: a case presented with fewer of the typical clinical features.

Through out the outbreak investigation, steady quality assurance together with checkup of congruence between clinical findings and laboratory results should be made. For this, communication between laboratory persons and clinicians is very crucial. However, it should be remembered that for many health facilities laboratory investigation of every case can not be practical for obvious reasons. In

such situations, it might suffice to conduct laboratory tests for the first few cases of the disease. For example, taking serum samples for the first 5 cases is recommended for measles.

It has to be also noted that laboratory tests may include environmental investigations, i.e. investigation of food sanitation, suspected breeding

symptomatic, and that there are individuals yet to be exposed to the risk factor of the disease under investigation. Thus, active search for additional cases is extremely vital if the investigation is to prevent healthy people from contracting the disease.

This is done by:

a. Passive surveillance:

This includes:

- Searching similar cases in the registers of health facilities where cases have been reported,
- Recording each case fulfilling the suspected case definition on the reporting format prepared for the investigation. The case reporting format should include identifying information, socio-demographic information, clinical and lab information, risk factor information.

b. Active surveillance:

This includes:

- Sending out a letter describing the situation and asking for reports.
- Alerting the public directly, to see a physician if they have symptoms compatible with the disease in question.
- Asking case-patients if they know anyone else with the same condition.
- Conducting an active case finding mission.

Meanwhile, cases of the disease that are already identified should get the appropriate treatment preferably by following standard case management guidelines. Hand in hand with this the necessary precautions for preventing disease transmissions in health facilities should be in order.

2.3.6 Describe the epidemic with respect to time, place, person

Using stimulated passive surveillance and active surveillance for recording identified cases, there will be available data for analysis by important variables. These variables are Time, Place and Person.

The purpose of describing disease occurrence by time, place and person is to get a clue about the general features of the epidemic (where are most cases of the epidemic seen, where is epidemic spreading to, what the source of the epidemic is, who the high risk groups are, etc) so that early and timely measures can be started. Therefore, analysis of data should be done frequently during the epidemic as new data might change the findings of the description.

a. Characterize the outbreak by time: Epidemic curve

The epidemiologic tool for describing disease occurrence by time is called epidemic curve. Epidemic curve is a graph commonly a histogram,

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exception to the rapid rise and fall of a point source epidemic is when the incubation period of the disease is long. Example:

- c = mode of the incubation period (from the time of exposure to the date with maximum onset of cases)
- a + b = maximum incubation period (from the time of exposure to the date of onset of last case)

On the other hand in cases of continuous or intermittent common source epidemic, (i.e. the source of an outbreak remains for a longer time, days, weeks or longer either continuously or intermittently as in cases of a waterborne outbreak that spreads through a contaminated community water supply) the epidemic curve will have no clear peak (wider or irregular) and will be with prolonged duration of more than 1 incubation period. This is because there will be multiple exposures with variable incubation periods unlike in that of the point source epidemic.

If the epidemic is propagated or progressive type (i.e. transmission of an infectious agent from one susceptible host to another either through direct or indirect transmission e.g. epidemics of measles,

yellow fever, malaria, etc), typically, the epidemic curve would have:

- An initial slow rise (showing few people infected spread)
- A succession of several peaks (showing the presence of several generations of cases and increased number of cases in each generation)
- A prolonged duration (more than 1 incubation period)
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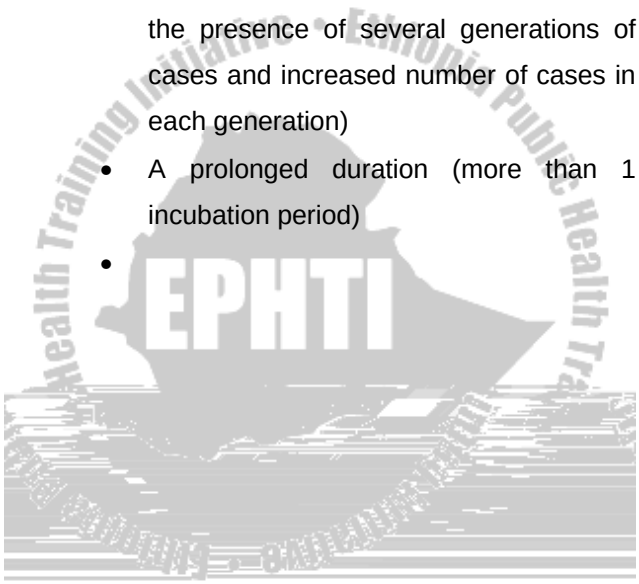

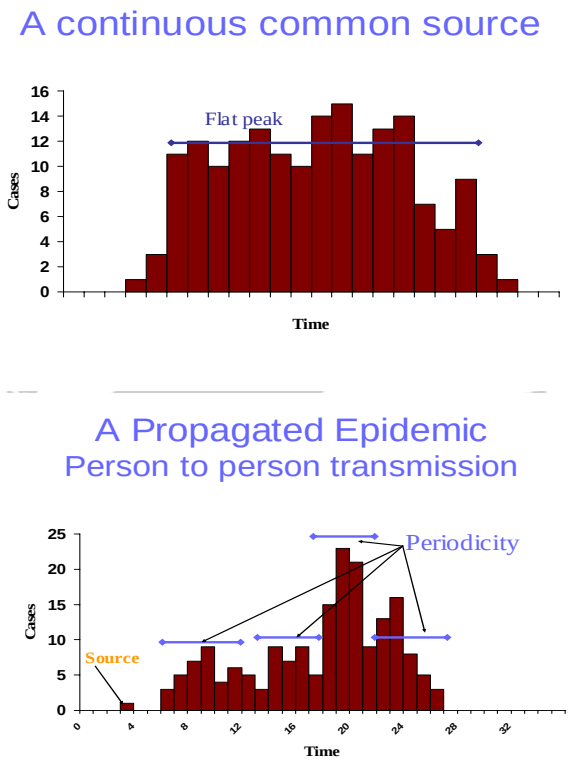

Figure 1.2: Epidemic curve for point source (upper), continuous common source (middle), and propagated epidemic (lower).

ii. Probable date of exposure

The time till the date of mode of the epidemic curve is

Exercise:

An outbreak caused by certain etiologic agent X, with an incubation period of 2-15 days (average 8 days), has the following chatayte

- One method is by subtracting the minimum incubation period from the date of onset of the first case (September 20 minus 2 days) or by deducting the maximum incubation period from the date of onset of last case (September 30 minus 15 days). This gives us September 18 (from the first) and September 15 (from the second); the probable date of exposure was between September 15 and 18.
- The other method is by subtracting the average incubation period from the date on which maximum number of onsets is recorded (the mode). This means September 25 minus 8 days, which gives the probable date of exposure to be on September 17.

Though the above two methods gave different results, the results are nearly the same and can be used as an estimate of the date on which there was exposure causing the outbreak.

iv. Evaluation of the timeliness of detection, investigation and response

In addition to the date of onset of each case, the horizontal axis of the epidemic curve can also be made to show the following dates:

- date of case detection of the index case(s)
- date of report of the possibility of the epidemic to the investigator(s)
- date when the investigation was began
- date when the response was began

Using the distance from the onset of illness in the index case (s), one can determine the level of awareness of the community about the disease under investigation, the timeliness of the report from the health institution, the timeliness of the response from the investigator(s), the timeliness of measures taken, etc.

b. Characterize the outbreak by place, spot map

Description of the epidemic by place is also another very vital task which potentially uncovers several features of the epidemic. The epidemiologic tool for

describing epidemics by place is called spot map. Spot map is a map showing the case of a disease in their respective place of residence.

However, the spot map is only a display of the number of cases in the respective localities; it doesn't take in to consideration the population density difference of each sub area. It is therefore important to supplement spot maps with place specific attack rates particularly if there is a perceived variation in the population density.

In the spot map: pay particular attention to:

- Cluster of cases or deaths
- Relation of clusters with presumed sources of infection (for e.g. common water source)

Another application of spot map is when one cannot distinguish the two (common source and propagated) by the epidemic curve, studying the geographic distribution will help to differentiate them. The propagated epidemics tend to show geogrphic spread with successive generations of cases in the spot map while the common source epidemic tend to aggregate in certain places.

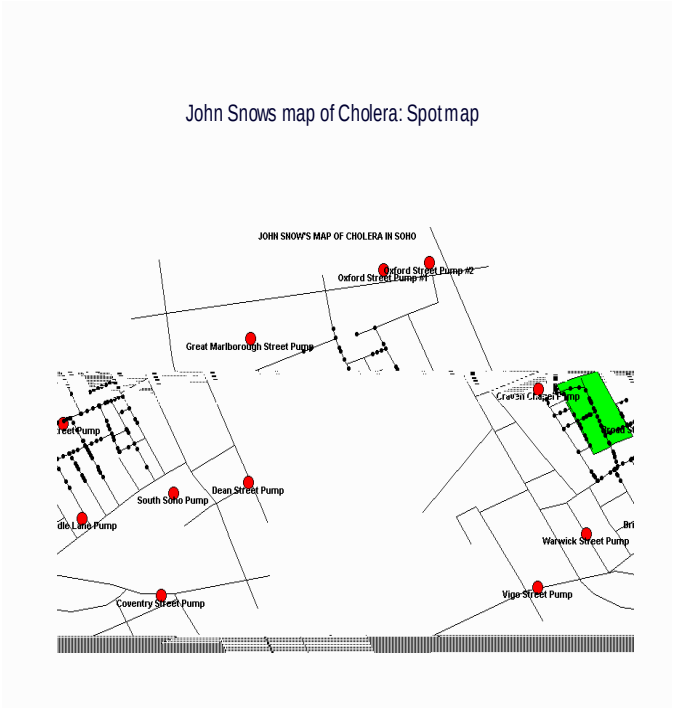

Fig.1.3. Spot map showing distribution of cases by place

c. Characterize the outbreak by person, person specific attack rates

Identifying personal characteristics that could be related with the cause of the epidemic also gives valuable clues about the epidemic and the high risk groups. For instance some of the intervention measures for all practical reasons couldn't be given for each and every individual in the affected areas. For example vaccinations are seldom plenty to give them for all people in the area. Therefore identifying the high risk group makes issuing interventions

- Outcomes of cases (Survived/died)
- Laboratory results

The rate disease occurrence given by the above specific personal characteristics is called person specific attack rate. For example Sex specific attack rate.

2.3.7 Formulate hypothesis about the cause of the epidemic and test them

The data obtained from the description of the epidemic by place, person and time can be used to formulate a hypothesis about the cause of the epidemic. The formulated hypothesis can be tested using either of the two methods:

- The attack rate method
- The case-control method

These methods allow the identification of the possible sources of the epidemic by quantifying the strength of association between exposure and disease.

i. The attack rate method

Attack rate (incidence rate) is calculated for two group of individuals: those exposed to the risk of interest and with out the risk.

$$\text{Attack rate} = \frac{\text{new cases of disease during the outbreak}}{\text{Total Population at risk of contracting the disease}} \times 100$$

The greater the difference in attack rates in people exposed and not exposed to a suspected exposure, the stronger the evidence that the particular exposure is the cause of the disease. It is worth noting that information is needed both from example: those exposed to the risk factors of interest and those without. It is a common pit fall to leave those without the risk.

ii. The case control method

Cases and non cases are compared with respect to the proportion of people exposed. The greater the difference in proportion of cases exposed and non-cases exposed, the stronger implication of association between the exposure and the disease. It

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CHAPTER THREE

PRINCIPLES OF EPIDEMIC

3.2. Introduction

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- To have effective response with appropriate control method and adequate resources and logistics.

Components of epidemic preparedness and response

community representatives). The best way to ensure this is to establish an epidemic management committee early in the epidemic. This team can then

Before the epidemic, the committee members should:

- Set priorities
- Write the epidemic preparedness and response plan
- Define prevention and control strategies
- Ensure that the surveillance system can detect epidemic occurrences
- Assign specific responsibilities for surveillance, preparedness and response
- Identify and mobilise resources

During the epidemic, the committee members should:

- Implement the plan (verification, investigation and management of the epidemic)
- Rapid and co-ordinated response
- Implement prevention and control strategies

- Monitoring and evaluation of prevention and control strategies
- Identify, mobilise and utilize available resources
- Reporting

After the epidemic, the committee members should:

- Evaluate the preparedness and response
- Review and update the plan
- Modify prevention and control strategies
- Identify and mobilise resources
- Anticipate new epidemic
- Strengthen surveillance

B. Setting priorities

Before setting the priority, the following questions should be answered based on literature review, report, health institution records…etc.

