Republic of Ghana

Technical guidelines for

Integrated Disease Surveillance and Response in Ghana

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Cover: Health workers conduct an immunization session in Kumasi, Ghana.
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Ghana Health Service/ Ministry of Health	**WHO/Ghana**	**WHO/AFRO**	**WHO/Geneva**	**PHR*plus***
Mr. J.K Addo	Dr. J. Amankwa	Dr. N. Agata	Dr. S. Chungong	Ms. C. Quijada
Dr. L. Ahadzie	Dr. M. Eshetu	Dr. W. Alemu		Mr. J. Setzer
Dr. M. Essel Ahun		Dr. M. Kone		
Mr.G. Amenuvegbe		Dr. I. Sow		
Dr. G. Amofah				
Dr.E.K. Ansah				
Dr. F. Bonsu				
Prof. R.K. Britwum				
Dr. K.O. Antwi-Agyei				
Ms. E. Alhassan				
Mr. E.T. Larbi				
Dr. C. Marfo				
Dr. S.B. Ofori				
Dr. S.O. Sackey				
Mrs. M. Quist-Therson				
Dr. A. Twumasi				
Mr. A. Wiah				

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Working Group for Initial Adaptation

Mr. J.K. Addo
Dr. Lawson Ahadzie
Mr. Gregory Amenuvegbe
Dr. Evelyn K. Ansah
Dr. S.O. Sackey

Finalization of First Draft

Dr. Evelyn K. Ansah

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AFRO	African Regional Office
AFP	Acute Flaccid Paralysis
AIDS	Acquired Immunodeficiency Syndrome
CBS	Community-based Surveillance
CBSW	Community-based Surveillance Worker
CDC	U.S. Centers for Disease Control and Prevention
DHMT	District Health Management Team
E-mail	Electronic Mail
EPI	Expanded Programme on Immunizations
GHS	Ghana Health Service
HIV	Human Immunodeficiency Virus
IE&C	Information, Education and Communication
IDSR	Integrated Disease Surveillance and Response
MCH	Maternal Child Health
MOH	Ministry of Health
NGO	Non-governmental Organization
OPD	Outpatient Department
ORS	Oral Rehydration Solution
RHMT	Regional Health Management Team
STI	Sexually Transmitted Infection
TBA	Traditional Birth Attendant
VHC	Village Health Committee
WHO	World Health Organization

Disease surveillance is the process of being watchful and vigilant for health problems and their determinants with the intention to take measures that will control and prevent disease, and thus improve or maintain the health of the population. A single functional disease surveillance system integrated into each level and intervention programme of the health care system is essential for identifying problems and acting to resolve them. Incorporating epidemiological methods into the surveillance system enables health personnel to make evidence-based decisions for public health actions. Specific surveillance objectives guide policymakers towards selecting data that are the most useful to collect and use to set priorities, plan interventions, mobilise and allocate resources and predict or provide early detection of outbreaks – all strategies for disease control and prevention.

This manual adapts for the Ghanaian health system the integrated disease surveillance and response (IDSR) guidelines developed by the World Health Organization (WHO) Regional Office for Africa (AFRO) and the U.S. Centers for Disease Control and Prevention (CDC) for the broader African context. The manual defines IDSR and discusses the various steps of the IDSR process, from collecting data that will help to identify problems, through data analysis that leads to an appropriate response, to evaluating and improving the response and the system itself.

Making IDSR a Regional Strategy for Africa

Building on the experience of successful programmes, WHO/AFRO proposed a comprehensive strategy for improving communicable disease surveillance and response in the African region. In September 1998, the 48th meeting of the Regional Committee for Africa was held in Harare, Zimbabwe. Through resolution AFRO/RC48/R2, member states adopted IDSR as a regional strategy.

To implement IDSR, WHO/AFRO and the CDC developed a system of simplified tools that contain guidelines for disease surveillance and response actions. These guidelines contribute to decision-making based on the use of timely information, selection of appropriate responses and effective use of available resources for preventing and controlling communicable diseases. Many countries, of which Ghana is one, are adapting the guidelines to their national contexts.

What is integrated disease surveillance?

The broad objective of the IDSR strategy is to provide a rational basis for decision making and implementing public health interventions that efficaciously respond to priority communicable diseases. More immediately, ISDR is an effort to protect the public's health by taking measures to prevent communicable disease and by quickly detecting and controlling disease outbreaks that do happen. It is based on the collection and analysis of data that is used to identify and respond effectively to outbreaks, and it is integrated because activities link communities and all programmes and levels of the health system, from individual health facilities, to the district, regional and national levels. It emphasizes standardized, nationwide preparation rather than ad hoc reactions to outbreaks; that is, it secures human and financial resources needed to operate an ongoing, effective system; monitors disease outbreaks, particularly at the local and district levels; confirms diagnoses if necessary through laboratory tests; reports outbreaks in a timely way; responds with the most effective public health intervention based on hard evidence; takes action to prevent future outbreaks; and evaluates the performance of both the intervention and the surveillance system itself. Successful programmes have demonstrated that disease control and prevention are achieved when resources are dedicated to improving the ability of health officials to detect the targeted diseases, obtain laboratory confirmation of outbreaks and use epidemic thresholds at the district level to trigger the needed interventions.

In an integrated system:

- The district level is the focus for integrating surveillance functions. This is because the district is the first level in the health system with full-time staff dedicated to all aspects of public health such as monitoring health events in the community, mobilising community action, encouraging national assistance and accessing regional resources to protect the health of the district's residents.

- All surveillance activities are coordinated and streamlined. Rather than using scarce resources to maintain separate vertical activities, resources are combined to collect information from a single focal point at each level.

- Several activities are combined into a single integrated activity and take advantage of similar surveillance functions, skills, resources and target populations. For example, surveillance activities for acute flaccid paralysis (AFP) can address surveillance needs for neonatal tetanus, measles and other diseases. Thus, health staff who routinely monitor AFP cases can also review district and health facility records for information about other priority diseases.

- Surveillance focal points at the district, regional and national levels collaborate with epidemic response committees at each level to plan relevant public health response actions and actively seek opportunities for combining resources.

IDSR objectives

IDSR aims to improve the capability of districts to detect and respond in a timely and appropriate way to diseases and conditions that cause high levels of death, illness and disability in the district's catchment area. By strengthening IDSR skills and resources, improved health and well-being for district communities can result. To that end, integrated disease surveillance seeks to:

- Strengthen the capacity of health systems to conduct effective surveillance activities

- Integrate multiple surveillance systems so that forms, personnel and resources can be used more efficiently and effectively
- Improve the use of information for decision-making

- Improve the flow of surveillance information between and within levels of the health system

- Improve laboratory capacity and involvement in confirmation of pathogens and monitoring of drug sensitivity
- Strengthen the involvement of laboratory personnel in epidemiological surveillance

- Increase the involvement of clinicians in the surveillance system

- Emphasize community participation in detection and response to public health problems

At any given time, ISDR may also focus on an individual aspect of disease control. For example, a disease control programme may want to know the progress of its prevention activities, so the surveillance team collects age and vaccination status for cases of vaccine-preventable diseases. Related to both prevention and control, the surveillance unit can monitor the epidemiology of a particular disease so that the programme can more accurately identify a geographic area or population at high risk and focus prevention activities or prepare to react to an outbreak. In addition, improving laboratory support for disease surveillance is essential for confirming causes of illness and early detection of outbreaks.

How can IDSR contribute to epidemic preparedness and response?

To be effective, a public health system must maintain its surveillance system at the ready, because when an outbreak of an infectious disease occurs or is detected, there is no time to conduct initial training or assemble supplies. Timely detection of outbreaks must be followed by prompt and appropriate response actions. To save lives, all efforts must be focused on meeting the needs of patients and controlling disease in the community.

The regular data collection and analysis done under IDSR leads to prompt identification and even prediction of outbreaks. This allows health personnel to better understand and anticipate emergencies and therefore to prepare for such situations. For example, a district's epidemic management committee can define each level's role in outbreak response in advance. Combining resources for training and simulations and setting aside adequate amounts of equipment, and vaccines, drugs and other supplies maximises limited resources.

How does information flow in an integrated disease surveillance system?

A system such as IDSR depends on a timely flow of accurate information between levels of the system. Much of the flow is upward from the community and facility levels to the district and thence to the regional and national levels. But a truly integrated system also comprises a downward flow, so that lower levels see how the data they contributed was used, how their problem fits into the broader picture and how the overall system is working. The following narrative describes the flow of information in a disease surveillance system, and Figure 1 depicts the same in graphic form.

An ill person presents to medical attention. Information about the patient is recorded in a register. The register is updated daily to include information for both inpatients and outpatients. At a minimum, the following data are collected: the patient's ID number, date of presentation at the facility (date of onset is not a part of standard outpatient registers), date of discharge (inpatient only), village (location), age, diagnosis, treatment and outcome (inpatient only).

If the clinician suspects a disease or condition that is targeted for elimination or eradication, or if the disease has high epidemic potential, the disease is reported immediately to the designated health staff in the health facility and at the district level. The health facility begins a response to the suspected outbreak. At the same time, the district takes steps to investigate and confirm the outbreak. One action that is taken if an outbreak is suspected is to obtain laboratory confirmation. Laboratory specimens are obtained and the following data are documented: type of specimen, date obtained, date sent to the lab, condition of specimen when received in the lab and lab results. The investigation results are used to plan a response action with the health facility.