- What are the major epidemic prone diseases?
- What is the risk of an epidemic?

- Time since last outbreak, example one may suspect meningitis outbreak if there has been outbreak free period of two years as it is usual for meningitis to occur every two years these times.
- Frequency of previous outbreaks and recent disease trends, e.g. if Cholera outbreaks are occurring in a country frequently, the risk for further epidemic clearly great.

- What would be the likely impact of an epidemic?
    - Potential number of cases
    -

C. Formulate epidemic preparedness plan

The plan should include the following;

- List the priority diseases
- Define the surveillance, preparedness and response measures to be implemented
- Identify responsibilities (who does what)
- Identify co-ordination mechanisms (leadership)
- Specify resources available for preparedness and response (budget)
- Decide on the list of activity, resources or supplies that will be required for the activity and time framework

D. Implement/strengthen surveillance

Successful epidemic response depends on effective surveillance system. Hence, during the acute phase of the epidemic it is necessary to keep the individuals at special risk (e.g. contacts) under surveillance. After the epidemic is under control, it becomes necessary to keep the community under surveillance

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These activities are:

- Early and regular epidemic preparedness and response team/committee meeting
- Early assessment of the potential scale of the epidemic
- Co-ordinated investigation and implementation of control measures
- Providing public information when ever important using health education and media strategy

3.4. Epidemic control measures

3.4.1. Aim of control measures

Central to any outbreak investigation is the timely implementation of appropriate control measures to minimize further illness and death. The aim of all control measures is to act at the weak link or links in the chain of infection (or any exposure outcome chain) so as to prevent additional cases of the illness. However, the type of control measures which would be taken is dependent on the type of the specific diseases and this is discussed in detail in chapter 5.

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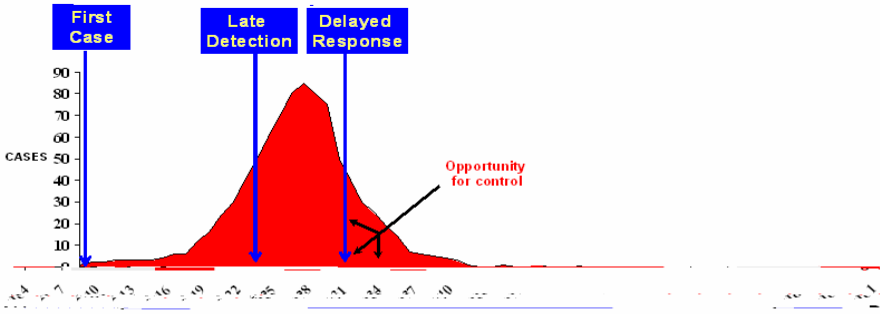
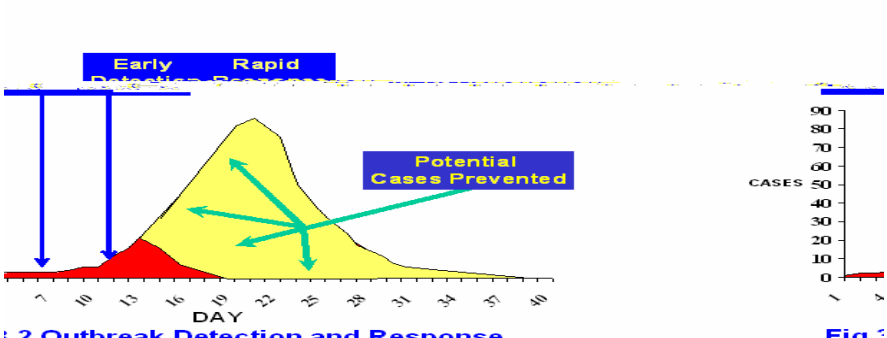
The timing and nature of control measures are difficult. Balancing the responsibility to prevent further disease with the need to protect the credibility and reputation of an institution is very important.





3.4.3. General classes of interventions

Control measures for every of infectious diseases of public health importance are different and relatively peculiar, however most of the intervention measures can be grouped it to three:

i. Measures directed against reservoirs

- If reservoirs of the disease include domestic animals immunization, testing of herds and

destruction of infected animals, example: brucellosis and bovine tuberculosis

- If the reservoirs are wild animals like in case of Rabies, post-exposure prophylaxis is the recommended measures
- If humans are the main reservoirs of infection, the following are potential control activities:

- Removal of the focus of infection, e.g. cholecystectomy for typhoid carriers
- Treatment of infected individuals to make them non infectious; e.g. Tuberculosis
- Isolation of infected persons from the non-infected for the period of communicability

NB:

- Isolation is not suitable for the control of diseases in which a large proportion of infections are inapparent or in which maximal infectivity precedes overt illness.
- Quarantine is a form of isolation with limitation of freedom of apparently healthy persons or animals who have been exposed to a case of

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- Attempts to reduce transmission of respiratory infections include chemical disinfection of air & use of ultra violet light, improving ventilation patterns.
- Action to interrupt transmission of disease whose cycles involve an intermediate host: E.g. clearing irrigation farms from snails to control Schistosomiasis.

iii. Measures that reduce host susceptibility

Control measures also include strengthening the host's immunity to resist disease through the following activities:

- Active immunization, e.g. in the prevention of EPI disease
- Passive immunization, e.g. Tetanus, Rabies

Chemoprophylaxis: e.g. Tuberculosis, Malaria

3.4.4. Report and disseminate findings

At the end of epidemic investigation, prepare a comprehensive report and submit to the

CHAPTER FOUR MONITORING AND EVALUATION OF EPIDEMIC INVESTIGATION AND MANAGEMENT

4.1 Learning objectives

At the end of this chapter the student will be able to:

- describe the basics of planning for performance monitoring and evaluation of epidemic investigation and management;
- acquainted with components of performance monitoring and evaluation of epidemic investigation and management;
- describe monitoring and evaluation frameworks, indicators and health management information system for Epidemic investigation and management; and

- evaluate the timeliness of detection, investigation and response status.

4.2 Introduction

At the end of the epidemic it is important to evaluate the various phases of the response and to prepare a report of the epidemic and lessons learnt. Monitoring and evaluation of the epidemic through continued surveillance to determine if there is further spread and the impact of interventions.

The purpose of Monitoring and Evaluation of epidemic is to measure effectiveness. Ideally, Monitoring and Evaluation tools can be used to demonstrate that efforts have truly had measurable impacts on the outcomes of interest i.e. in the control of epidemics. In other situations, monitoring and evaluation can indicate whether resources are being used most efficiently.

Monitoring tools are those used to track ongoing results in epidemic control activities. Evaluation tools, on the other hand, are used to assess or to analyze

the impact of control activities in order to understand the conditions that help or hinder their success. Hence monitoring and evaluation helps to:

- make informed decisions regarding operations management and service delivery;
- ensure the most effective and efficient use of resources;
- determine the extent to which epidemic control activities are on track and to make any needed corrections accordingly and
- helps in objective conclusions about the extent to which the epidemic control activities is having or has had the desired impact.

4.3 Performance Monitoring and Evaluation

Performance monitoring is tracking the key elements of epidemic control activities performance over time (inputs, activities, results). Evaluation is used to measure changes in targeted results that can be attributed to the intervention, or analyzing inputs and

activities to determine their contribution to averting the epidemic. In other words, evaluation activities go beyond the scope of the control activities to consider, and sort out the influence of other factors. For instance, members of the community who live in the suspected area may not be applying the preventive and control measures for the reason of negligence. Monitoring may reveal that the number of cases of the suspected epidemic is increasing, but it will require an evaluation activity to reveal why the numbers of cases are still increasing, and then the control activities may perhaps be adjusted to measures that are locally acceptable.

Performance monitoring, hence can:

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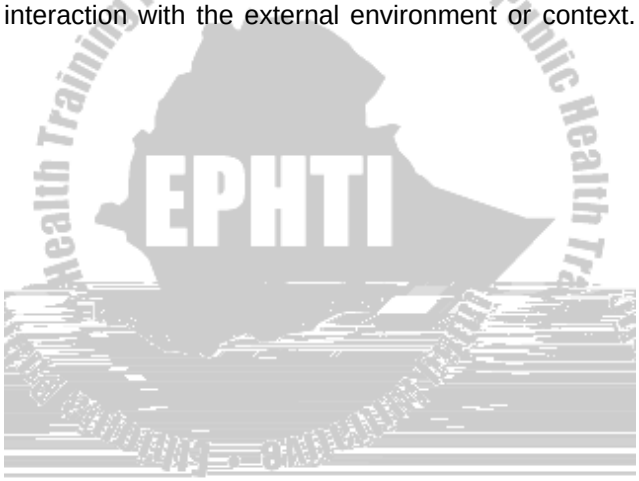
frameworks is one way to develop a clear understanding of the goals and objectives of the control activities with emphasis on the objective or measurable objectives. Developing monitoring and evaluation frameworks also help to clearly define the relationships among factors key to the implementation and success both internal and in interaction with the external environment or context.



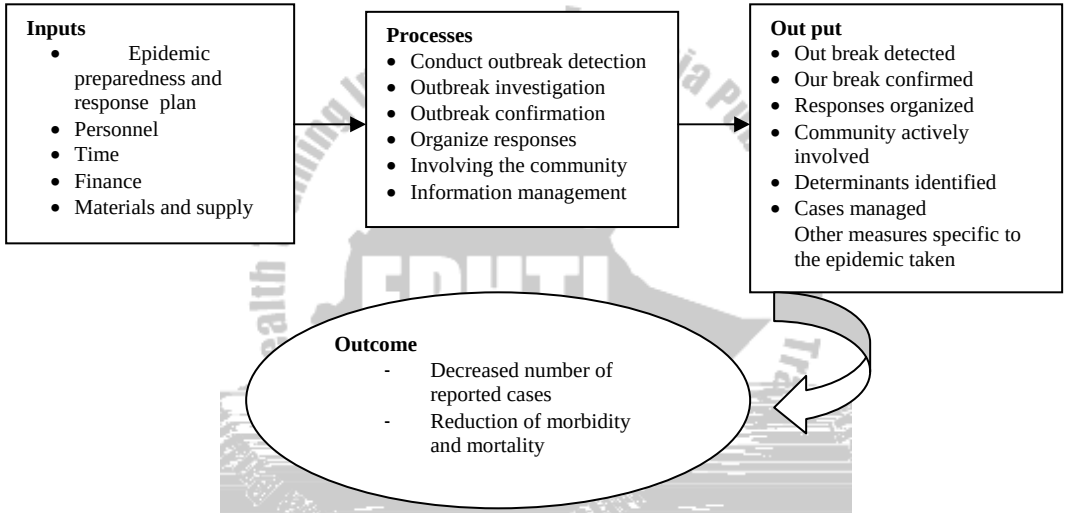


Fig. 4..1. Logical framework of monitoring and evaluation for epidemic control activities

4.5 Indicators of performance monitoring and evaluation for epidemic investigation and management

The above logical framework enables to formulate monitoring and evaluation indicators. An indicator is a variable that measures one aspect of a program or project. The purpose of indicators typically is to show that a program activity has caused a change or difference in something else. Therefore an indicator of that change will be something that we reasonably expect to vary. Its value will change from a given or baseline level at the time the intervention starts, to another value after the intervention has had time to make its impact felt, when the variable, or indicator, is calculated again. Secondly, an indicator is a measurement. It measures the value of the change in meaningful units for program management that can be compared to past and future units and values. In other words, calculation of an indicator establishes the objective value at a point in time with a metric for some factor of interest to program goals. Even if the

factor itself is subjective, like attitudes of a target population, the indicator metric calculates its value objectively at a given time. Thirdly, an indicator focuses on a single aspect of a program or project. It may be an input, an output, or an overarching objective, but its related indicator will be narrowly defined in a way that captures that aspect as precisely as possible. A full, complete, and appropriate set of indicators for a given project or program in a given context with given goals and objectives will include at least one indicator for each significant element of the intervention. An indicator as shown in the logical framework can be:

Input indicators: - the number and type of personnel, the amount of money allocated etc

Process indicators: - outbreak detection, confirmation and control (the quality of early warning system, flow of epidemiological information, laboratory confirmation of the diagnosis, case definition, case management, education campaigns, surveillance, others

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-It will have an appropriate range and number of clearly operationalized indicators,

- It will draw on a variety of appropriate data sources and kinds of data;
- It will include baseline and target values appropriate for the program in its particular Operational context, for each indicator; and
- It will spell out a plan and schedule for data collection, including estimations of the financial and technical resources that will be required to achieve each element of that plan, in such a way that all stakeholders are aware of and commit to their share of responsibility for ensuring the Data System functions as designed.

Monitoring and evaluation of epidemic investigation and management vary accrding to which level it serves. These may include:

- Policy or Program Level
- Population Level
- Service Environment Level

- Client Level
- Spatial/Geographic Level

The data sources for the monitoring and evaluation for epidemic investigation and management may come from:

- Case surveillance (e.g., epidemiology of disease)
- Medical records
- Interview data
- Sentinel surveillance systems
- Sample households or individuals

Tools for monitoring and evaluation of epidemic investigation and management include:

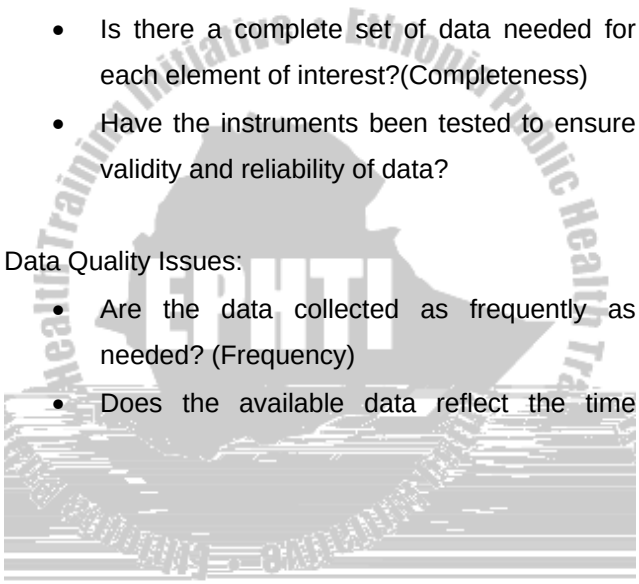
- Case reports
- Client register analysis
- Patient flow analysis
- Direct observation

Data Quality Issues related to monitoring and evaluation of epidemic investigation and management:

- Will the data cover all of the elements of interest? (Coverage)
- Is there a complete set of data needed for each element of interest?(Completeness)
- Have the instruments been tested to ensure validity and reliability of data?

Data Quality Issues:

- Are the data collected as frequently as needed? (Frequency)
- Does the available data reflect the time



CHAPTER FIVE
EPIDEMIC-PRONE DISEASES AND THEIR MANAGEMENT IN ETHIOPIA

Learning objectives: At the end of this chapter, student will be able to:

- Describe the epidemiological characteristics of the common (epidemic–prone) diseases;
- Describe the risk/precipitating factors for occurrence of outbreaks of different epidemic-prone diseases;
- Describe the case definitions for different epidemic-prone diseases;
- Describe the investigation and management activities of epidemics of different diseases.

Introduction

Among the communicable diseases included in the integrated disease surveillance system in the

country, 11 of them are under the list of diseases labeled as epidemic-prone. However, this manual has included those epidemic-prone diseases that are known to cause epidemics in the country. These include cholera, bloody diarrhea (shigella), measles, meningitis, yellow fever, typhoid fever, relapsing fever, epidemic typhus and malaria. In addition, leishmaniasis (kala-azar) and avian human influenza are included to increasing attention they are given at national level.

In this chapter, epidemiology and characteristics of each of the specific disease, risk factors, case definition, epidemic investigation and management procedures of the respective diseases are briefly presented.

5.1 Bloody diarrhea

Epidemiology and Characteristics of the disease

Bloody diarrhea has been ranked among the top 10 causes of morbidity in under five children in Ethiopia. Its occurrence is widespread throughout Ethiopia and is associated with outbreaks.

Bloody diarrhea is caused by bacteria including shigella, E. coli, non-typhoid salmonella, campylobacter jejuni. It is also caused by E. hystolytica.

Shigella dysenteriae is the most common cause of enteric infections. Large-scale epidemics may be caused by shigella dysentariae type 1(SD1) with up to 30% of the population infected. The case fatality rate may approach 20% among young children and elderly persons with severe dehydration and in state of malnutrition. The incubation period is from 1 to 4 days.

Clinical illness is characterized by acute fever and bloody diarrhea and can also present with systemic

symptoms and signs as well as dehydration especially in young children.

Transmission: Shigella dysentriae is transmitted from person-to-person through fecal-oral spread.

Favoring transmission:

Overcrowded areas with unsafe water and poor sanitation (for example, refugee and famine population).

Case definition

Suspected case:

A person with diarrhea and with visible blood in stool.

Confirmed case:

Suspected case with stool culture positive for shigella dysentariae 1.

Investigation

- Interrogate the case to determine factors contributing to transmission.

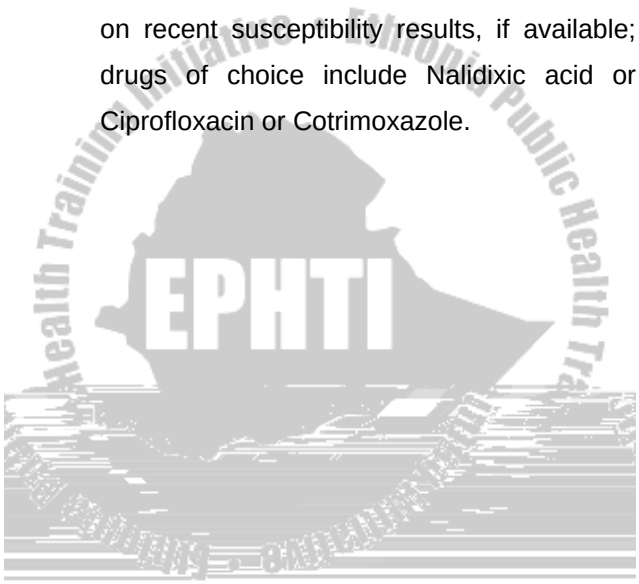
- Obtain stool or rectal swab specimen for confirming the epidemic.

General Management

- Report the suspected case to the next higher level of the health system.
- Search for additional cases in locality of confirmed case.
- Mobilize community to enable rapid case detection and treatment.
- Identify high-risk populations using person, place, time data.
- Reduce sporadic and epidemic-related cases by promoting hand washing with soap or ash and water after defecating and before handling food, strengthening access to safe water supply and storage, and use of latrines and safe disposal of human waste.

Specific management

- Assess patient for dehydration and rehydrate with oral rehydration solution or I.V fluids accordingly (annex 2.1) and
- Treat suspected case with antibiotics based on recent susceptibility results, if available; drugs of choice include Nalidixic acid or Ciprofloxacin or Cotrimoxazole.



ice to treat bloody diarrhea due to S. dysentariae type 1

		oxacin	**Cotrimoxazole** (trimethoprim + sulphamethoxazole) Give two times daily for 5 days
Weight	Tablet 250 mg	Tablet 250 mg	
Children'			

s dose					
3-5 kg	1/4	1/4	1/4	2	5.0 ml
6-9 kg	1/2	1/2	1/2		
10-14 kg	1	1	1	3	7.5 ml
15-19 kg	1	1	1	3	7.5 ml
20-29 kg	2	2	1	6	15 ml
Adult dose					

5.2 Cholera

Transmission: It is transmitted mainly through eating or drinking contaminated food or water; that is, cholera is spread through the fecal-oral route.

Determinants:

Environmental factors:

Confirmed case of cholera: Any person with diarrhea who has V. cholera 01 or 0139 isolated from their stool.

Investigation

- Maintain surveillance through watching for increase in the baseline number of cases of cholera in endemic areas and be alert for a single case in non-endemic area.
- Obtain laboratory confirmation
- Investigate suspected cases

General management

- Convene epidemic committee
- Inform the public concerning the need to seek appropriate treatment without delay
- Implement control measures
    - Health education on safe drinking water, hand washing, food safety, and seeking treatment early.
    - Provision of safe and adequate water

- Safe disposal of excreta
- Disposal of bodies and disinfection

- Collect and report data/document epidemic

Specific management

- Assess patient for dehydration and rehydrate with oral rehydration solution or I.V fluids accordingly (annex 2.1) and
- Treat suspected cases of cholera with antibiotics using recommended drugs. Drugs of choice are listed in the table below.

Table 5.2. Antibiotic drugs of choice to treat cholera

Antibiotic	**Children**	**Adults**
Doxycycline	---	300 mg
Tetracycline (4 times		

per day for 3 days)		
Erythromycin	10 mg/kg (3times per day for 3 days)	250 mg (4times per day for 4 days)

Doxycycline is WHO's antibiotic of choice for adults (except pregnant women) because only one dose is required.

TMP-SMX is WHO's antibiotic of choice for children. Tetracycline is equally effective, but may not be available for pediatric use in some countries.

Furazolidone is the antibiotic of choice for pregnant women.

Use erythromycin or chloramphenicol if the other recommended antibiotics are not available, or where V. cholera strains are resistant to them.

5.3 Malaria

Epidemiology and Characteristics of the disease

Malaria is one of the most serious and complex health problems of human beings. It causes 300 million to 500 million episodes of acute illness and 1.2 million deaths per year globally. It is the leading cause of death in children under 5 years in sub-Saharan Africa and, in some countries, accounts for one quarter of such deaths.

Malaria is a major public health problem in Ethiopia. It has been consistently reported as one of the three leading causes of morbidity and mortality in the past years. The magnitude of the problem in 2002/2003 has even worsened and the disease has been reported as the first cause of morbidity and mortality accounting for 15.5% out-patient consultation, 20.4% admissions and 27.0% in patient deaths. In non-epidemic year, 5-6 million clinical malaria cases and over 600,000 confirmed cases are reported from health facilities.

Malaria is caused by pr

c) Man-made increase: deterioration of vector control operations, inadequate management of surface waters, increased irrigation and other development activities, insecticide resistance, destruction of cattle and/or houses (e.g. through disaster or war) leading to increase man/vector contact.
d) Immigration of non-immune into an endemic area.
e) Immigration of infective into a receptive non-endemic area.
f) Resistance to anti malarial drugs.

Case definition

Uncomplicated malaria:

Any person with fever or fever with headache, back pain, chills, sweats, myalgia, nausea, and vomiting diagnosed clinically as malaria.

Confirmed uncomplicated malaria:

Any person with fever or fever with headache, back pain, chills, sweats, myalgia, nausea, vomiting and with laboratory confirmation of diagnosis by malaria blood film or other diagnostic test for malaria parasites.

Severe malaria

Any person hospitalized with a primary diagnosis of malaria and confirmed by a positive blood smear or other diagnostic tests for malaria.

Investigation

- An epidemic should be suspected when there is an unusual increase in the number of new malaria cases or deaths compared to

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Prophylaxis

- Prophylaxis: Mefloquine 5 mg/kg/week

5.4 Measles

Epidemiology and Characteristics of the disease

Measles is a febrile rash illness due to paromyxovirus (morbillivirus). Measles virus is spread via the respiratory route and is transmitted extremely efficiently. Measles is characterized initially by fever, cough, runny nose, and malaise, making it indistinguishable from many other viral respiratory infections for the first several days, during which the child is highly infectious. A characteristic rash then appears. The incubation period is 7 to 18 days from exposure to onset of fever.

Before widespread use of measles vaccine, measles was consistently one of the leading causes of death among children worldwide, accounting for an estimated 20-30%of such deaths. Large epidemics occur every few years in areas with low vaccine

coverage and where there is an accumulation of persons who have never been infected or vaccinated. The World Health Organization estimates that measles still causes 45 million cases and 1 million child deaths, with over 50% of these in Sub-Saharan Africa.

Transmission: Airborne by droplet spread and direct with nasal or throat secretions of infected persons.