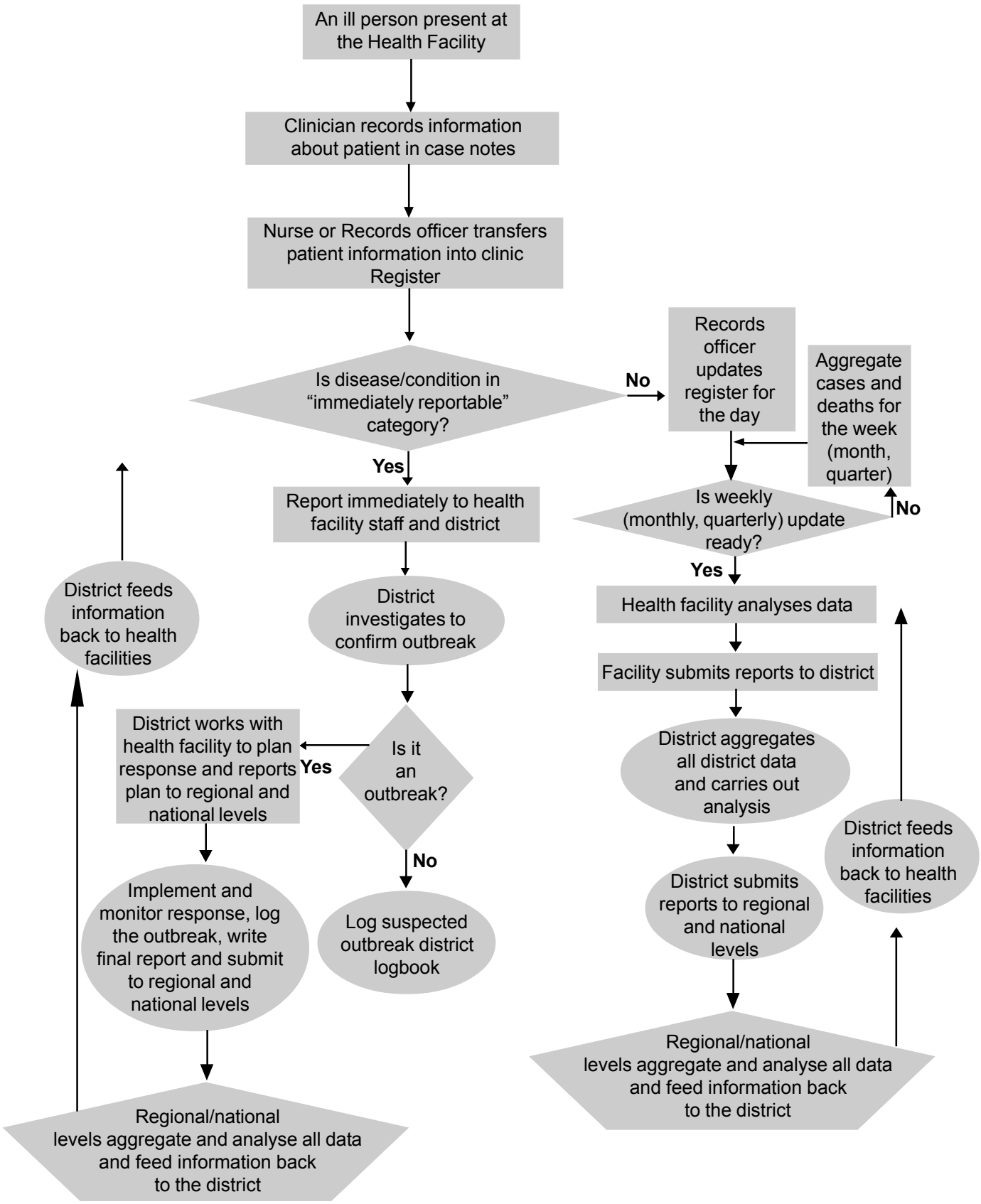
Periodically (weekly, monthly, quarterly), the health facility summarises the number of cases and deaths for each routinely reported IDSR condition and reports the totals to the district. The health facility performs some analysis of the data such as keeping trend lines for selected priority diseases or conditions and observing whether certain thresholds are passed to alert staff to take action.

At the district level, data is compiled monthly for each of the IDSR conditions. The district prepares analyses of time, place and characteristics of the patients such as age and gender for both outpatients and inpatients. These results are sent to the regional and national levels.

The district uses the data to plot graphically the routine surveillance trends and epidemic curves for IDSR conditions. In addition, the district maintains a log of suspected outbreaks reported by health facilities and communities. This list documents the nature of the potential outbreak, the number of possible cases, the dates of investigations and actions taken by the district. It also includes any findings of investigations led by district, regional or national levels.

If action must be taken to contain an outbreak or resolve another public health issue, the district monitors the response and then writes a report about the incident once it has been controlled. The surveillance focal point provides disease-specific data and information to each disease prevention and control programme.

Figure 1: Information flow in an integrated disease surveillance system



How are surveillance functions described in these guidelines?

The WHO/CDC guidelines assume that all levels of the health system are involved in conducting surveillance activities. The many activities that constitute surveillance are grouped into seven steps, described briefly below.

Step 1: Identify cases. Using basic, standard case definitions, identify priority diseases and conditions.

Step 2: Report suspected cases or conditions to the next level. If this is an epidemic-prone disease, investigate and respond immediately.

Step 3: Analyse and interpret data. Compile the data, and analyse it for trends. Compare information with previous periods and summarise the results.

Step 4: Investigate and confirm suspected cases and outbreaks. Take action to ensure that the case or outbreak is confirmed including laboratory confirmation[1] wherever feasible. Gather evidence about what may have caused the outbreak and use it to select appropriate control and prevention strategies.

Step 5: Respond. Mobilise resources and personnel to implement the appropriate outbreak or public health response.

Step 6: Provide feedback. Encourage future cooperation by communicating with levels that originally reported the outbreaks and cases about the investigation outcome and success of response efforts.

Step 7: Evaluate and improve the system. Assess the effectiveness of the surveillance system in terms of timeliness, quality of information, preparedness, thresholds, case management and overall performance. Take action to correct problems and make improvements.

There is a role for each surveillance function at each level of the health system.[2] Each level supports activities at other levels and reinforces the opportunity for successful decision-making at corresponding levels and functions. The levels are defined as follows:

Community: Represented by basic village-level services such as trained traditional birth attendants (TBAs), village health committees (VHCs), unit committee members, village health workers or similar health care providers.

Health facility: For surveillance purposes, all health institutions with outpatient only or together with inpatient facilities are defined as health facilities.

District: The administrative unit usually serves a population between 100,000 and 300,000 people.

Region: The intermediate administrative unit between district and central/national level.

National: The level where policies are set and resources are allocated.

The matrix in Table 1 defines surveillance functions and skills according to the aforementioned steps and how they are achieved at each level of the health system.

[1] In an integrated system, some laboratory services are available at each level, guided by a national-level system of quality assurance and linked to reference laboratories for specific diseases.

[2] In Ghana, the effort to improve surveillance includes all health facilities: public, private and quasi-governmental.

Table 1: Surveillance activities to detect and respond to priority diseases, by level of the health system

	1.0 Identify*	2.0 Report	3.0 Analyse and Interpret
Community	▪ Use simple case definitions to identify priority diseases or conditions in the community	▪ Know which health events to report to the local health facility and when to report them	▪ Involve local leaders in observing and interpreting disease patterns and trends in the community
Health Facility	▪ Use standard case definitions to identify priority diseases or conditions that present in: ▪ Inpatient and outpatient services ▪ Community reports ▪ Record information about suspected cases in clinic register and patient case notes ▪ Use local laboratory capacity to diagnose suspected cases ▪ Use standard protocols to process laboratory specimens ▪ Collect and transport clinical specimens for laboratory investigation	▪ Report case-based information for immediately notifiable diseases ▪ Report data gathered from inpatient and outpatient services and from community and private sector sources ▪ Report summary data to district level ▪ Report laboratory results from screening sentient populations at target sites (for example, STI clinic, MCH service, blood bank)	▪ Prepare and periodically update graphs, tables and charts to describe time, person and place for reported diseases and conditions ▪ Identify and inform district level immediately of any disease or condition that: ▪ Exceeds an epidemic threshold ▪ Occurs in locations where it was previously absent ▪ Occurs more often in a population group than previously ▪ Presents unusual trends or patterns ▪ Interpret results. Discuss possible public health action with district ▪ Observe changes in trends during routine analysis of laboratory results
District	▪ Maintain activities for collecting routine surveillance data in a timely way ▪ Review records of suspected outbreaks ▪ Collect and transport clinical specimens for laboratory evaluation	▪ Support health facilities in knowledge and use of standard case definitions for reporting priority diseases and conditions ▪ Make sure health facility staff know when and how to report priority diseases and conditions ▪ Promptly report immediately notifiable diseases to the regional level ▪ Report laboratory results to regional, national and local officials	▪ Define denominators and obtain data for ensuring accurate denominators ▪ Aggregate data from health locality reports ▪ Analyse case-based data by person, place and time ▪ Calculate rates and thresholds ▪ Compare current data with previous periods ▪ Prepare and periodically update graphs, tables and charts to describe time, person and place for reported diseases and conditions ▪ Make conclusions about trends, thresholds and analysis results ▪ Describe risk factors for priority disease or conditions
Region	▪ Maintain activities for collecting routine surveillance data in a timely way ▪ Support districts to review records of suspected outbreaks ▪ Ensure that districts and health facilities conform to policies and procedures established with national reference laboratory	▪ Support districts and health facilities in knowledge and use of standard case definitions for reporting priority diseases and conditions ▪ Ensure that health staff in the district know when and how to report priority diseases and conditions ▪ Promptly report immediately notifiable diseases to the national level ▪ Report laboratory results to national level	▪ Define denominators and obtain data for ensuring accurate denominators. ▪ Aggregate data from district reports ▪ Analyse case-based data by person, place and time ▪ Calculate rates and thresholds ▪ Compare current data with previous periods ▪ Prepare and periodically update graphs, tables and charts to describe time, person and place for reported diseases and conditions ▪ Make conclusions about trends, thresholds and analysis results ▪ Describe risk factors for priority disease or conditions

Note: STI = sexually transmitted infection, MCH = maternal child health

* Laboratory steps apply to each level with access to laboratory services.