Determinants:

- In the absence of vaccination, every child in an area where measles virus is circulating would be expected to contract measles.
- Living in overcrowded urban areas.
- Large family size, travel patterns, and types and locations of social interactions (for example, market-places).
- Immuno-compromized individuals

Case definition:

Suspected case:

Any person with fever and maculopapular (non-vesicular) generalized rash and cough, coryza or conjunctivitis (red eyes) OR any person in whom a clinician suspects measles.

Confirmed case:

A suspected case with laboratory confirmation (positive IgM antibody) or epidemiological link to confirmed cases in an epidemic.

Threshold level for epidemic: 5 cases per week in a health facility.

Investigation

- Report suspected case to the next level.
- Collect blood sample for confirming the epidemic.
- Investigate the case or epidemic to identify causes of epidemic.

General management

- Improve routine vaccine coverage through the EPI, and lead supplemental vaccination activities in areas of low vaccine coverage.
- Isolation of children or should be kept out of school at least 4 days after appearance of the rash.

Specific management

a. Case management of uncomplicated measles

Many children will experience uncomplicated measles and will require only supportive measures:

- Give vitamin A, first dose in the health facility or clinic; give the mother one dose to give at home the next day.
- Advise mothers to treat the child at home as long as no complications develop
- Provide nutritional support: continue breast feeding or give weaning foods and fluids at frequent intervals and treat mouth ulcers
- Control fever by keeping the child cool

- Instruct to return for further treatment if the child's general condition worsens or any of the danger signs develop
- Explain to mothers that there is an increased risk of diarrhoea, acute respiratory infections and other infections in the weeks following measles and encourage them to seek medical advice early.
- Immunize close contacts, if they are identified within 72 hours of exposure.

Supplementary measles immunization should focus on areas not yet affected, but where the outbreak likely to be spread. Start immunization immediately.

Target age group: during epidemics the recommended age to be included in the supplemental immunization is 6 months to 5 years. Depending on the attack rate, children older than 5 years can be consider (e.g. school-age children).

b. Case management of complicated measles

In developing countries, at least three-quarters of cases can be expected to have at least one complication and some may have multiple systems involvement.

Actions to be taken in cases of complication include:

- refer to health facility for further management
- follow the above recommendations for case management of uncomplicated measles

AND

- ensure that two doses of vitamin A are given
- clean eye lesions and treat with 1% tetracycline eye ointment three times a day for 7 days (for corneal lesions, cover the eye with a patch) - vitamin A administration is particularly important to minimize the risk of potentially blinding eye lesions: in this situation, use a third dose of vitamin A four weeks later using the same dosage and age as in table 2.
- clean ear discharge and treat with antibiotics

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Haemophilus influenzae, or *streptococcus pneumoniae.*

Epidemics of bacterial meningitis due to meningococcus (*N. meningitides*) are more likely to occur in sub-Saharan Africa, in an area known as the "African meningitis belt" (or "Lapeyssonnie's belt". Meningococcus is a gram-negative bacterium. Within this species, 12 serogroups have been identified A, B, C, D, X, Y, Z, W135, 29E, H, I, L. Serogroup A, is predominantly involved during epidemics. Type C is also involved although to a less extent.

Meningococcal meningitis was first recognized in Ethiopia in 1902. Outbreaks were reported in 1935, 1940, 1950, 1964, 1981 and 1989. The 1981 and 1989 outbreaks were the largest ever recorded in Ethiopia with 50, 000 cases, 990 deaths in 1981, 45, 806 cases, and 1686 deaths in 1989. The 1981 epidemic affected the northern and western parts of Ethiopia but that of 1989 affected all regions of the country.

Transmission: human to human via airborne droplet spread.

Determinants of the disease:

The following factors are thought to favor infection by meningococci:

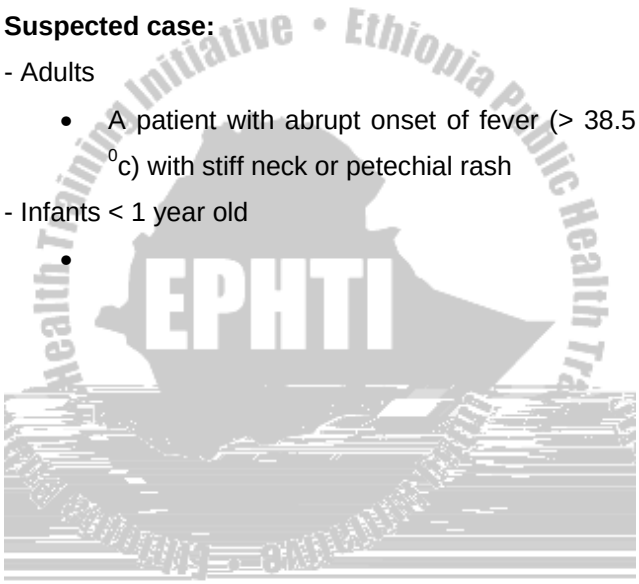
- Increase virulence of the organism from groups, A, B and C and virulence of certain clones within a serogroup;
- Alteration of an individual's nasopharyngeal mucosa because of climatic changes, such as cold dry whether or seasonal winds or because of a viral infection;
- Immune deficiency;
- Overcrowding: transmission is increased

less common in those over the age of 30, with 80 to 90 percent of cases occurring in those below this age.

Case definitions

Suspected case:

- Adults
  - A patient with abrupt onset of fever (> 38.5 ^{0}c) with stiff neck or petechial rash
- Infants < 1 year old
  -



Confirmed case:

- Suspected or probable case with latex agglutination or pastorex positive for N. meningitides. OR
- Positive culture of CSF or blood with identification of N. meningitides.

Threshold level for epidemic

- An epidemic of meningitis can be declared when 15 cases are reported per 100,000 inhabitants per week.
- If the population is less than 30 000, 5 cases in a week or doubling of the number of cases over a three week period (e.g. week one: 1 case, week two: 2 cases, week three: 4 cases). An increase in the number compared to the same time in previous years is also adequate to declare an epidemic of meningitis.
-

including mass vaccination, when two cases of meningitis are confirmed, irrespective of the population size.

Investigation

- Confirm the clinical diagnosis of meningitis in the index case.
- Obtain CSF samples from as many patients as possible.
- Identify the causative organisms by gram stain of CSF, culture and latex agglutination test.
- If a meningococcus is incriminated as the cause of an out break:
  a) Determine its serogroup
  b) Determine its drug sensitivity.

General management

If criteria for epidemic threshold rates are met the following actions are necessary:

- Intensify active surveillance for the detection of cases.

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Table 5.4. Standard treatment of meningitis in urban area:

Drugs	Dosage: Per kg Per 24 hrs.	Average Individual dose	Route	Duration
Crystalline penicillin	350,000 500,000	1-4 yrs 1 mega unit	IV/IM	5-7 days
Crystalline penicillin	350,000 500,000	5-11 yrs 2 mega units	IV/IM	5-7 days
Crystalline penicillin	350,000 500,000	>12 yrs 3 mega units	IV/IM	5-7 days

Note: In conditions where intravenous infusions are difficult to maintain, procaine penicillin G, 1 million

Standard treatment for rural areas:

Long acting chloramphenicol in oil (500mg/2ml)

Presentation and route of administration: Vial (2ml) = 500mg for IM injection only.

The preparation must never be given intravenously.

The required dosage should be split in to two volumes, each half to be given at separate site.

Age group	Dose in mg/gm	Dose in ml
6mos-1 year	500 mg	2ml
12-23 months	1.0 gm	4ml
2-5 years	1.5 gm	6ml (in 2 sites)
6-9 years	2.0 gm	8 ml (in 2 sites)

Duration of therapy

-

- No contraindication in pregnancy and

highland areas, especially during the cold rainy season.

Transmission: humans acquire infection when infected body lice are crushed and their fluids contaminate mucous membranes or breaks in the skin. Spirochetes are not transmitted directly by the bite of a louse or by inoculation of louse feces.

Determinants:

- Epidemics are common in wars, in famine or in other situations where malnourished, overcrowded populations with poor personal hygiene, such as in prisons.

Case definition:

Suspected case:

Any person presented with an abrupt onset of rigors with fever, usually remittent, head ache, arthragia and myalgia, dry cough, epistaxis.

Confirmed case:

A suspected case with demonstration of Borrelia in peripheral blood film.

Investigation

- Investigate the case to determine the risk factors contributing for the transmission.
- Investigate contacts and keep all immediate contacts under surveillance.
- Collect specimen for laboratory.

General management

- Report the index case to the next level.
- Search for additional cases in locality of confirmed cases.
- Interrupt the infection chain by delousing using 10% DDT or soaking or steaming clothing and bed sheets in boiling water.
- Conduct community education on personal and environmental hygiene.

- Analyze the cases by time, place and person and take actions to improve the epidemic control activities.
- Establish regular reporting system.

Specific Management

Treat any individual suspected and confirmed cases with appropriate therapy in closely monitored setting.

Single dose of penicillin, is usually accompanied by less frequent and less severe reaction. However, some patients may fail to clear the spirochetes or experience a relapse. While single dose of Tetracycline is associated with more frequent and severe reaction, there is little treatment failure or few or no relapse.

The drug of choice is therefore,

1. Penicillin G, 400,000-600,000 unit IM, followed by oral Tetracycline 500 mg every 6 hours for 2 more days.
2. Erythromycin 500 mg as a single dose for pregnant mothers and children.

3. Close monitoring of fluid balance in cases of Jerish-Herxhemier reaction that may occur following antibiotics treatment.

5.7 Typhoid Fever

Epidemiology and Characteristics of the disease

Typhoid fever is a systemic bacterial disease characterized by insidious onset of fever, severe headache, malaise, anorexia. It is caused by **Salmonella typhi**; a gram negative, aerobic, rod like organism.

Human beings are the only reservoirs of infection. All ages and both sexes are susceptible. About 2-4% of typhoid patients become chronic carriers of the infection. Food handlers, especially if they are intermittent carriers are particularly dangerous and have been responsible foTD-028S y eidem5.9(n)7.3(ei-13.6vgoaa ty)9.3t03/pp6.7(ersme-5.8(i0 T

and urine of patients and carriers. Flies may infect foods in which the organism multiplies to achieve an infective dose.

Risk factors:

- Areas without safe water supply
- Areas without good sanitation

Case definition

Suspected case:

Any person with gradual onset of remittent fever (rising in step ladder fashion) in the 1st week, headache, arthralgia, anorexia, constipation and

Investigation

- Investigate the case to determine risk factors contributing to transmission.
- Obtain blood or stool specimen for confirming the epidemic.

General management

- Report the suspected case to the next higher level of the health system.
- Search for additional cases in the locality of confirmed cases.
- Strengthen case management and treatment.
- Mobilize community to enable rapid detection and treatment.
- Identify high-risk populations using person, place, time data.
- Reduce sporadic and epidemic-related cases by:
    - Promoting hand washing with soap or ash and water after defecating and before handling food,

- Strengthening access to safe water supply and storage, and
- Use of latrines and safe disposal of human waste.

Specific management

- Treat the suspected cases with antibiotics based on recent susceptibility results, if available.
- Chloramphenicol 500 mg four times a day for 14 days for adults is a drug of choice or Ciprofloxacin 500 mg oral twice a day for 5-7 days
- Chloramphenicol 50-100mg/kg body weight for 14 days for children.

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Specific management

Treat any individual suspected and confirmed cases with appropriate therapy in closely monitored setting.

Treatment of Typhus

1. Tetracycline 500mg PO QID for 7 to 10 days for adults except pregnant women or Chloramphenicol with same dose for adults including pregnant mothers.
2. Chloramphenicol 50-100mg/kg body weight for 7 to 10 days for children.

distributed throughout the low lands of Ethiopia with varying degree of endemicity. The most important

immunity during a previous epidemic. Males are affected more often than females in a ratio of 4:3.

Transmission: the disease is transmitted to humans by the bite of a tiny 2 to 3 millimeter-long insect vector, the phlebotomine sandfly.

Risk factors:

- Movement of non-immune people into potential visceral leishmaniasis endemic; areas
- Malnutrition;
- Ecological change in favour of the sand fly vector.

Case definition

Suspected case:

Any person with irregular bouts of fever, substantial weight loss, swelling of the spleen and liver, and anemia.

Confirmed case:

A suspected case with demonstration of the parasite in stained smears from spleen, bone-marrow, lymph gland aspirates or blood.

Investigation

- Investigate the case to determine risk factors contributing to transmission.
- Perform serological test for suspected cases.
- Make/obtain confirmed parasitological diagnosis in stained smears from spleen, bone-marrow, lymph gland aspirates or blood.

General management

- Report the suspected case to the next higher level of the health system.
- Search for additional cases in locality of confirmed cases.
- Strengthen case management and treatment.

- Mobilize community to enable rapid detection and treatment.
- Identify high-risk populations using person, place, time data.
- Reduce sporadic and epidemic-related cases by:
    - Personal protection using insect repellants applied to the skin and insecticide-impregnated bed nets or curtains;
    - Spraying of residual insecticides inside and around house;
    - Clearing the sites (used for resting and breeding) of certain species of sand fly vectors.

Specific management

- Treat the confirmed cases with sodium stibogluconate or other available effective alternative drugs.

5.10 Yellow fever

Epidemiology and Characteristics of the disease

Yellow fever is viral hemorrhagic disease caused by a flavivirus. Large scale epidemics occur every 3 to 10 years in villages or cities worldwide. Sporadic cases can occur regularly in endemic areas. The incubation period is 3 to 6 days after the bite from an infected mosquito. While only the minority of cases are, severe, case fatality rate may be 25% to 50% among patients with syndrome of hemorrhage, jaundice, and renal disease.

Transmission: transmitted human-to-human via the bite of aedes mosquitoes (urban epidemic) or via forest mosquito species and forest primate reservoir (jungle cycle).

Determinants:

- Sporadic cases often linked to occupation or village location near woods or where monkeys are numerous.

- Non-vaccinated persons.

Case definition

Suspected case:

A person with acute onset of fever followed by jaundice within two weeks of onset of first symptoms. Hemorrhagic manifestations and renal failure may occur.

Confirmed case:

A suspected case with laboratory confirmation (positive IgM and viral isolation) or epidemiologic link to confirmed cases or epidemics.

Investigation

- Collect specimen for laboratory confirmation
- Investigate the case to determine how transmission occurred.
- Plan for an immunization activity.

General management

- Report case-based information immediately to the next level.
- Mobilize community early to enable rapid case detection and treatment.
- Conduct a mass campaign in appropriate age group in the area (ages 6 months and older) and in areas with low vaccine coverage.
- Identify high risk population groups and take steps to reduce exposure to mosquitoes.

Improve routine and mass vaccination campaigns to include yellow fever in high risk areas.

Specific management

- Treat and manage the patient with supportive care administered under a bed net (ORS for rehydration, paracetamol for fever) and strict isolation procedures.

5.11 Avian Human Influenza (AHI)

AI is an infectious disease caused by influenza type **A** virus which occurs naturally in all birds, especially wild water birds (e.g. ducks). Birds carrying the virus spread it through saliva, nasal secretions and feces. Today, there is no vaccine for preventing the infection and also it is unclear that if antiviral medications that are commonly used for influenza are effective.

Definition:

Avian Influenza /fowl plague/ bird flu / is a zoonotic viral disease that affect chickens, turkeys, other wild birds and human being.

Types of AI

1. Low pathogenic AI (LPAI)
    - Most common influenza infection in birds
    - Causes mild and in-apparent infections
    - May be any subtype

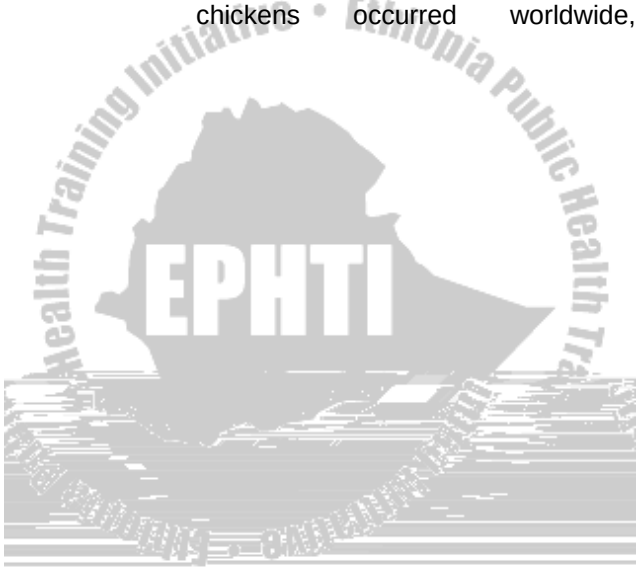
2. Highly pathogenic AI (HPAI)
    - Some H5 or H7 subtypes
    - Causes severe illness in poultry and often death
    - LPAI H5 or H7 subtypes can mutate into HPAI H5 or H7 subtypes
    - Current H5N1 is the common type

Epidemiology and characteristics of disease

An epidemic of the disease was reported since 1510 and there were 4 pandemics in the 19th Century and 3 in the 20th century. The past experience indicates that there is no regularity to pandemics and no reliable basis for predicting when/where that might arise.The most recent cause for concern occurred in December 2003 that confirmed the cause of

Since the current epidemic of 2003:-

- 50 countries have reported an outbreak in their Animals
- Efforts to control the outbreak (culling or death of > 150 million chickens occurred worldwide,



air passenger transport, land based communication and the opening of tourism will hasten the spread of pandemic influenza in few weeks.

Transmission:

The way of spread to Human:-

- Touching an infected bird, fluids or surfaces contaminated with fluids from infected birds
- Close contact with live or improperly cooked poultry
- Exposure during slaughter and preparation of domestic poultry for cooking
- Contact with dead wild birds or their parts
- Wild bird migration
- Animal and human populations in

animal markets (many species from many countries)

- Poor agricultural practices (inadequate infection control on farms, poultry excrement used in agriculture e.g., fed to pigs)

Determinants of infection:

- Within 7-10 days before symptoms begin:
  - Close contact with live, sick, or dead birds
  - In setting with confined birds
  - Contact with contaminated surfaces or environments
  - Ingestion of uncooked infectious poultry
  - Travel or residence in area affected by avian influenza outbreaks in animals…etc
- Uncertain risk of person to person spread:

- Face to face contact
- Touching or within 1 meter of suspected or diagnosed H5N1 patient without proper precautions
- Touching or being within 1 meter of a person who has severe pneumonia or dies from an acute respiratory illness without proper precautions…etc

Case Definition

Community case:

- Sudden onset of Fever,
- Cough,
- sore throat and /or shortness of breath

and

- Have been in contact during the 7 days prior to the onset of symptoms with birds, including chickens, that have died of an illness or persons presenting with the above symptoms

Suspect/Probable case:

- Fever (>38°C)

and

One or more of the following symptoms:

- Cough;
- sore throat;
- shortness of breath

± diarrhea, vomiting, bleeding, conjunctivitis, abdominal pain and pleurisy

and one or more of the following:

- Laboratory evidence for influenza A by a test that does not sub-type the virus.
- Having been in contact during the 7 days prior to the onset of symptoms with a confirmed case of Influenza A/H5 while this case was infectious.
- Having been in contact during the 7 days prior to the onset of symptoms with birds, including chickens, that have died of an illness or presenting with the above symptoms.

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AND

- limited laboratory evidence for Influenza A/H5 (H5 specific antibodies detected in a single serum specimen)

Confirmed case:

An individual for whom laboratory testing demonstrates one or more of the following

- Positive viral culture for Influenza A/H5
- Positive PCR for Influenza A/H5
- Positive Immunofluorescence antibody (IFA) test
- 4-fold rise in Influenza A/H5 specific antibody titer in paired serum samples

Investigation

- Identification of a single case is considered an epidemic
- Immediately reportable disease -24 hr
- Reported - case based reporting format.

- Recommended specimen should be collected timely, properly stored and transported.
- Zero reporting/week should be initiated and instituted
- Usually the investigation procedure will have three phases:

a. Pre-Investigation

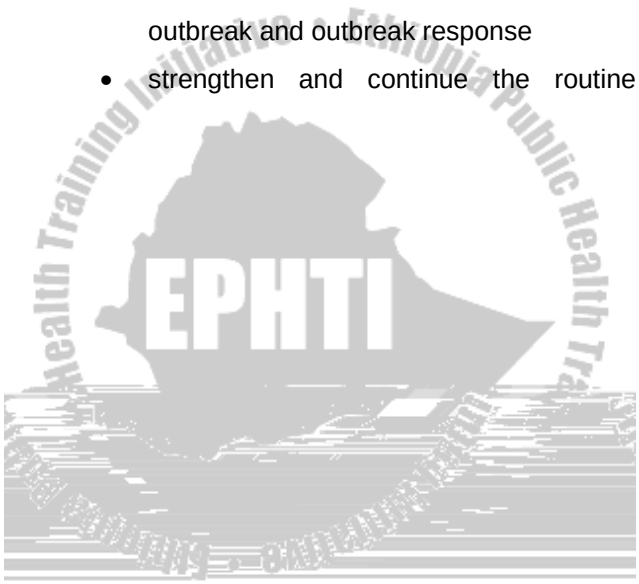
- Planning the Response

b. Investigation

- Case Definition
- Specimen Collection
- Case Finding
- Interviewing
- Contact Identification
- Reporting
-

Epidemic management

- manage cases effectively to prevent complications
- identify cause of the outbreak
- inform the general public about the outbreak and outbreak response
- strengthen and continue the routine



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Helpful Principles for outbreak investigation and management of such illnesses in school settings include:

6.1.1 The schools health unit should be alert of epidemic possibilities

Any disease in which the occurrence is unusual over a given time period - such as two or more cases of hepatitis, salmonella, etc - should be reported to the local body responsible for initiating investigation and control measures. An unexpectedly high absentee rate with symptoms such as diarrhoea, fainting, rash, illness, or vomiting should alert school personnel to the existence of possible outbreaks in school. The speeds with which disease occurrences need to be reported are very much dependent on the incidence/prevalence of the disease and the action that needs to be taken to address it.

6.1.2 Start investigation as early as possible

During an outbreak in school and possible exposure in school, an investigation should be started

immediately. The school health team and representatives from administration should contact the Public Health Authority of the locality in order to control the epidemic. An investigation should be started to determine the cause and measures to contain the epidemic and prevent a reoccurrence should be taken.

An investigation involves gathering lots of information as quickly as possible. Information gathered will come from laboratory testing of specimens, interviewing both those who are cases and those who are not cases and from onsite assessments of the environment.

Methods of investigation inenes ancomee environt cacome28746ironment.1

national communicable disease surveillance system. In conducting active surveillance, involving students like class representatives is proven effective in epidemic preparedness and management.

6.1.4 Effective communication can't be overemphasized

In addition to the real concerns about the spread of disease, there will often be problems of communication, relationships with administration, faculty, parents, other physicians in school, as well as dealing with publicwith tefa*iTlbefa*m ua/TT2 1 TfT*-0.TD0 Tculty, a6co d-f6l, ale433

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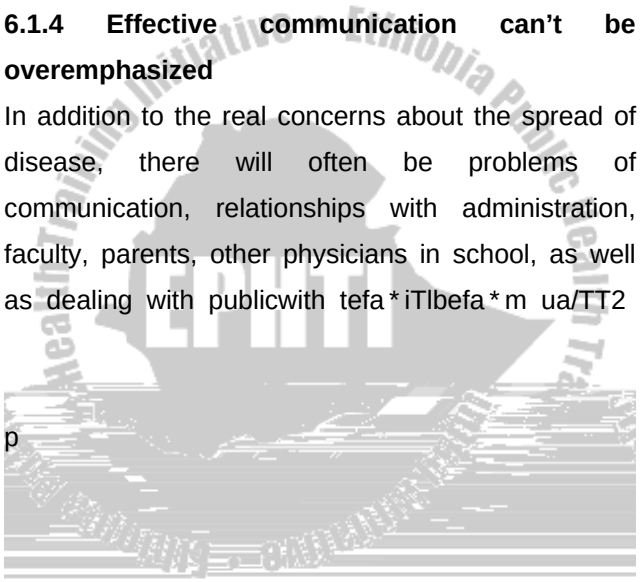

6.1.5 Learn from the epidemic to prevent occurrence of similar future epidemics

Once an outbreak is controlled, it is important that the lesson learned from the investigation is used to

responsible for health care delivery or social welfare;

for funds. Prisoners are often housed in overcrowded facilities with inadequate ventilation, hygiene and sanitation. Food that is provided can be unappealing and nutritionally inadequate.