** These steps assume appropriate laboratory capacity.

	4.0 Investigate**	5.0 Respond	6.0 Provide Feedback	7.0 Evaluate and Improve the System
Community	▪ Support case investigation activities such as informing the community of the problem case finding and collecting specimens	▪ Assist health authorities in selecting response activities ▪ Participate in response activities ▪ Mobilise community resources appropriate for response activity ▪ Carry out community health education	▪ Give feedback to community members about reported cases and prevention activities	▪ Decide if public health action took place as planned ▪ Evaluate the community response to the public health action
Health Facility	▪ Take part in investigation of reported outbreaks ▪ Collect, package, or store and transport specimens for laboratory testing ▪ Use investigation and laboratory results to confirm the outbreak ▪ Process and record laboratory results ▪ Provide the results to district health management committee, clinical staff and patient	▪ Treat cases and contacts according to standard case management guidelines ▪ Use appropriate infection control measures ▪ Carry out public health response with the district level ▪ Mobilise community involvement in the response ▪ Advocate for resources	▪ Give feedback to community members about outcome of reported cases and prevention activities	▪ Monitor timeliness and completeness for reporting routine and case-based information to the district level ▪ Evaluate routine detection and reporting of priority diseases and conditions ▪ Evaluate preparedness for and timeliness of response activities ▪ Evaluate appropriateness of case management ▪ Take action to improve reporting practices ▪ Take action to improve readiness for timely response to outbreaks ▪ Maintain contact with community to maintain preparedness and prevention activities ▪ Monitor the interval between receipt of specimens and sending of results ▪ Monitor quality of laboratory results
District	▪ Arrange and lead investigation of reported cases or outbreaks ▪ Assist health locality in safe collection, packaging, storage and transport of laboratory specimens for confirmatory testing ▪ Receive and interpret laboratory results ▪ Decide if the reported outbreak is confirmed ▪ Report the confirmed outbreak to the regional level ▪ Distribute additional specimen collection kits for special surveillance activities	▪ Select and implement appropriate public health response (for example, depending on the plan to strengthen case management, conduct immunization activity, improve control and prevention activities) ▪ Alert nearby areas and districts about the confirmed outbreak	▪ Alert nearby areas and districts about outbreaks ▪ Give health facilities regular, periodic feedback about routine control and prevention activities	▪ Monitor and evaluate program targets and indicators for measuring quality of the surveillance system ▪ Monitor and evaluate timeliness and completeness of reporting from health facilities in the district ▪ Monitor and evaluate timeliness of response to outbreaks ▪ Monitor routine prevention activities and modify them as needed

	1.0 Identify*	2.0 Report	3.0 Analyse and Interpret
National	▪ Establish steps for surveillance of sentient populations ▪ Conduct special surveys to gather information about reported cases, outbreaks and unusual events ▪ Define and update surveillance needs and implement training for and other support to each level ▪ Advocate for adequate resources to support the identification and reporting of cases ▪ Set policies and procedures with national reference laboratory ▪ Use national reference laboratory for maintaining quality control and standards	▪ Set policies and procedures for reporting priority diseases and conditions at each level ▪ Include private sector laboratories in the reporting network ▪ Support reporting activities throughout the system ▪ Provide reports to WHO as required and share information with other partners	▪ Set policies and procedures for analysing and interpreting data ▪ Aggregate data received from district reports ▪ Make sure each level uses appropriate denominators for analysis ▪ Interpret trends from national perspective ▪ Adopt or define action thresholds ▪ Provide training resources for analysing and interpreting data ▪ Analyse data for time, person and place ▪ Analyse map and stratify by district and other factors ▪ Make conclusions based on analysis results ▪ Define public health analysis skills appropriate to each level of personnel in the system

	4.0 Investigate**	5.0 Respond	6.0 Provide Feedback	7.0 Evaluate and Improve the System
Region	▪ Support activities of the district for investigating reported outbreaks: supplies, logistics, equipment, budget ▪ Alert laboratory and support its confirmation activities: supplies, transport, media, logistics, transport of specimens ▪ Notify national level about confirmed outbreak ▪ Distribute additional specimen collection kits for special surveillance activities ▪ Request additional specimens as needed ▪ Take part in epidemic response	▪ Support district health management committees to select and implement appropriate public health response (for example, to strengthen case management, conduct immunization activity, improve control and prevention activities) ▪ Alert nearby areas and districts about the confirmed outbreak	▪ Alert nearby areas and districts about outbreaks ▪ Give health facilities regular, periodic feedback about routine control and prevention activities	▪ Monitor and evaluate program targets and indicators for measuring quality of the surveillance system ▪ Monitor and evaluate timeliness and completeness of reporting from health facilities in the district ▪ Monitor and evaluate timeliness of response to outbreaks ▪ Monitor routine prevention activities and modify them as needed
National	▪ Alert laboratory and support its confirmation activities: supplies, transport, media, logistics, transport of specimens ▪ Support activities for investigating reported outbreaks: supplies, logistics, equipment, budget ▪ Collaborate with international authorities as needed during investigations	▪ Set policies and procedures for responding to cases and outbreaks of priority diseases and conditions ▪ Support epidemic response and preparedness activities ▪ Report and disseminate results of outbreak response in bulletins, media, press releases and briefings	▪ Give feedback about response activities to each level ▪ Give districts regular periodic feedback about routine control and prevention activities ▪ Develop and periodically distribute regional bulletin for epidemiology and public health	▪ Establish and disseminate policies for monitoring surveillance and outbreak response activities ▪ Establish policies and practices for supervising surveillance and outbreak response activities ▪ Evaluate detection and reporting activities and make improvements as needed: ▪ Monitor and evaluate programme targets and indicators for measuring quality of the surveillance system

	4.0 Investigate**	5.0 Respond	6.0 Provide Feed-back	7.0 Evaluate and Improve the System
National	▪ Notify regional international networks about confirmed outbreak ▪ Process specimens from investigation and send timely results as required to each level ▪ Take part in epidemic response			▪ Monitor and evaluate timeliness and completeness of reporting from intermediate levels ▪ Monitor and evaluate timeliness of national support for outbreak response ▪ Monitor and evaluate effectiveness of district level outbreak response activities ▪ Monitor routine prevention activities and modify as needed ▪ Monitor quality assurance for laboratories at lower levels

How can districts strengthen surveillance and response?

Districts can use the matrix in Table 1 to assess the existing surveillance system and profile their role in the system.[3] A district may update its profile to decide where priority activities can take place to improve surveillance and response capacity. The matrix also provides a systematic framework for improving and strengthening a developing system. A checklist in Annex 1 outlines what needs to be in place in order to conduct IDSR.

Practical uses of the matrix include:

- Ensuring that all necessary functions and capacities have been identified
- Establishing accountability to provide a basis for assigning functions to appropriate levels and determining what capacities should be present
- Developing activities and training for human resource development
- Managing and monitoring programmes
- Planning for surveillance and laboratory personnel, supplies and materials

Moreover, the matrix illustrates several key assumptions about surveillance systems.

- If one or more of the elements at each level is not present or is being performed poorly, the risk of failure increases for achieving surveillance and control objectives.
- An effective system will be supported at each level from the levels above and below.
- A complete system minimises any delay in taking public health actions.
- The functions of detection, analysis, investigation, response, feedback and evaluation are interdependent and should always be linked.

What is contained in the guidelines?

The manual sets forth basic general guidance on surveillance and response. Its practical guidelines are intended for use as:

- A general reference for surveillance activities across all levels

[3] Ghana completed an assessment of the surveillance system using an assessment tool developed by WHO/AFRO. The assessment has already resulted in specific plans and activities.

- A set of definitions for thresholds that trigger some action for responding to specific diseases
- A stand-alone reference for level-specific guidelines
- A resource for developing training, supervision and evaluation of surveillance activities
- A guide for improving early detection and preparedness activities for improved and timely response.

Who should use the guidelines?

The information and recommendations in this manual are intended for use primarily by health staff in the disease surveillance coordination units at district and health facilities. However, the information applies also to:

- Surveillance officers/focal points
- Public health units
- Health facility in charges
- District health management teams (DHMTs)
- Regional health management teams (RHMTs)
- National Surveillance Unit staff
- National communicable disease programme managers and managers of the Expanded Programme on Immunizations
- Medical doctors and nursing personnel
- Environmental health officers
- Public health officers and administrators
- Medical and nursing educators
- Public health educators

IDSR in Ghana

Ghana and its health care system

Ghana is centrally located in the West African sub-region and has a total landmass of 238,833 square kilometres. It is bounded on the north by Burkina Faso, on the east by Togo, on the west by Côte d'Ivoire and on the south by the Atlantic Ocean. Provisional results of the 2000 population and housing census conducted in March 2000 indicated that the population of Ghana is 18.4 million. The estimated mid-year population for the year 2001 is approximately 18.9 million based on an estimated national growth rate of 2.5%.

The country is divided into 10 administrative regions that are subdivided into 110 administrative districts. The government administrative machinery is decentralised to the regional and district levels.

The public health care system is organised around the Ministry of Health (MOH) and the Ghana Health Service (GHS). The MOH is the central government agency and administrative authority responsible for the formulation of overall sectoral policy. It is also responsible for monitoring and supervision of service provision. The GHS is an executive agency responsible for the implementation of policy. It is the system through which the government provides health care to the population. The GHS has a hierarchical organisational structure from the central headquarters level in Accra to the regions, districts and sub-districts. Services are delivered through a network of facilities and public health management systems. Services at community, sub-district and district levels constitute the primary health care services delivered in the context of a district health system. The objective of this organisation is to ensure that there is universal access to health care.

In general, the health of Ghanaians is improving. Between 1957 and 1998, infant mortality dropped from 133 per 1,000 live births to 54 deaths per 1,000 live births. Life expectancy increased from 45 years to 55 years. However, the improvements achieved have not been evenly distributed. There is a wide variation in the health of Ghanaians in various regions.

In order to improve the health status of Ghanaians further, the country developed a five-year (1997–2001) Medium Term Health Strategy. The five objectives or pillars of the strategy are:

- Increasing access to health care
- Improving the quality of health care
- Improving efficiency in delivery of care and avoiding waste
- Developing partnership between the MOH and other providers
- Improving financing of health services

The use of an integrated disease surveillance system in monitoring communicable diseases contributes directly to two of these objectives: improving the quality of health care and improving efficiency in delivery of care.

The overall epidemiological picture of Ghana is that of a developing country at the onset of health transition. That is, its burden of disease profile is still dominated by communicable diseases, undernutrition and poor reproductive health, but non-communicable diseases such as neoplasm, diabetes and cardiovascular disease are increasingly significant. Currently, however, communicable diseases remain the most common causes of death, disability and illness. Conditions such as malaria, diarrhoea and respiratory infections dominate diseases reported at the outpatient facilities in the country. Meningococcal meningitis, cholera and yellow fever occur in epidemic cycles. While these diseases present a serious and widespread threat to the well-being of communities, well-known interventions are available to control and prevent the diseases.

Disease surveillance in Ghana

Although disease surveillance has been a priority of Ghana's Ministry of Health, the system in place for carrying out this objective has not performed optimally in the past. The system comprised some four independent sub-systems which were barely linked. In addition, surveillance data for communicable diseases was not reported in a complete and timely manner, or not at all. Those data that were reported were not always analysed. As a result, the opportunity to take action with an appropriate public health response was lost. Finally, even where adequate information was available, it was not necessarily disseminated so that the local level could use it to take action.

These weaknesses in the system were brought into sharp focus during the cerebro-spinal meningitis outbreak in the northern sector of the country in 1996/97. Since then the MOH/GHS has initiated moves to strengthen the system. These include the following:

- Establishing surveillance units at national and regional levels in 1998 to coordinate surveillance activities in the country.
- Training in surveillance and epidemic management
- Expansion of the community-based surveillance (CBS) system countrywide.

These developments coincided with sensitisation of member states on IDSR strategy by WHO/AFRO. As a member state, Ghana adopted the strategy in 1998 and began the process of implementing it, including rationalizing the use of resources for disease control and prevention. Currently, in Ghana, many intervention

programmes have their own disease surveillance systems. Each programme has made efforts through the years to improve its ability to obtain data for developing timely and reliable information that can be used for action. They involve similar functions especially at district and health facility levels. They often use the same structures, processes and personnel.

Which diseases does Ghana target for surveillance?

Priority diseases vary from country to country depending on the local epidemiological situation. Ghana's MOH suggests 23 communicable diseases and conditions be targeted for integrated disease surveillance in the country[4] (Table 2). These diseases were selected because they fall into one or more of the following categories:

- They are top causes of high morbidity and mortality in Ghana (for example, malaria, pneumonia, diarrhoeal diseases, tuberculosis and HIV/AIDS).
- They have epidemic potential (for example, meningitis, yellow fever and cholera).
- Surveillance is required internationally (for example, yellow fever and cholera).
- They have available effective control and prevention interventions for addressing the public health problem they pose (for example, schistosomiasis, onchocerciasis, trachoma).
- They can easily be identified using simple case definitions.
- They have national intervention programmes for prevention and control, eradication or elimination.

Table 2: Priority diseases for IDSR in Ghana (n=23)

Epidemic-prone diseases
Cholera Diarrhoea with blood (Shigella) Measles Meningoccocal meningitis Viral haemorrhagic fevers Yellow fever
Diseases targeted for eradication and elimination
Poliomyelitis (polio) Dracunculiasis Leprosy Neonatal tetanus
Diseases of special public health focus
HIV/AIDS Malaria Tuberculosis
Other diseases of public health importance
Buruli ulcer Diarrhoea in children less than 5 years of age Lymphatic filariasis Viral hepatitis Pneumonia in children less than 5 years of age Onchocerciasis STIs Schistosomiasis Trachoma Yaws

[4] Even though plague is a disease, which is internationally reportable, it has been taken out of the list for Ghana because it is not one of the priority diseases in Ghana. However, surveillance is still on-going for this disease.

How does Ghana's MOH/GHS support efforts to strengthen disease surveillance?

The MOH/GHS provides IDSR support for every level of the health system through the following:

- The development of comprehensive national technical guidelines including:
  - Standard case definitions for priority diseases
  - Standard consulting room registers
  - Revised surveillance forms for reporting on diseases
  - Analysis formats for each level
  - Standard outbreak protocol and case investigation tools
  - Training manuals for training in core functions of surveillance
  - Surveillance log books

- Advocacy for resources and resource mobilization as follows:
  - Communication facilities
  - Surveillance forms for reporting
  - Laboratory reagents and transport media
  - Replacement of over-aged vehicles in the system
  - Appropriate incentive packages for CBSWs
  - Recruitment of extra human resources where required
  - Training programs for targeted staff

- Monitoring and detection of diseases across the country through:
  - Establishment of epidemic management committees and rapid response teams
  - Regular reporting of priority diseases
  - Monitoring of timeliness and completeness of reports
  - Regular feedback to lower levels verbally, or in writing
  - Integration of surveillance indicators into checklist for general supervision

Identify Cases of Priority Diseases and Conditions

This section describes how to:

- Use standard case definitions for detecting suspected priority diseases and conditions
- Update district procedures for surveillance and response
- Use the laboratory network to confirm suspected outbreaks

1.0 Identify Cases of Priority Diseases and Conditions

Cases and suspected outbreaks of priority diseases and conditions[5] may come to the attention of the health system in several ways. For example:

- A member of the community reports a single suspected case, a cluster of deaths and/or an unusual health event to the health facility. For example, a pharmacy reports a sharp increase in the number of purchases of a particular medication or treatment. A school reports an increased number of absentees due to similar signs and symptoms.

- During active searches to find additional cases for a particular disease, the surveillance officer identifies cases of other priority diseases that have not been reported. For example, during a review of the clinic register for cases of acute flaccid paralysis, the officer also looks for suspected cases of other vaccine-preventable diseases, such as measles, neonatal tetanus, meningitis and cholera.

- Radio, television or newspapers report rare or unexplained health events in the area.

- A person falls ill and seeks treatment from a health facility.

- An individual health facility reports a cluster of deaths or an unusual increase in the number of cases. While these cases may not cross the health facility's action threshold for the catchment area, when the cases are analysed at the district level in conjunction with reports from other health facilities, an outbreak is detected. For example, an individual health facility reports the death of an adult with bloody diarrhoea. Viewed in isolation, the problem appears to be limited to that catchment area. However, if several health facilities in the district report a similar event, a district problem is detected and action can be taken.

- Vital events records show an increase in neonatal deaths.

1.1 Use standard case definitions

In order to improve case identification and eventual response, use:

- Standard case definitions
- Up-to-date procedures for surveillance and response
- Laboratory testing for confirmation of diagnoses

A case definition is a standard set of criteria that is used to decide if a person has a particular disease, and if the case should be considered for reporting and investigation. Case definitions make use of both clinical and surveillance criteria.

- ***Clinical case definition:*** Clinical staff (doctors, nurses, or medical assistants) see a patient with certain signs and symptoms[6]. A clinical case definition provides the criteria for diagnosing the cause of the symptoms and identifying appropriate and potentially life-saving treatment to offer the patient. Resources permitting, the clinician will ask for a diagnostic laboratory test to support the diagnosis.

[5] A condition is a collection of signs and symptoms with which a patient presents.

[6] Symptoms are what the patient complains of; signs are the objective indications of a disease, i.e. what the clinician finds on examining the patient.

Without the laboratory confirmation, the clinician may not be able to determine either the cause of or appropriate treatment for the patient's condition.

- ***Surveillance case definition:*** A case definition for surveillance is used to:
  - Obtain an accurate classification or definition of all cases of a disease or condition in a given population
  - Avoid incorrect identification of similar conditions

Using the same case definition throughout a country's public health surveillance system allows data from different areas to be compared consistently and ensures accurate tracking of particular diseases or conditions. When health facilities and districts use different case definitions, tracking the trend of a particular infectious disease is impossible. Health staff who analyse the data and take action will not know if the apparent trend is due to the disease under surveillance or to some other cause – and thus they may not be able to take appropriate action.

1.1.1 Introduce case definitions for use by the health facilities

Take action to ensure that health facility staff know how to use standard surveillance case definitions specified by national policy for reporting priority diseases and conditions to the district level.

Surveillance case definitions for the priority diseases in an integrated disease surveillance system are in Annex 2.

Also refer to information about case definitions in the disease-specific recommendations in Section 9 of these guidelines.

1.1.2 Distribute simplified case definitions to the community

Involve the community in plans to improve surveillance and response procedures in the district. If the community does not know how to notify health authorities when priority diseases or unusual health events occur, suspected cases will not be seen at the health facility, and cases will not be reported.

Community health workers, traditional healers, birth attendants and community leaders should know how to recognise and report selected priority diseases to the health facility. They should also refer people with the suspected disease or condition to the health facility for treatment. Provide information to the community about priority diseases on posters, newsletters and announcements during community meetings.

Being prepared to respond effectively to the community reports will encourage the community to participate in the system.

Ghana started implementing a community-based surveillance system in 1998. The CBS is based on the experience of the Northern Region using volunteers to detect and report guinea worm cases as part of the Guinea Worm Eradication Programme.

A list of case definitions for use in community surveillance is in Annex 3.

1.2 Improve district procedures for surveillance and response

Use national assessment findings and recommendations to plan activities that will yield improvements to the surveillance system[7]. It may not be possible to implement everything in a single year. Therefore, the list of activities should be prioritised. Then evaluate on an annual basis the priorities that have been achieved and, while maintaining those achievements, make plans to address the next priorities.

1.2.1 Update the profile of each catchment area

Annually update information about the catchment area, whether for an individual facility or an entire district. For example, make sure to have up-to-date information about:

- The size of important target populations in the district such as children less than 5 years of age, women of childbearing age, all children and adults from ages 1 through 30, people living in refugee settlements, youth out of school and so on
- Major public health activities in the area including public, private and quasi- or non-governmental immunization activities, clean water projects, family planning clinics, feeding centres for undernourished children and so on
- The leading five to 10 current public health problems treated in the district or facility.

1.2.2 Update the list of reporting sites in the district

Require all of the health facilities (public, private and quasi-governmental) in the district to report surveillance information to the district level. Record the health facility and names of staff who are responsible for surveillance activities. A worksheet that can be used to list the reporting sites and contact focal persons at each site can be found in Annex 4.

1.3 Define laboratories for confirming suspected outbreaks

Several diseases or conditions may cause signs and symptoms that are the identical or similar to those caused by other diseases or conditions. For example, a child with fever and rash over the entire body might be diagnosed as having measles, even though there could be several other causes of the child's clinical presentation. Even well trained, experienced health providers may need laboratory test results to make the correct diagnosis.

Having laboratory support increases the likelihood not only that an individual diagnosis is correct but that ensuing public health action will be efficient and appropriate. Using the laboratory to help confirm outbreaks ensures that surveillance data and public health actions are timely and appropriate. Concomitantly, it precludes unnecessary and costly public health actions, such as conducting a mass immunization campaign against measles when the cause of the symptoms is not measles.

Annex 5 contains guidelines for requesting, collecting, handling and transporting specimens for recommended laboratory tests as well as general guidance on the test timelines and results.

[7] WHO/AFRO has a surveillance assessment tool.

1.3.1 Establish communication with the designated laboratories

Establish or strengthen routine communication with identified laboratories that will receive specimens from a health facility or district and confirm suspected outbreaks. (Use the form in Annex 6 to list laboratory contact information.) Ensure that the procedures for confirming the disease or condition and reporting the results are clear and can be reliably carried out.

1.3.2 Identify a district laboratory focal person

A district-level laboratory focal person should make sure that laboratory confirmation procedures are known and followed in the district. The designated staff person should:

- Support health facilities in determining when to take a specimen for confirming the suspected case.
- Coordinate with the laboratory, as needed, to identify the correct specimen for collection and any special concerns or procedures.
- Collect and package the specimen safely or assist the health facility in doing so.
- Ensure the safe and reliable transport of the specimen from the health facility to the district laboratory.
- Receive the laboratory results from the laboratory and report them promptly to the health facility and national levels.
- Take action with the health facility based on the laboratory report.