Health services may be weak or absent. Illegal behavior such as the use of alcohol, drugs or sexual activities (with or without consent) may continue unchecked. Such conditions are ripe for the outbreak of epidemic diseases, particularly communicable diseases including TB and HIV.

6.2.2 Prisons and communicable disease epidemics

Prisons can act as breeding grounds for communicable diseases, and can introduce new, unhealthy practices (drug use, unsafe sex). People often enter prison with less healthy lifestyles than the general population, having been more likely to abuse alcohol, tobacco and illegal drugs, more likely to suffer mental disorder and at increased risk of communicable diseases. Vigorous health promotion programs can improve the lifestyles of both prisoners

and prison staff, and may also improve their productivity and morale.

Prisoners are members of the general population: they come from and usually return to the community. The relationship between the health of prisoners, their families and the wider community is thus an important concern. Limiting the spread of communicable diseases in prison benefits both prisoners and the wider community.

In general, reducing the rate of incarceration through penal reform is fundamental to improving prison health. By decreasing overcrowding, transmission of infectious disease can be reduced, and living conditions can be substantially improved. In addition, fewer prisoners can mean greater resources to improve prison conditions both for prisoners and staff. But, specifically there are recommended actions for the common epidemic prone diseases in prison settings.

6.2.3 Epidemics of Tuberculosis in prisons

6.2.3.1 Why is Tuberculosis an epidemic prone disease in prison settings?

TB is reported to be up to 100 times more common in prisons than in the civilian population.

The reason why Tuberculosis is among the epidemic prone diseases in prison settings is that a collection of risk factors for development and spread of the disease co-exist in prisons. This concentration of risk factors can ignite TB epidemics that are not restricted to the confines of a prison. These factors include:

inadequate treatment of infectious cases, high turnover of prisoners through repeated transfers within the prison system, release and recidivism, overcrowding, poor ventilation, etc.

3. Prisoners are also at risk of rapid progression to TB disease following recent infection or reactivation of latent infection through: co-existing pathology, particularly HIV and intravenous drug use, poor nutritional status and physical/emotional stresses.

If TB in prisons is to be controlled effectively, all of these factors must be acknowledged and addressed wherever possible.

The rate of Multi Drug Resistant Tuberculosis (MDR-TB) is also more common in prison settings as factors that encourage transmission of regular TB will enhance the spread of Multi Drug Resistant TB. In addition, various prison aspects may particularly enhance the development of MDR-TB. These include: fewer resources and weaker health care provision than for the society in general, leading to

erratic drug supplies and inadequate treatment, failure to complete supervised treatment courses through repeated inter prison transfer where treatment completion is not assured, release during treatment when TB services are not accessible, hidden defaulting through coercion by other prisoners or a desire to remain a 'TB patient' and receive better living conditions, etc.

These factors must be addressed as a priority to prevent the development of epidemic drug-resistant TB.

6.2.3.2 Methods of Tuberculosis Epidemic Control in Prison settings

a. Early diagnosis and Treatment of TB cases in prisons

The risk of transmission of TB infection depends on the concentration of infectious droplets in the air and the duration of exposure. The greatest risk of TB epidemic in prisons is therefore when a case of TB in prison remains undiagnosed or ineffectively treated. Hence, the most effective way to reduce transmission

of TB is the early diagnosis and effective treatment of infectious TB cases.

Many of the factors which promote TB transmission can be remedied by simple and inexpensive administrative measures to obtain early identification of cases and prompt initiation of effective treatment of infectious cases.

Early diagnosis of potentially infectious TB patients is possible, for instance, by screening at entry, effective case-finding through self-referral, use of cough registers, training and education program for staff and visitors, effective procedures and timely communication between laboratory and health personnel, etc.

Effective treatment of infectious TB cases is possible by rigorous direct observation of treatment (DOT) and smear monitoring until the completion of treatment.

b. Isolation of prisoners with infectious tuberculosis

It is standard infection control practice in hospitals for patients with infectious TB to be separated from other patients until treatment has rendered them non-infectious. In most cases this takes about two weeks from the start of effective treatment. Similarly, prisoners suffering from infectious TB should be housed separately from other prisoners until they are non-infectious. Where MDR-TB is not common, this should be after a minimum of two weeks directly observed treatment and clinical improvement. Where MDR-TB is common, at least one negative smear is also required.

Separate housing does not necessarily mean an entirely separate facility. However, a separate building or room should be allocated for infectious cases if at all possible. Care should be taken to avoid contact between infectious cases and other prisoners in bathing, dining or recreational rooms and punishment cells. If a centralized treatment facility is used, it is recommended to create separate

departments (preferably units with non-shared air/ventilation) for patients: being assessed for TB disease (diagnostic unit), with smear-positive TB, with smear-negative pulmonary and extra pulmonary TB and those who have become smear-negative through treatment (if they are not to be transferred back to their prisons of origin), who refuse or default from treatment and with chronic TB.

This separation is useful for operational reasons where there are large numbers of patients and may reduce the risk of re-infection or super-infection. Where multi drug resistant disease is common, separation of infectious cases from other prisoners is extremely important because of the difficulties and expense of treating these forms. Separate housing should be maintained at least until smear negativity is confirmed.

taken to limit transmission of infection (e.g. ensure meetings take place in well ventilated areas).

c. Improving ventilation in prisons

Most simply, involves maximizing natural ventilation and controlling the direction of airflow by opening windows or external doors at opposite ends of a room and using fans. Other more complex and costly methods include: Mechanical ventilation (air extraction fans, exhaust ventilation systems, air filtration or ultraviolet germicidal radiation, etc. Other methods must be maintained in a good state of repair and installed with expert guidance and if used, should be prioritized to the highest risk areas (e.g. sputum collection rooms, laboratories, autopsy suites).

d. Encouraging personal respiratory protections in prisons

Personal respiratory protections include wearing surgical masks. Surgical masks are not designed to protect the wearer. However, infectious TB patients

may wear surgical masks to protect others during transport or meeting visitors for example. However, care should be taken not to stigmatize.

TB patients, and health education and information should accompany the distribution of masks.

e. Evaluation of epidemic control measures

Evaluation of implementation of infection control measures (e.g. proportion of new entrants screened for TB, time between suspicion of TB and request for sputum analysis, time from collection of sputum to receipt of results, time from receipt of positive result to initiation of treatment).

f. Other measures

Prophylactic treatment must be considered for infants born to mothers with active TB (isoniazid 5-10mg/kg per day for 6 months). These infants should subsequently be vaccinated with BCG. TB treatment of the mother does not preclude breast-feeding and where possible breast-feeding should continue.

BCG vaccination acts by preventing the spread of TB bacilli in the body after initial infection rather than reducing the risk of infection.

It has only been consistently demonstrated to reduce the risk of progression from infection to disseminated disease in children, while its protective role in adults is unclear. BCG should, however, be given to all children born in prison, as soon as possible, according to the Expanded Programme of Immunization (EPI) schedule. Children under 5 who enter prison to live with their parents should be vaccinated with BCG, if there are no contraindications and they did not receive the vaccination as an infant.

6.2.4 Epidemics of HIV in prisons

6.2.4.1 Why is HIV an epidemic prone disease in prison settings?

Rates of HIV in detained populations are thought to be up to 75-fold than in civilian populations. This is because, like for Tuberculosis, prisons present a high concentration of risk factors for the transmission of

HIV infection. These include the facts that: a disproportionate number of inmates come from, and return to, backgrounds where the prevalence of HIV infection is high, risk behaviors such as intravenous drug use and unsafe sexual practices (with or without consent) commonly occur in prisons, risk behaviors and HIV may not be officially acknowledged so hindering efforts at education regarding safer practices, interventions to reduce risk of HIV infection (such as the provision of clean injecting equipment or condoms) may be restricted or considered unacceptable, there may be a high frequency of tattooing using un sterilized equipment, presence of other sexually transmitted diseases (e.g. syphilis) in prisons, etc.

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c. Providing **medically supervised** narcotic detoxification programs (e.g. narcotic substitution) for addicts.

d. Making condoms freely and confidentially available.

6.2.5 Epidemic of other health problems in prisons

Prisons also present other communicable disease risks to staff and inmates. These include transmission of blood-borne or sexually transmitted

6.3 Epidemics in hospital settings: Epidemic of nosocomial infections

Hospital-acquired infections (Nosocomial Infections) can be defined as those that were neither present nor incubating at the time the patient was admitted. However, the symptoms might occur after the patient is discharged from the hospital. For example, for surgical site infection, as many as 70% of infections may present after discharge.

Nosocomial infections continue to be a major cause of morbidity and mortality. These infections prolong hospital length of stay, increase mortality, and raise the overall cost of healthcare.

Principles:

6.3.1 Early notification

The Infection Control Unit of the hospital should be notified about clusters of nosocomial infection, resistant and or epidemiologically important organisms or communicable diseases in patients, staff, or visitors. In some instances, one case of an

infection may require a response, in other diseases clusters or an increases in occurrence.

6.3.2 Follow the following procedures

1. Verify diagnosis of identified patients;
2. Confirm existence of an outbreak;
3. Institute initial control measures (proper isolation);
4. Develop a working case definition;
5. Direct nursing units to identify patients who have been exposed during an outbreak;
6. Find cases (by interview, chart review and microbiologic surveillance, as indicated);
7. Evaluate previous hospital experiences with the organism or disease; list (line) cases
8. Create epidemic curve;
9. Develop a presumptive hypothesis on which to initiate additional reasonable control measures;

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6.3.4- Put nosocomial infection surveillance in place

If not yet in place, the occurrence of one epidemic is a good opportunity to commence surveillance of nosocomial infections in hospital settings so that future similar outbreaks can be prevented. Hospital programmes of infection control (IC) should include surveillance to detect common source outbreaks, identify problem areas, help set priorities for infection control activity, and meet national standards. Surveillance can also provide data to help convince clinicians and managers of the need for improvements in infection control practices. Surveillance must be performed in a systematic way with the aim of reducing rates of hospital infection. Surveillance results should be fed back to clinical and managerial staff and should lead to action.

The purpose of Nosocomial Infection Surveillance is to:

a) detect and monitor adverse events,

b) assess risk and protective factors,

of HAI) is compared with a standard. By repeated audit cycles, practice is brought closer to the ideal.

It is often more meaningful and more useful to use surveillance data from a single institution to measure trends over time, either to alert staff to increasing problems or to monitor the effectiveness of interventions.

Formal surveillance of infections requires each patient to be assessed, often repeatedly, by trained staff. For this reason, true infection surveillance (and especially incidence surveillance) is very expensive due to the need for staff time. Because of this, surveillance is often done routinely by analysing laboratory reports, or by informal ward visits, or by a combination of the two.

However, it must be recognised that these methods are not accurate. Laboratory reports are not always indicative of true infection. Negative reports (or no report) do not always mean infection is absent.

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Health action plan

Disasters are often associated with health problems as the susceptibility of people to diseases increases with deprivation of basic necessities such as food and shelter. Every time a disaster is anticipated, a health plan should be prepared at any level of the health system. The plan should include the following tasks:

- Health and nutritional surveillance of the affected areas.
- Mass immunization of vulnerable population in the event of likely outbreak of epidemics, particularly against measles and meningitis.
- Regular and periodic disinfection of sources of drinking water.
- Medical examinations of children in schools and supplementary vitamins e.g. vitamin A.
- Early detection of malnutrition.
- Activities concerning the establishment and utilization of therapeutic feeding centers.
- Coordination of all stakeholders with respect to health measures.

- Provision of basic sanitation services.
- Timely procurement of commonly used

health workers in early diagnosis and treatment. In principle, the three main methods of control are dealing with the source of infection; interrupting transmission; and protecting susceptible individuals (see the details on chapter two).