Report Priority Diseases and Conditions

This section describes how:

- Often to report priority diseases and conditions
- To record information in clinic registers or case notes
- To use standard methods for reporting diseases
- To improve routine reporting practices

2.0 Report Priority Diseases and Conditions

Ensuring reliable reporting of surveillance data throughout the system is important so that programme managers, surveillance officers and other health care staff can use the information to:

- Identify problems and plan appropriate responses
- Take action in a timely way
- Monitor disease trends in the area

2.1 Know how often to report priority diseases and conditions

Health care facilities, both outpatient and inpatient, must note priority diseases in a clinic register on a daily basis (Annex 7). The method and urgency of reporting surveillance data to the next higher level depends on specific disease control activities. There are two main procedures for reporting disesases:

- ***Immediate, case-based reporting***
  Immediate, "case-based" reporting is required for epidemic-prone diseases and some diseases targeted for eradication and elimination. That is, a health facility reports to the district by the fastest means possible even a single incidence of such a disease. The initial report, required at the district level within 48 hours of the patient being seen at the health facility, can be verbal – via telephone or radio-phone – or written – via facsimile or E-mail. It is followed up by a case-based reporting form or line list (Annexes 8 and 9).

- ***Routine summary reporting***
  This is reporting of the total number of cases and deaths due to priority diseases that a health facility sees in a given period: weekly, monthly and quarterly (Annexes 10-16). These totals are analysed and the results used to monitor progress towards disease reduction targets, measure achievements of disease prevention activities in the district, and identify hidden outbreaks or problems so that early action can be taken.

Table 3 shows the mode of reporting of various diseases to the next higher levels, whilst Table 4 shows the deadlines for reporting.

Table 3: Mode of reporting Ghana's 23 priority diseases to the next higher levels

Name of disease	When to report a suspected case
Immediately reportable diseases - Cholera - Meningitis - Yellow fever - Measles - Viral haemorrhagic fever - Polio/acute flaccid paralysis - Dracunculiasis (guinea worm disease) - Neonatal tetanus	- Report case-based information immediately to the district as soon as a case is suspected - Make the initial report by fastest means possible (telephone, facsimile, E-mail, radiophone) - Follow up with a written report, using case-based surveillance reporting form (Annex 8) or line list (Annex 9). (AFP, neonatal tetanus and dracunculiasis have their own forms.)

Name of disease	When to report a suspected case
Routine summary reporting A. Weekly reporting ■ Cholera ■ Meningitis* ■ Measles *(These three diseases are selected because of their weekly thresholds)*	A. Summary information on these three epidemic-prone diseases should be reported weekly (Annex 10) in addition to their immediate notification. Enter "zero" on the report form when no cases were suspected or confirmed during the reporting period.
B. Monthly reporting ■ Diarrhoea with severe dehydration in children <5 years of age ■ Diarrhoea with some dehydration in children <5 years of age ■ Bloody diarrhoea ■ Pneumonia in children <5 years of age ■ Severe pneumonia in children <5 years ■ Malaria ■ Yaws ■ AIDS ■ Dracunculiasis ■ Viral hepatitis ■ Trachoma ■ Schistosomiasis ■ Lymphatic filariasis ■ Sexually transmitted infections	B. Summary information on epidemic-prone disease should be reported monthly (Annex 11) in addition to their immediate notification. Enter "zero" on the report form when no cases were suspected or confirmed during the reporting period.
C. Quarterly reporting ■ Leprosy ■ Tuberculosis ■ Buruli ulcer	C. Summary information on these diseases should be reported quarterly, on specially designed forms (Annexes 12-16).

***** Because Ghana falls within the meningitis belt, analysis of meningitis cases should be done weekly. During an outbreak, cases and death should be reported and graphed **daily**.

Table 4: Deadlines for reporting to the next higher level

Level	Deadline for reports to reach the next higher level			
	Immediate	**Weekly**	**Monthly**	**Quarterly**
Community	Within 48 hrs	NA	NA	NA
Health Facility	Within 48 hrs	Tuesday of the following week	5th day of the following month	5th day of the month following the end of the quarter
District	Within 48 hrs	Thursday of the following week	15th day of the following month	15th day of the month following the end of the quarter
Regional	Within 48 hrs	Friday of the following week	25th day of the following month	25th day of the month following the end of the quarter
National	Within 48 hrs	Monday of the second week	5th day of the second month after the end of the month	5th day of the second month following the end of quarter

2.2 Record information in clinic registers and case notes

Both outpatient and inpatient health care facilities must keep daily summaries of priority diseases that they see[8]. (See Annex 7.)

In outpatient departments (OPD), the clinician who sees the patient (doctor, nurse or medical assistant) records the patient's diagnosis in a patient OPD card. This information is transferred into the consulting room register. Medical record officers tally cases, which are then used to compile weekly or monthly summaries.

For inpatients, the clinician records the diagnosis in the case notes. The information is transferred into the ward register. The medical records officer tallies the cases and deaths for each diagnosis daily. Each month, the daily totals are summarised and reported to the district level as required.

To ensure those cases of priority diseases and conditions are recorded correctly:

- Take steps to ensure that all health staff know the standard case definitions recommended by national policy. Establish or modify existing procedures so that all health staff will be able to apply the standard case definitions in detecting or suspecting cases or outbreaks.
- Highlight with staff those diseases or conditions that require immediate reporting for case-based surveillance. For example, all the health staff should be aware of the epidemic-prone diseases (yellow fever, viral haemorrhagic fever, etc.) for which one case is a suspected outbreak requiring immediate action.
- Depending on the recommendations for a specific priority disease or condition, as soon as an epidemic-prone disease is suspected, ask the patient about additional cases in the home, workplace or community.
- Identify the focal person at the health facility who will be responsible for tracking priority diseases and reporting them as required.
- Identify sources in the community who are able to report suspected cases of priority diseases to the health facility. Examples of community sources include:
  - Community-based surveillance volunteers
  - Pharmacists/chemical sellers
  - Community-based health planning services workers
  - Schoolteachers
  - Private clinics/maternity homes
  - Community leaders
  - Assemblymen
  - Religious leaders
  - Traditional healers
  - Trained birth attendants
  - Unit committee members

[8] Make sure that health staff who record, report or store data understand the need for patient privacy and the confidentiality of medical records. Annex 17 contains guidance for managing public health surveillance data.

- Identify and train CBS volunteers on priority diseases under surveillance. Provide other community sources with information about the priority diseases to be monitored through surveillance. Give enough information about the disease so that the community source can refer cases to the health facility, or notify the health facility when unusual or unexplained health events occur in the community.

The list of simplified case definitions for community surveillance in Annex 3.

2.3 Use standard methods for reporting priority diseases

In an integrated system, streamlining reporting allows for data to be reported efficiently by using a minimum number of forms and reporting contacts. Rather than requiring health facilities to provide reports using several forms for each disease control and prevention programme, data about the priority diseases can be reported on a single set of forms. Case-based information can be reported first verbally, then in writing on a case reporting form. Summary data is reported on weekly and monthly summary reporting forms as appropriate.

2.3.1 Report immediately reportable diseases or unusual events promptly

When an immediately reportable disease or outbreak of any priority disease is suspected, report the patient's locating information, date of onset of symptoms, and other relevant risk factors to the next level. The verbal or written notification should reach the district within 48 hours from when the case was first seen by the health facility.

Also report immediately any unusual health event reported by the community such as a large number of deaths whilst investigations go on. Report information about the health event verbally by telephone or radiophone, or use an immediately transmissible written method such as E-mail or facsimile. Prompt reporting is required for certain diseases because action can be taken to control the wider transmission of the disease and prevent additional cases from occurring. (See Tables 3 and 4.)

2.3.2 Report case-based information on a form

After the initial verbal report is made, complete a case-based surveillance form. If a verbal report cannot be made, the case reporting form may be the first contact that the district receives about the case. A sample of the form and instructions for completing it are in Annex 8. Important information about a case should include:

- Patient's name. If neonatal tetanus is reported, also record the name of the mother
- Patient's date of birth, if known, or the age of the patient
- Patient's locating information (address, village, neighborhood)
- How to contact the patient or the parents of the patient if more information is needed
- Patient's gender
- Date the patient was seen at the health facility and the date the case was reported to the district
- Date of onset of the disease (refer to disease-specific guidelines in section 9 for signs and symptoms that define onset of the disease)
- If reporting a suspected case of a vaccine-preventable disease, describe the patient's immunization history (and also for the mother if neonatal tetanus is suspected)
- Patient's status at the time of the report (if an inpatient, report final outcome as living or deceased)
- Date of the report

The health worker who completes the form should record his or her name and the date the form was sent to the district.

Make three copies of the form by photocopy, by carbon copy or by hand. Keep one copy at the health facility. Submit the original and one extra copy to the district. The district will transmit the extra copy to the regional level. Use the fourth copy as a laboratory transmittal slip if a laboratory specimen is taken. Send it with the specimen to the laboratory.

Refer to Annex 4 or the disease-specific guidelines in Section 9 for information about which laboratory tests to request.

2.3.3 Report summary data routinely

Each week, month, or quarter, depending on the disease, the health facility collates the total number of cases and deaths due to priority diseases and conditions seen in that facility. Separate totals are calculated for outpatient cases and inpatient cases. The summary totals are recorded on a form and sent to the district level.

The district aggregates the totals from all the health facilities that report and then reports district summary totals to the regional level, which in turn reports to the national level.

2.4 Improve routine reporting practices

In some health facilities, more than one person may be responsible for recording information about patients seen. For example, after the medical assistant or doctor sees a patient, the details are entered in a clinic register. Later in the day, a nurse tallies the number of cases and deaths seen in an outpatient service. The ward nurse tallies the number of hospitalised cases. Each month, a records clerk or statistician calculates summaries for all the diseases and records them in a standard form.

To improve routine reporting practices the following steps are necessary:

- Clinician makes/records diagnosis **daily**.
- Health staff/nurse records/tallies diagnosis **daily**.
- Medical record staff collates and compile data **daily**.
- Disease control officer extracts reportable diseases or diseases which need prompt attention from the medical records office and reports to the next level **daily**.
- Staff monitor timeliness and completeness of reporting to the next level **weekly, monthly or quarterly** as appropriate.
- Staff ensure regular feedback from the district level to the reporting health facility and from regional and national levels to the lower reporting levels.

2.4.1 Review the flow of information in the health facility

The management team of the health facility should make sure that:

- Clinicians record information in the clinic register using the recommended case definition so that health staff who tally the cases at the end of the day can reliably record the required diagnoses on the tally sheet.

- Clinicians, ward nurses or other responsible staff should complete the case form while the patient is still present.
- Record clerks or statisticians have summary forms that contain spaces for recording cases and deaths due to the priority diseases according to the standard case definitions.
- Record clerks know how to complete the summary forms.
- Health staff review the monthly totals and provide comments on the forms about results seen in monthly analysis. (See Section 3.)
- Health staff record the totals on a recommended monthly summary reporting form.

Note: In the sample monthly summary reporting forms, there is space for recording observations about the data that health professionals at the health facility and district observe either during routine analysis or when they complete the form each month.

2.4.2 Submit zero reporting when no cases of immediately reportable diseases are diagnosed

If no case of a particular disease is detected in the reporting period, put a "zero" (0) for that disease on the form. This will tell the staff at the next level that the health facility or district has submitted a complete report, i.e., that another number was not inadvertently omitted.

2.4.3 Use line lists and summary reporting during outbreaks

When five or fewer cases of a single disease occur during the week in a health facility, report the information about each case on an individual case-based reporting form.

If more than five cases occur during a week per health facility, use a line list instead of an individual case-based reporting for to record and report the cases weekly.

When a large number of cases occur in a single suspected outbreak, report summary totals of cases and deaths each week.

Analyse Data

This section describes how to:

- Receive, handle and store data reported from lower levels
- Analyse data by time, place and person
- Draw conclusions based on the analysis results
- Compare analysis results with thresholds for public health action

3.0 Analyse Data

Analysing trends of cases and deaths over time has many benefits. Data should be analysed at each level where they are collected. The analysis provides information for:

- Identifying causes of problems and their most appropriate solutions
- Identifying trends and taking prompt public health action
- Evaluating the quality of public health programmes in the district over the medium and long term.

This information in turn leads to two important outcomes:

By allowing for correct diagnoses of diseases and prompt treatment and control actions during an outbreak of a disease or condition, analysis contributes to containing the outbreak and preventing further cases from occurring.

Occurrence of diseases changes over time. Some of these changes occur regularly and can be predicted, such as an increase in malaria cases during the rainy season. Analysis and use of the summary data are essential for improving district public health activities that target diseases such as malaria, tuberculosis, HIV, and the vaccine-preventable diseases. These are diseases that account for up to 80% of the deaths that are due to the priority diseases and conditions. Many of the deaths in children less than 5 years of age are due to diarrhoea and pneumonia.

This section focuses on the analysis of data at the district and health facility levels.

3.1 Receive data from health facilities

As discussed in Section 2, the district team receives two types of surveillance data from reporting sites, such as health facilities, in the district:

- Case-based or other information from suspected cases of immediately reportable diseases
- Routine (weekly/monthly/quarterly) summary totals of cases and deaths for the priority diseases

The district should review reporting forms and other written reports for completeness as soon as they are received. (Section 7 discusses in greater detail the importance of reports being submitted in a timely and complete way and how to work with a health facility to improve their reporting.)

3.2 Analyse data by time, place and person

In order to detect outbreaks, follow their course and monitor public health activities, health staff need to know:

- How many cases occurred
- Where the cases occurred
- When the cases occurred
- The population most affected
- Risk factors that contributed to transmission of the disease

This information comes from data in patient registers and line lists. But it is easier to identify problems and detect outbreaks if the data are summarised in a table, graph or map, because, when data are so displayed, the information can be understood quickly, and patterns and trends emerge.

One method for ensuring that at least routine summary data for priority diseases is analysed every week/month is to maintain an analysis book at the health facility and district levels. The tables, graphs and maps that summarise the data analysis can be kept together in a notebook and/or placed on the wall. Each month the graphs and tables are updated and conclusions drawn about what is shown.

The analysis book can be easily observed during a supervisory visit or when the health facility public health team or district response team want to have information about how to respond to health events in the area. Table 5 lists recommended methods and tools for analysing surveillance data so that health staff will have the information they need to take a public health action.

Table 5: Objectives, tools and methods of descriptive analysis for communicable diseases

Type of Analysis	Objective	Tools	Activity
Time			
For immediately reportable diseases and monthly summary totals of cases and deaths for priority diseases	Detect abrupt or long-term changes in disease occurrence, how many occurred, and the period of time from exposure to onset of symptoms	Record summary totals in a **table** or on a **line graph** or **histogram**	Compare the number of case reports received for the current period with the number received in a previous period (months, seasons or years)
Place			
Usually for immediately reportable diseases and outbreaks	Determine where cases are occurring (for example, to identify high risk area or locations of populations at risk for the disease)	Plot cases on a **spot map** of the district or area affected during an outbreak	Plot cases on a map and look for clusters or relationship of the location of the cases to the health event being investigated
Personal			
Usually for immediately reportable diseases and outbreaks	Describe reasons for changes in disease, occurrence, how it occurred, who is at greatest risk for the disease, and potential risk factors	Extract specific data about the population affected on a table to calculate rates, ratios and proportions	Depending on the disease, characterise cases according to the data reported for case-based surveillance such as age, gender, place of work, place of residence, immunization status, school attendance and other known risk factors for the diseases

To make a table:

1. Decide what information you want to show on the table. For example, consider analysis of measles cases and deaths by age group.

2. Decide how many columns and rows you will need. Add an extra row at the bottom and an extra column at the right to show totals as needed. In the example, you will need a row for each age group, and a column for each variable such as age group or cases and deaths.

3. Label all the rows and columns, including measurements of time. In the examples later in this section, the analysis is done yearly. Analysis of person is also recommended for analysis of outbreak data.

4. Record the total number of cases and deaths as indicated in each row. Check to be sure the correct numbers are in the correct row or column.

To make a graph or histogram:

1. Decide what information you want to show on the graph.

2. Write a title that describes what the graph will contain (for example, monthly totals for inpatient cases and deaths due to malaria with severe anaemia)

3. Decide on the range of numbers to show on the vertical and horizontal axes.
   - Start with zero (0) as the lowest number.
   - Write numbers, going up until you reach a number higher than the number of cases.
   - Chose an interval if the numbers on the vertical axis are large.
   - Label the vertical axis, explaining what the numbers represent.
   - Label the horizontal axis and mark the time units on it. The horizontal axis is divided into equal units of time. Usually it begins with the beginning of an outbreak, or the beginning of a calendar period, such as a month or year.

4. Make each bar on the graph the same width.

5. Mark the number of cases on the graph or histogram. For each unit of time on the horizontal axis, find the number of cases on the vertical axis. Fill in one square for each case, or for some number of cases in the column for the day on which the patient was seen. Show deaths by using a different pattern of lines, or a different color.

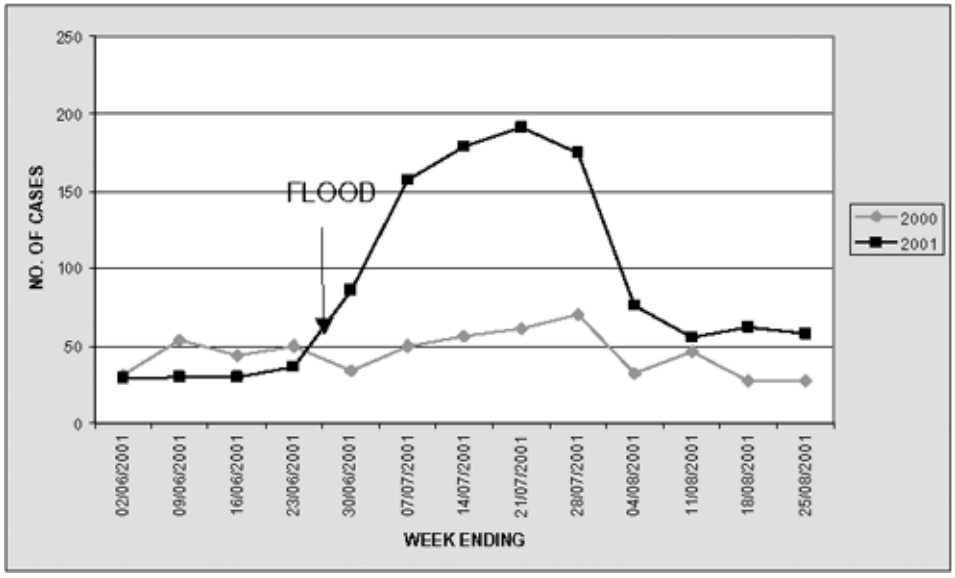
6. When making a line graph, instead of making a bar or filling in squares, draw a cross or make a point where the horizontal and vertical lines cross. Connect the points on the graph to show the trend going up or down over time.

3.2.1 Analyse data by time

Time analysis detects change – increases or decreases – in the numbers of cases of disease and deaths over time. Observing disease trends over time helps to show when changes occur. By examining events that precede a change in the number of cases, it may be possible to identify the causes of the change and therefore to predict change, and take appropriate public health actions for controlling or preventing further occurrence of the disease.

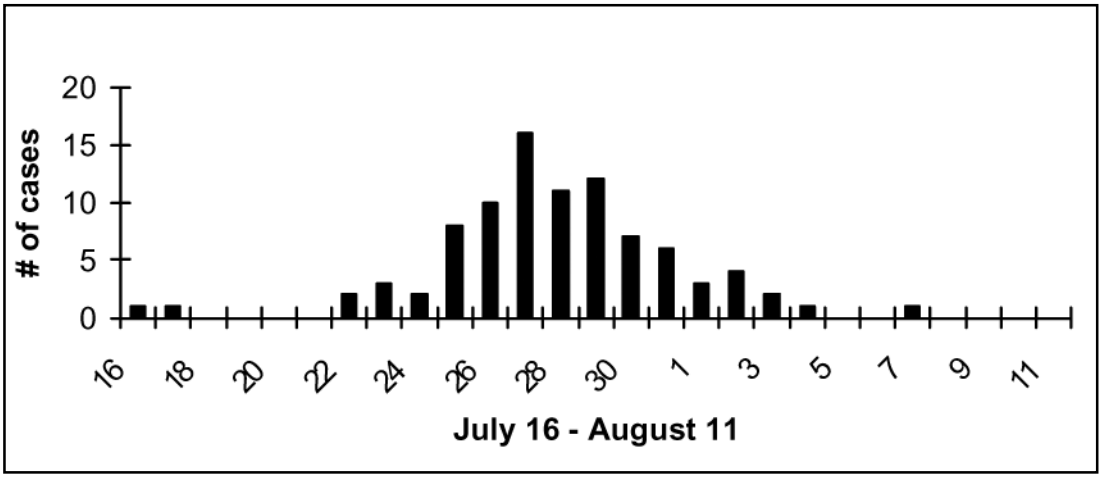
Data about time is usually shown on a graph. The number or rate of cases or deaths is placed on the vertical or y-axis. The time period being evaluated is placed along the horizontal or x-axis. Events that might affect the particular disease being analysed can also be noted on the graph. For example, the graph may indicate when a flood occurred in the Accra metropolitan area and its impact on the number of cases of cholera in the area. Figure 2 is an example of a line graph. (A sample grid for time analysis is in Annex 18.)