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Annexes

Annex 1. Outline for preparing epidemic preparedness and response plan of epidemic prone diseases

Part I- The organism and disease	**Part II- Prevention and Control**	**Part III- Epidemic Control**
1.1 Description about the nature and magnitude of the problem	List of prevention and control strategies of control, prevention and elimination phase of the disease epidemic/out break	3.1. Management
1.2 Description about causative organism		3.2. Method of Detection
1.3 The pathogenesis and clinical		3.3. Means of confirmation

problems - including case definition		
1.4 Mood of Transmission and immunity		3.4. Planning for a response, Defining and agreement on planned response, management of response, method of provision of public information and list of post-out break activities
1.5 Treatment - including method of diagnosis, clinical assessment , management based on severity and classification of the diseases		

Anex 2. Treatment of diarrhea

Steps in diarrhea management:

1. Assess for dehydration
2. Rehydrate the patient
3. Antibiotics for cholera and dysentery
4. Feed the patient
5. Teach the patient and family

Assess degree of dehydration (DHN)

Assessment of the diarrhea patient for dehydration			
. LOOK AT CONDITION	Well, alert	Restless, Irritable	Lethargic or unconscious; floppy
EYES	Normal	Sunken	Very sunken and dry
THIRST	Normal	Thirsty, drinks eagerly	Drinks poorly or not able to drink
2. FEEL SKIN	Goes back	Goes back	Goes back

PINCH	quickly	slowly	very slowly
3. DECIDE	The patient has no No sign of DHN	If the patient has two or more signs of the above signs, there is some DHN	If the patient has two or more signs of the above signs, there is severe DHN

a. Rehydration of patient with severe DHN – treatment Plan C

- Start IV fluid immediately
  - Ringers lactate is best
  - Also give ORS if patient can drink, about 5ml/kg/hr
- Monitor very frequently
- Completely reassess adults after 3 hours and infants after 6 hours.

Ringer's lactate IV

Age	First give 30 ml/kg in	Then give 70 ml/kg in
Infants (< 12 months)	1 hour	5 hours
1 year and over	30 minutes	2.5 hours

If the weight is known, calculate the amount of ORS by multiplying the patient's weight in kg by 75.

c. ORS for patient with No DHN – treatment Plan A

Age	Amount of ORS after each loose stool	Give enough ORS packets for:
< 24 months	50 – 100 ml	500 ml/day
2-9 years	100 – 200 ml	1 liter / day
10 years and over	As much as wanted	2 liters / day

Patients who showed no signs of dehydration when they were first assessed or patients who improved from dehydration and showed no dehydration may be treated at home.

Annex 3. Malaria treatment

a) First-line treatment

The first-line treatment of P. falciparum is arthemether-lumefantrine admistered for 3 days. For infants less than three months or five kg of body weight and pregnant women in the first trimester, oral quinine administered 3 times a day for 7 days.

Arthemether-lumefantrine: Tablet containing 20 mg Arthemeter plus 120 mg Lumefantrine in a fixed dose combination.

35+	> 10 years	4	4	4	4	4	4

b) Second-line treatment

If a P. falciparum positive patient returns back to facility with fever or history of fever between the 4th day and 14th day after treatment with Artemether-Lumefantrine, do blood examination for malaria parasites. In addition, ask the patient if he/she has vomited the drug or had diarrhea after treatment. Check also whether the drug taken is of reliable brand and is not expired. If the blood film is positive for asexual malaria parasites and other conditions are excluded, administer oral quinine if condition of the patient permits.

Quinine 8 mg base/kg 3 times daily for 7 days

Weight (kg)	Age (years)	Oral (tablets) dosage to be given daily	
		200 mg salt	300 mg salt
4-6	2-4 months	1/4	-
6-10	4-12 months	1/3	1/4
10-12	1-2 years	1/2	1/3
12-14	2-3 years	3/4	½
14-19	3-5 years	3/4	½
20-24	5-7 years	1	¾
25-35	8-10 years	1 1/2	1
36-50	11-13 years	2	1 ½
50+	14+	3	2

Quinine dosage for severe falciparum malaria:

Whenever IV administration of quinine is not possible:

1. Quinine 20 mg salt per kg loading dose IM in 2 divided doses, anterior thigh.

2. Then quinine 10 mg salt per kg IM every 8 hours until patient can swallow.
3. Then administer Artemether-Lumefantrine as indicated above or oral quinine if the first drug is not available. However, if a patient has a history of intake of artemether-lumefantrine before complications developed, give quinine tablets 10 mg salt per kg every 8 hours to complete 7 days treatment.

Whenever IV administration of quinine is possible:

Loading dose:

- Quinine 20 mg salt/kg of body weight by infusion over 4 hours, in 5% dextrose saline (5-10ml/kg of body weight depending on the patient's overall fluid balance).

Maintenance dose:

- Twelve hours after the start of the loading dose, give quinine 10mg salt/kg of body weight in dextrose saline over 4 hours.
- Repeat the same dose of quinine (i.e. 10 mg salt/kg) every 8 hours until the patient can take oral medication.
- Then administer Artemether-Lumefantrine as indicated above or oral quinine if the first drug is not available. However, if a patient has a history of intake of artemether-lumefantrine before complications developed, give quinine tablets 10 mg salt per kg every 8 hours to complete 7 days treatment.

Annex 4. Setting a threshold for malaria epidemic or preparing a norm-chart

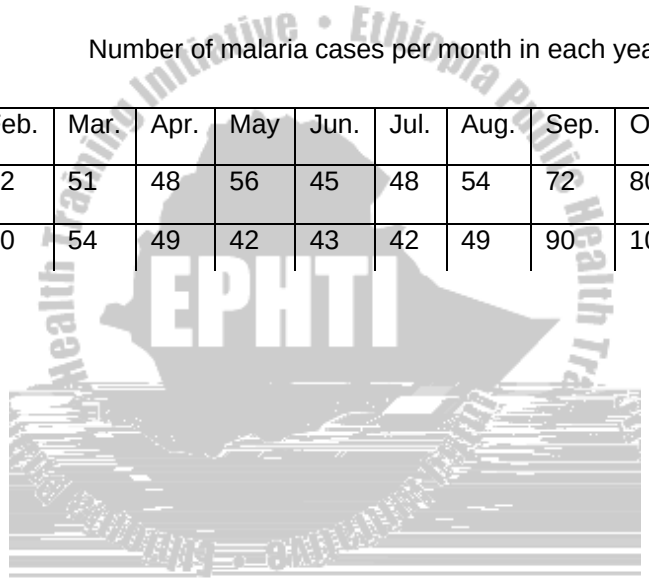
Steps:

1. Look at the number of malaria cases at specific health facility or district by month for the past 5 years excluding epidemic years.
2. Determine the 3rd quartile for the monthly series by identifying the 4th highest number from the bottom in each data series (since data is ranked in ascending order). This is the 3rd quartile representing the upper limit of the expected normal number of malaria cases.
3. Plot the 3rd quartile for each data series by months for the 5 year period and join the points with a line. The line represents the upper normal limit of the expected number of cases.
4. Plot the monthly malaria cases that visited a

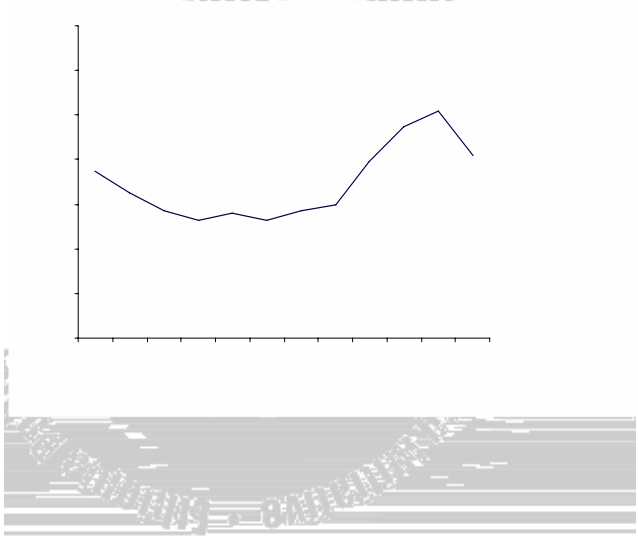
above the 3rd quartile (upper limit), this is an indication of a possible malaria epidemic.

Example: Number of malaria cases in certain health facility by month for consecutive five years along with the median and the 3rd quartile for each month for the five year is shown in the table below.

Year	Number of malaria cases per month in each year											
	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
2001	75	62	51	48	56	45	48	54	72	80	85	74
2002	67	60	54	49	42	43	42	49	90	104	102	82



From the hypothetical and 3rd quartile given in the above table, a graph can be prepared as follows. A second line represents a year report of certain health facility (HF) plotted on a monthly basis to show how current data is compared with the norm-chart.



Annex 5. Specimens for laboratory confirmation for epidemic prone disease

Suspected disease or condition	Diagnostic test	Specimen
Cholera	**Isolate V. cholerae from stool culture and determine 01 serotype using poly valent antisera for V. cholera 01**	**Liquid stool or rectal swab**
Diarrhea with blood (shigella dysenteriae type) and other shigellae	**Isolate shigella dysenteriae type 1 (SDI) in culture**	**Stool or rectal swab**

Malaria	**Presence of malaria parasites in blood films for suspected cases**	**Blood usually fingers - stick sample**
Measles	**Presence of IgM antibodies to measles virus in serum**	**Serum**
Meningitis	**- Microscopic examination of CSF for gram negative diplococci** **- Culture and isolation of N. Meningitis from CSF**	**- Cerebral Signal Fluid (CSF)** **- If CSF is not available blood culture**
Typhoid fever	**Blood and stool culture**	**Stool or blood and**

	ELISA test	**serum**

Disease	Use for reporting suspected priority diseases by health facilities	Use for community level

	coryza or Conjunctivitis (red eyes) or any person in whom a clinician suspects measles. A measles death is a death occurring with in 30 days of on set of the rash.	
Meningitis	**Any person with sudden on set of fever (> 38.5^{0}c rectal or 38^{0}c axillary) and one of the following signs: neck stiffness, altered consciousness or other meningeal signs**	**Any person with fever and neck stiffness**
Typhoid fever	**Fever chills gradually increasing and persisting headache, rash, abdominal pain, diarrhea or constipation, delirium, and**	**Any person with fever, constipation or diarrhea, delirium and prostration**

	prostration	
Relapsing fever	**Fever lasting 2-9 days and with afebrile period of 2-4 days**	**Any person with fever that relapses after a febrile periods**
Epidemic Typhus	**Sudden onset of headache, chills, prostration, fever and general pairs possibly with macular eruption that initially appear on the trunk followed by a spread to other body parts except the face, the soles and palms**	**Any person with sudden asset of headache and fever with chills, general pains with or with out rash.**
Malaria	**Uncomplicated malaria** **Any person with fever with headache, back pain, chills, sweats, myalgia, nausea and vomiting diagnosed clinically as**	**Any person with fever or fever with headache, back pain, chills, sweats, myalgia, nausea and vomiting.**

	malaria **Confirmed uncomplicated malaria** **Any person with fever or fever with headache, back pain, chills, sweats, myalgia,**	
Yellow fever	**Any person with sudden onset of high fever (>39^{0}c rectal or 38^{0}c axillary) followed by**	

Annex 7. IDS case-based surveillance reporting form

Reporting health facility:					**Repor ting Woreda/zone**			
6 7 IDS Case-based Reporting Format From Health Facility/Health Worker to Woreda/zone health office/department								
Cholera	Dracunculiasis	Neonatal Tetanus	Measles	Meningitis	Plague	Viral hemorrhagic Fever	yellow Fever	Others/Sp ecify
Date of form received at the national level: / / (Day/Month/Year)								
Name of patient:								
Date of birth (DOB): / / Day/Month/Year)				**Age (if DOB unknown):**				
						Year	Month (if<12)	Day (NNT only)
Sex:		M= Male F= female						
Patient's Address:								

Locating Information:			
	If applicable or if the patient is neonate or child, please write full name of mother and father of the patient		
Date seen at Health Facility: / /	**Date Health Facility Notified woreda/Zone:** / /	/ / **Date of Onset:**	
Number of vaccine doses received:		9 = unknown	
	For cases of Measles, NT (TT in mother), yellow Fever, and Meningitis (For Measles, TT, YF-by card & for Meningitis, by history)		
Date of last vaccination:	/ /		
	(Measles, Neonatal Tetanus (TT in mother), yellow Fever, and Meningitis only)		
Blank variable #1 of the case:			
Blank variable #2 of the case:			
In/Out Patient	1= Inpatient	2= Outpatient	
Outcome	1= Alive	2= Dead	3= Unknown

Final classification of case	1=Confirmed	2= Probable	3= Discarded	4=Suspect
Person completing the form; Name:		**Signature:**		
Date form sent to Woreda/zone: / / (Day/month/Year)				

Cholera direct exam; specify the method used:					
Meningitis: N Meningitidis		Culture			
		Latex			
		Gram stain			
Meningitis: S pneumonia		Culture			
		Latex			
		Gram stain			
Meningitis: H influenza		Culture			
		Latex			
		Gram stain			
Shigella Dysenteriae		Culture			
		Type	/Type1	/Other types	/ No shigella
Typhoid Fever	Widal ("0" > 1:160)				

	Blood Culture				
	Stool culture				

Annex 8. Case Study: Epidemic preparedness and response plan for Measles outbreak

This plan adopted from WHO guidelines for Epidemic preparedness and response for Measles outbreak, Geneva, Switzerland, May 1999. It describes the way the plan should be designed and what issue should be dealt to have a comprehensive plan. This can be also taken as a sample to prepare epidemic preparedness and response plan in the context of specific disease entity using the same steps (see annex 1).