Figure 2: Weekly trend of cholera in Accra Metropolis June-August 2001 compared with same period 2000



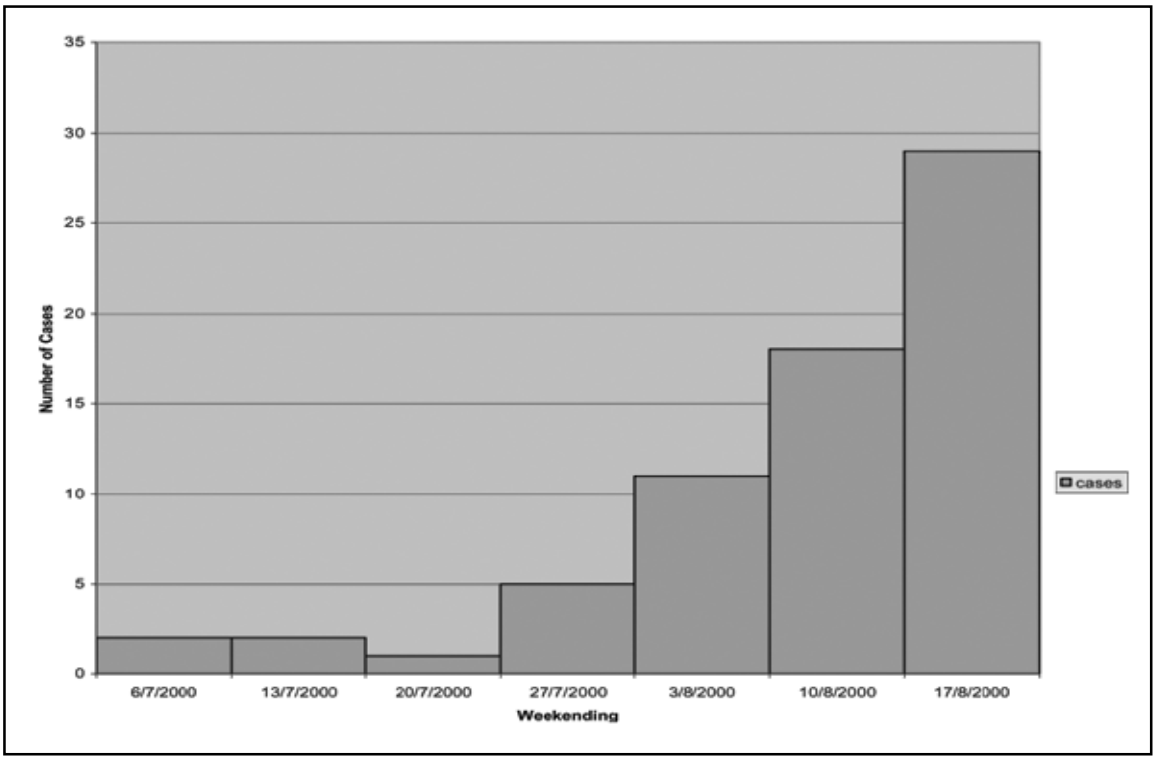
Bar graphs also can be used to display the number of cases over time. Figure 3 is an example of a bar graph.

Figure 3: Number of cases by day of onset of symptoms



A histogram is like a line graph except that it uses squares to represent cases rather than a line to connect plotted points. Use histograms to analyse outbreak data and to show an epidemic curve (an epi curve). For acute outbreak diseases, time may be shown in one-day, two-day, three-day, one-week or longer intervals. In a histogram, the cases are stacked on the graph in adjoining columns. Figure 4 is an example of a histogram.

Figure 4: Meningitis cases from Bolgatanga District



3.2.2 Analyse data by place

Analysing data according to place gives information about where a disease is occurring. Establishing and regularly updating a spot map of cases for selected diseases can give ideas as to where, how, and why the disease is spreading. An analysis of place provides information that is used to:

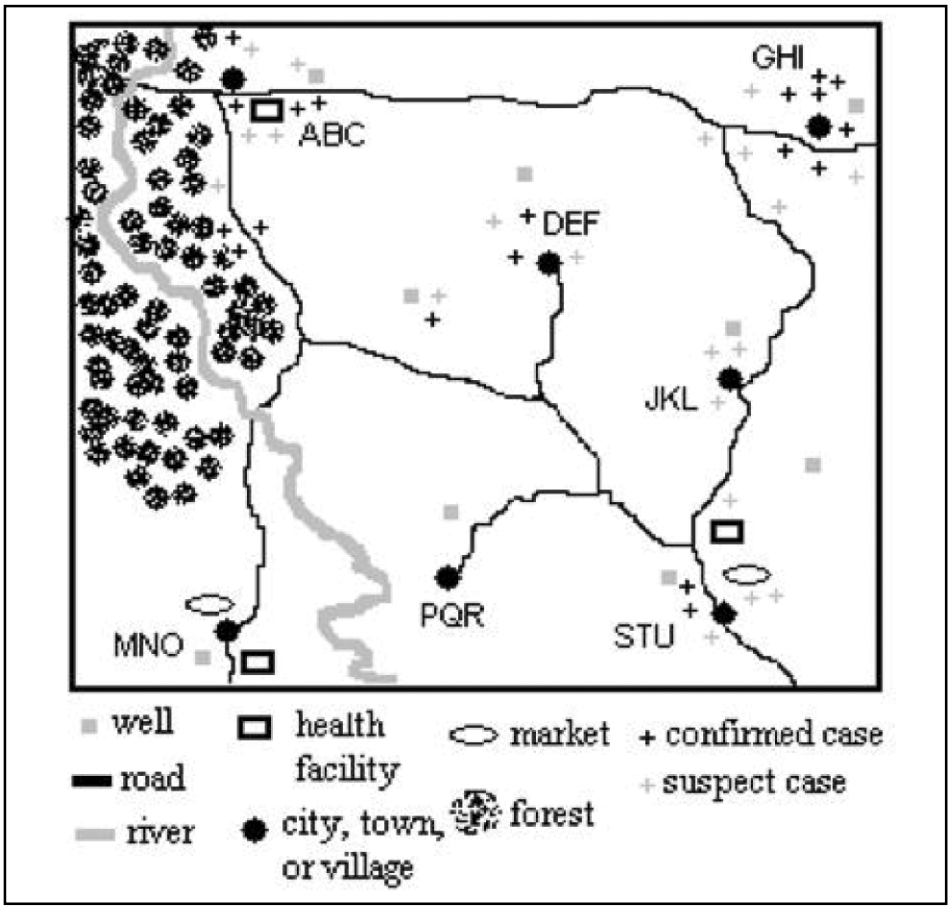
- Identify the physical features of the land
- Understand the population distribution and density of the area
- Describe the variety of populations in an area (farming area, high density urban area, refugee settlement and so on)
- Describe environmental factors (major water sources in a community such as rivers, lakes and pumps)
- Identify clinics, meeting houses, schools, community buildings and large shelters that can be used during emergency situations
- Show distances between health units and villages (by travel time or distance in kilometers)
- Plan routes for supervisory or case investigation activities
- Create a spot map to use as part of routine surveillance of disease.

Figure 5 is an example of a spot map.

- Obtain a local map from the local government office or land department. Trace the main features needed for health work onto transparent paper and then to a large card that can be hung on a wall for easy use. If no official map is available, sketch the whole district area.

- Prepare a code of signs to use on the map, to represent each of the following features that will be shown on the map:
  - Location of health facilities in the district and the areas each serves
  - Geographic areas such as forests, savannah areas, villages, roads and cities
  - Location of bodies of water such as rivers, streams and lakes
  - Socioeconomic areas of relevance to priority diseases
  - Significant occupation sites such as mines or construction sites
  - Location of suspected and confirmed cases of priority diseases
  - Location of previous confirmed outbreaks

Figure 5: Spot map of District X



3.2.3 Analyse data by person

Analysis by person is recommended for describing the population at risk for epidemic-prone diseases and diseases targeted for eradication or elimination. These are diseases that are reported quickly and individually, on a case-based surveillance form, so data about personal characteristics should be available. Analysis by person is **not** routinely recommended for summary data.

A simple count of cases does not provide all of the information needed to understand the impact of a disease on the community, health facility or district. Simple percentages and rates are useful for comparing information reported to the district.

The first step in analysing data by person is to identify the numerator and denominator for calculating percentages and rates.

- The **numerator** is the number of specific events being measured (such as the actual number of cases or deaths of a given disease, for example, the number of cases of measles that occurred during the year in children less than 5 years of age).

- The **denominator** is the number of all events being measured (such as the size of the population in which the cases or deaths of a given disease occurred, or the population at risk, for example, the total population less than 5 years old).

Simple percentages can be calculated to compare information from populations of different sizes. For example:

Health Facility	Number of measles cases this year in children less than 5 years of age
A	42
B	30

By looking only at the number of reported cases, it appears that a higher occurrence of measles cases occurred in health facility A.

But when the number of reported cases at each health facility is compared to the total number of children under 5 years living in each catchment area, then the situation becomes clearer.

Health Facility	Number of children less than 5 years living in the catchment area
A	1,150
B	600

By calculating the percentage of the number of cases of measles during the last 12 months in children under 5, the district officer can compare the impact of the illness on each facility. The numerator is the number of cases that occurred over one year. The denominator is the number of children under 5 at risk in each catchment area. In this example, the incidence rate is higher in health facility B than in health facility A.

Health Facility	Percentage of cases of measles among children less than 5 years during the last 12 months
A	0.4%
B	0.5%

3.2.3.1 Make a table for person analysis

A table is a set of data arranged in columns and rows; its purpose is to present the data in a simple way. For each priority disease or condition under surveillance, use a table to analyse characteristics of the patients who are becoming ill as well as to show the number of cases and deaths from the given disease that occurred in a given time. Annex 19 contains sample tables for person analysis by age, geography, gender distribution and other descriptors.