Part I. The organism and Disease

1.1 The nature and magnitude of the problem

Measles ranks as one of the leading causes of childhood mortality in the world. Before measles vaccine became available, virtually all individuals contracted measles with an estimated 130 million cases each year. Humans are the only natural host. Measles is a highly communicable infection. In Ethiopia,

1.2 The organism

Measles virus is a paramyxovirus of a single

Any person with fever, and maculopapular rash (i.e. non-vesicular), and cough, coryza (i.e. runny nose) or conjunctivitis (i.e. red eyes)

1.4 Transmission and immunity

Transmission is airborne, by droplet spread or by direct contact with the nasal and throat secretions of infected persons. And also it is communicable from slightly before the prodromal period to four days after the appearance of the rash.

Natural infection produces a lifelong immunity. Measles vaccine induces long-term and probably lifelong immunity in most individuals.

1.5 Treatment

1.5.1. Diagnosis: use of standard cased definition (as a clinical case definition in part 1.3)

1.5.2. Clinical assessment: Children must be examined for the following signs and symptoms to

ensure that those with severe complications are properly treated:

Ask if the child has had:

an inappropriate change in the level of consciousness, feeding or drinking

cough, convulsions, diarrhoea, ear pain

discharge from eyes or loss of vision

Examine the child for:

rapid pulse, wasting, sore red mouth

dehydration (thirst, sunken eyes, skin pinch goes back slowly)

pneumonia (rapid breathing, chest indrawing)

ear infection (draining pus, red/immobile eardrum)

eye disease (pus; corneal ulcer, perforation, clouding)

1.5.3. Classification for management: since case management depends on the severity of disease, the degree of severity of the case must be stated:

uncomplicated measles: a child with measles and none of the signs or symptoms of complicated disease

complicated measles: a child with measles and at least one of the signs or symptoms of complicated disease as per following table.

Complications of measles

Acute Complication	**Later complication**
Diarrhoea	Increased susceptibility to other infection
Pneumonia	Blindness
Laryngo-tracheobronchitis	Sub acute scelorsing encephalitis (SSPE)
Otitis media	
Malnutrition	
Corneal ulceration and blindness(due to Vitamin A deficiency)	
Stomatitis	
Acute encephalitis	

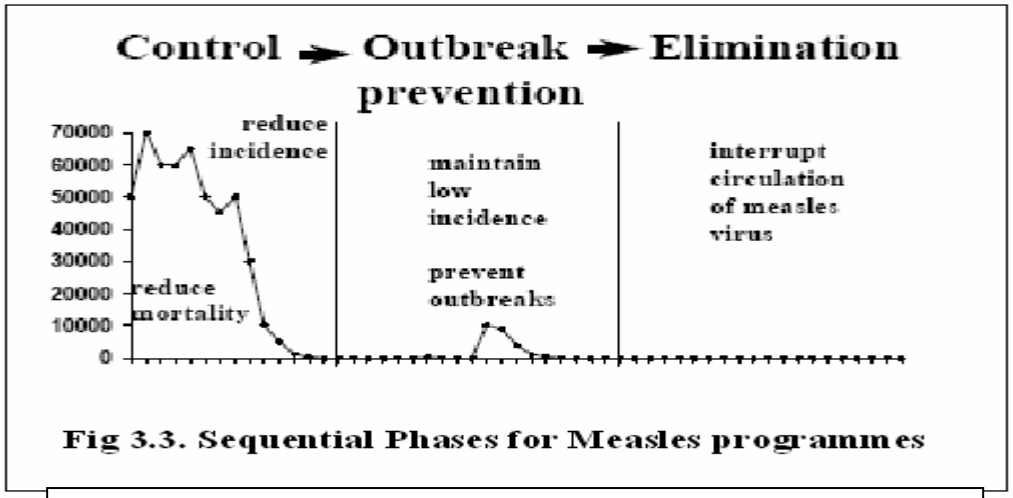


Fig 3.3. Sequential Phases for Measles programmes

Sequential phases for Measles Program

2.2 Measles control phase

The main strategy in this phase is increasing immunization/vaccine coverage, when high levels of vaccine coverage are attained (i.e. vaccine coverage >80%), measles incidence decreases and the intervals between outbreaks are lengthened (e.g., 4-8 years) when compared to those observed during the pre-vaccine era (e.g., 2-4 years)

2.3 Outbreak prevention phase

Once measles have been drastically and persistently reduced through a sustained increase in immunization coverage, out break prevention strategies should be implemented aiming at the prevention of periodic measles outbreaks. These strategies include improved surveillance in order to understand the changing epidemiology of the disease (e.g., changes in the age distribution of cases, etc.) and in order to identify populations at higher risk areas. (i.e. low immunization coverage, poor socio-economic and educational status, overcrowding, migration areas, Poor access to health facilities

and

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Part III. Epidemic Control

3.1 Management

When an outbreak occurs that has not been predicted, or could not be prevented, the response needs to be rapid, since measles is highly infectious and spreads rapidly. This supported by clearly defining surveillance system and out beaks threshold.

3.2 Detection

Detection of an outbreak relies on the ability of the responsible authority (Ministry of Health/Regional or District Health office) to recognise an increase in measles cases significantly above the number normally expected. This recognition is simpler if a routine surveillance system collects either summary or case-based information on clinical and confirmed cases of measles. The availability of such data allows for the establishment of background activity levels and the establishment of a local outbreak (or

epidemic) threshold. This threshold value is usually a number of cases in a defined period in excess of (a predetermined) expected number. The attainment of a threshold value should be considered as signalling an outbreak and should trigger specific responses.

3.3 Confirmation

When an outbreak is suspected:

- A preliminary case investigation must be carried out to confirm the diagnosis, assess the extent of the outbreak and identify the population at risk. This is best done by health workers using a suspected measles investigation form, seeking details on cases (e.g. clinical syndrome and immunization status) and contacts.
- It is important that blood samples be collected from the initial 10 reported cases of an outbreak, to confirm or not whether measles virus is the cause of the outbreak.

- hen blood samples should be taken and sent to central/national laboratories, which allows for confirmation of an out break.

3.4 Response

- prediction of, and preparedness for, further outbreaks.

Epidemic committee

The epidemic committee may include the following representative:

National/Regional/ District governmental officials

The Ministry of Health/ Regional or District Health Office (experts on communicable diseases, EPI, drug supply)

Hospitals (clinicians and nurses)

Laboratories

NGOs

Police and armed forces (if possible)

Community leaders and/or representatives

Others as appropriate

The responsibilities of the epidemic response team are to:

Meet in the absence of an epidemic to predict and plan for epidemics

Estimate and identify resources and procedures for

3.4.2 Definition and agreement on response

The main activities during the response to an outbreak will depend on the phase of the immunization programme. The activities to be implemented as a priority during all measles outbreaks will be:

- to prevent measles complications and deaths through early and effective case management
- to review epidemiological data and immunization programme in order to identify the cause(s) of the outbreak
- to increase public awareness of measles infection, treatment and prevention through immunization
- to strengthen existing routine immunization programmes, with particular attention to the identification of high-risk areas.

3.4.3 Management of response

Once a clear strategy has been defined, it is necessary to mobilise and manage the resources

required for the response. These resources will need to be mobilised in a co-ordinated fashion.

3.4.4 Public information

When an outbreak is declared, there is likely to be widespread public concern and media attention. It is important to keep the public informed about the outbreak and the outbreak response. Public information can be transmitted by a number of simple means, either directly to the community via schools or community meetings, or via the mass media such as radio, newspapers and television.

Simple, clear public information material can help to:

- allay fears
- convey public health messages regarding appropriate treatment of cases and immunization.

It is important that such material:

-

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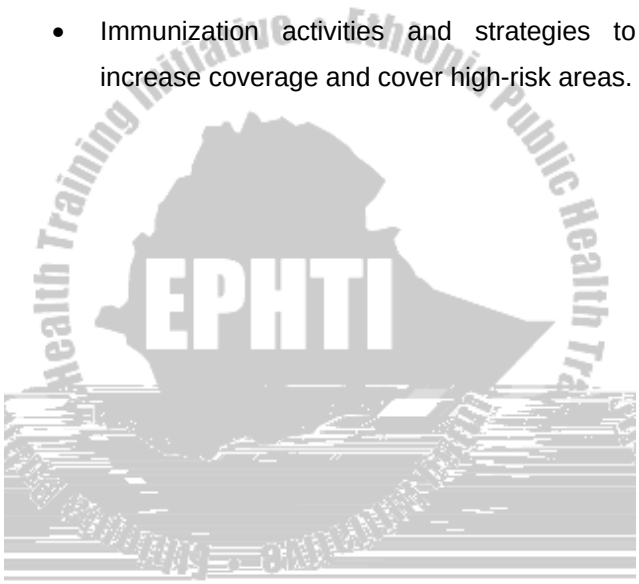
- surveillance (assess the surveillance system; recommend actions to enhance measles surveillance in the affected areas)
- preparedness /recommend action to improve outbreak response
- Immunization activities and strategies to increase coverage and cover high-risk areas.



GLOSSARY

Attack rate: a variant of an incident rate, applied to a narrowly defined population observed for a limited period of time, such as during an epidemic.

Case definition: a set of standard criteria for deciding whether a person has a particular disease

Host factor: an intrinsic factor (age, race, sex, behaviors, etc.) which influences an individual's exposure, susceptibility, or response to the causative organism.

Immunity: resistance usually associated with the presence of antibodies or cells having a specific action on the microorganism concerned with a particular infectious disease or on its toxin.

Inapparent infection: The presence of infection in a host without recognizable clinical signs or symptoms.

Incubation period: a period of sub-clinical or inapparent pathologic changes following exposure, ending with the onset of symptoms of infectious disease.

Infection: The entry and development or multiplication of an infectious agent in the body of persons or animals.

Infectious agent: an organism (virus, rikettisia, bacteria, fungus, protozoan or helminth) that is capable of producing infection or infectious disease.
Mixed epidemic is the type of epidemic usually begins with a common source of infectious agent with subsequent propagated spread.

Nosocomial infection: those infections that were neither present nor incubating at the time the patient was admitted.

Pandemic: an epidemic occurring over a very wide area(several countries or continents) and usually affecting a large proportion of the population.

Pathogencity: the proportion of persons infected, after exposure to a causative agent, who then develop a clinical disease.

Public Health Surveillance: the systematic collection, analysis, interpretation, and dissemination of health data on an ongoing base, to gain

knowledge of the pattern of disease occurrence and potential in a community, in order to control and prevent disease in the community.

Reservoir: the habit in which an infectious agent normally lives, growth and multiply; reservoirs include human reservoir, animal reservoir, and environmental reservoir.

Spot map: a map that indicates the location of each case of a rare disease or epidemic by a place that is potentially a relevant to the health event being investigated, such as where each case lived or worked.

Susceptible host: a person or animal not possessing sufficient resistance against a particular pathogenic agent to prevent contracting infection or disease when exposed to the agent.

Virulence: the proportion of persons with clinical disease, who after becoming infected, becomes severely ill or die.