Age group	Number of reported cases	Number of deaths
0-4 years	40	4
5-14 years	9	1
15 years and older	1	0
Age unknown	28	0
Total	78	5

3.2.3.2 Calculate the percentage of cases occurring within a given age group

When the summary totals for each age group are entered, one analysis that can be done is to find out what percent of the cases occurred in any given age group. Use the information on the table to:

1. Identify the total number of cases reported within each age group from the summary data for which time or person characteristics are known. (For example, there are 40 cases in children 0 through 4 years of age.)

2. Calculate the total number of cases for the time or characteristic being measured. (In this example, there are 50 cases whose age is known.)

3. Divide the total number of cases within each age group by the total number of reported cases. (For example, for children age 0 through 4 years, divide 40 by 50. The answer is 0.8.)

4. Multiply the answer by 100 to calculate the percent. (Multiply 0.8 X 100. The answer is 80%.)

Age group	Number of reported cases	% of reported cases in each age group
0-4 years	40	80
5-14 years	9	18
15 years and older	1	2
Age unknown	28	0
Total	78	100

3.2.3.3 Calculate case fatality rate

Case fatality rate helps to:

- Indicate whether a case is identified promptly
- Indicate any problems with case management once the disease has been diagnosed
- Identify a more virulent, new or drug-resistant pathogen
- Indicate poor quality of care or no medical care
- Compare the quality of case management between different catchment areas, cities and districts

Public health programmes can impact the case fatality rate by ensuring that cases are promptly detected and good quality case management takes place.

To calculate case fatality rate:

1. Calculate the total number of deaths. (In the example of the measles data, there are five deaths.)

2. Divide the total number of deaths by the total number of reported cases. (For example, the total number of reported cases is 78. The number of deaths is 5. So divide 5 by 78. 5 ÷ 78 is 0.06.)

3. Multiply the answer by 100. (0.06 X 100 equals 6%.)

Age group	Number of reported cases	Number of reported cases	Case fatality rate
0-4 years	40	4	10
5-14 years	9	1	11
15 years and older	1	0	0
Age unknown	28	0	0
Total	78	5	6

3.3 Draw conclusions from the analysis

3.3.1 Review the updated charts, tables, graphs and maps

Review the analysis tools to make sure that:

- The total number of cases and deaths under surveillance is up-to-date
- The case fatality rates are calculated and up-to-date
- The geographical distribution of the cases and deaths are described and include case fatality rates as appropriate

3.3.2 Compare the current situation with previous weeks, months, seasons and years

1. Observe the trends on the line graphs and look to see whether the number of cases and deaths for the given disease is stable, decreasing or increasing.

2. If case fatality ratios have been calculated, is the ratio the same as, or higher or lower than it was in the previous weeks, months, seasons and years?

3.3.3 Determine if thresholds for action have been reached

Thresholds are markers that indicate when something should happen or change. They help surveillance and programme managers answer the question, "When will you take action, and what will that action be?"

Thresholds are based on information from two different sources:

- A situation analysis describing who is at risk for the disease, what are the risks, when is action needed to prevent a wider outbreak, and where the diseases usually occur
- International recommendations from technical and disease control programme experts

These guidelines recommend two types of thresholds: an alert threshold and an epidemic threshold for epidemic-prone diseases. Other diseases do not have both types of thresholds although each disease certainly has a point where a problem needs to be reported and some action taken. The thresholds as described in these guidelines represent the continuum of recommended practices and are used to describe where action is recommended. Detailed thresholds for specific diseases are in Section 8. Definitions of the thresholds and their corresponding response are as follows:

An **alert threshold** suggests to health staff that further investigation is needed. Depending on the disease, an alert threshold is reached when there is one suspected case (for an epidemic-prone disease or for a disease targeted for elimination or eradication) or when there is an unexplained increase seen over a period of time in weekly and monthly summary reporting. Health staff responds to an alert threshold by:

- Reporting the suspected problem to the next level
- Reviewing data from the past and ongoing interventions
- Requesting laboratory confirmation to see if the problem is one that fits a case definition
- Being more watchful of new data and the resulting trends in the disease or condition
- Investigating the case or condition (see Section 4 for more specific guidelines on how to investigate outbreaks)
- Alerting the district director of health services/district disease control officer and district epidemic management team to a potential problem.

An **epidemic threshold** triggers a definite response. It marks the specific data or investigation finding that signals an action beyond confirming or clarifying the problem. Possible actions include communicating laboratory confirmation to affected health centres, implementing an emergency response such as an immunization activity, community awareness campaign or improved infection control practices in the health care setting.

Suggested thresholds that alert health staff to a possible outbreak are shown in Table 6. Also refer to the disease-specific guidelines in Section 9.

Table 6: Alert and epidemic/action threshhold for priority diseases under surveillance

Disease/condition	Alert threshold	Action/epidemic threshold
Acute Flaccid Paralysis (AFP/ Polio)	1 suspected case	1 confirmed case
AIDS		Intervention targets prevention so there is no need to wait for any index case or number of cases as threshold to take action
Buruli ulcer		Increasing number of cases seen
Cholera	1 suspected case	1 confirmed case where it has not been reported before
Diarrhoea with blood	Increasing number of cases if diarrhoea with blood over short period of time	If the suspected cases have been confirmed
Diarrhoea in children under 5 years	Increasing number of cases in a short time	Increasing number of cases or deaths in a short time
Dracunculiasis (guinea worm disease)	1 suspected case	1 confirmed case
Leprosy	1 suspected case	1 confirmed case
Lymphatic filariasis		Increasing number of cases
Malaria		Hyperendemic, threshold not applicable
Measles	1 suspected case	Confirmed outbreak
Meningitis	In population greater than 30,000: 5 cases per 100,000 inhabitants per week Population less than 30,000: 2 cases in 1 week or an increase in the number of cases compared to the same time in previous years	Population greater than 30,000: In one week, 15 cases per 100,000 inhabitants per week confirms epidemic in all situations If no epidemic during last 3 years and vaccine coverage against meningococcal meningitis is <80%, epidemic threshold is 10 cases per 100,000 inhabitants per week Population less than 30,000: 5 cases in 1 week or doubling of the number of cases over a 3-week period
Neonatal tetanus	1 suspected case	1 confirmed case through investigation
Onchocerciasis		Increase in number of cases diagnosed
Pneumonia in children under 5 years	Increasing number of cases or deaths in short time	Increasing number of cases or deaths in short time
Schistosomiasis		Increasing number of cases over a short time
STI		Threshold is not applicable
Trachoma		An unusual increase in the number of new trachoma cases as compared to the same period in previous years
Tuberculosis		Number of cases or deaths increasing over a period of time
Viral haemorrhagic fever	1 suspected case	1 confirmed case
Viral hepatitis		If there is an unusual increase in the number of new viral hepatitis cases or deaths as compared to the same period in previous years
Yaws		Increase in number of cases
Yellow fever	1 suspected case	1 confirmed case

3.3.4 Summarise the analysis results

Consider the analysis results with the following factors in mind:

- Trends for inpatient cases describe increases and decreases for the most severe cases. Deaths are most likely to be detected for cases that are hospitalized. The reporting of the case according to the definition is likely to be more accurate than those reported for outpatient cases.

- Increases and decreases may be due to factors other than a true increase or decrease in the number of cases and deaths being observed. The programme objectives for the disease reduction activities in an area should be to decrease the number of cases and deaths over time.

- If this decrease is not occurring, and the number of cases is remaining the same or increasing, consider whether any of the following factors are affecting reporting:
  - Has there been a change in the number of health facilities reporting information?
  - Has there been any change in the case definition that is being used to report the disease or condition?
  - Is the increase or decrease a seasonal variation?
  - Has there been a change in denominator (e.g. census results)?
  - Has there been a change in screening or treatment programmes? In community outreach or health education activities that would result in more people seeking care?
  - Has there been a recent immigration to or emigration from the area or increase in refugee or internally displaced populations?
  - Has there been any change in the quality of services being offered at the facility? For example, lines are shorter, health staff are more helpful, drugs are available, clinic fees are charged, attitude of staff in keeping records.

3.3.5 Compare this month's achievement towards disease reduction targets

Many public health programmes have set disease reduction targets. There may be targets for individual health facilities, for communities and for the district as a whole. Collaborate with the managers of the public health activity programmes to discuss progress towards the targets based on the analysis results.

If analysis results indicate that the programme strategy is not leading to a change or an increase in the number of cases being detected and treated, then discuss ways to improve the situation. For example, any increases or lack of decline in the number of cases should prompt further inquiry and action to improve the quality of the public health programme. Consider improvements such as:

- Information, education and communication (IE&C) messages
- Improving drug availability for pneumonia case management in children under 5 years of age
- Improving drug availability at least for pregnant women and children during the malaria season
- Working with community health staff to improve community awareness about when to bring children to the health facility for treatment for diarrhoea with dehydration, pneumonia and malaria
- Expanding HIV/AIDS prevention education to reach youth not in school
- Improving immunization coverage in areas of highest risk for a given vaccine-preventable disease (measles, neonatal and maternal tetanus, yellow fever)

3.4 Use the analysis results to improve public health action

Make statements that describe the conclusions drawn from the analysis results. Use them to take action to:

- Conduct an investigation to find out where there is an increase in the number of cases. Refer to Section 4 on how to investigate public health problems.
- Collaborate with specific disease reduction programmes to intensify surveillance if an alert threshold has been crossed.
- Advocate with political leaders and the community for more resources, if inadequate resources is identified as a cause for the increased number of cases.
- Provide feedback to lower levels. (Refer to Section 6.)

Investigate Reported Outbreaks and Other Public Health Events

This section describes how to:

- Make a decision to investigate a reported outbreak or other public health event
- Plan and carry out a case investigation
- Analyse the investigation results to determine what caused the problem

4.0 Investigate Reported Outbreaks and Other Public Health Problems

An investigation is aimed at identifying and evaluating people who have been exposed to an infectious disease or affected by an unusual health event. The investigation provides information to use in taking immediate action to control the disease and improving long-term activities to prevent its recurrence. The information gleaned from an investigation serves to:

- Verify the outbreak or the public health problem
- Identify and treat additional cases that have not been reported or recognised
- Collect information and laboratory specimens for confirming the outbreak
- Identify the source of infection or cause of the outbreak
- Describe how the disease is transmitted and the populations at risk
- Select appropriate response activities to control the outbreak
- Strengthen prevention activities to prevent future recurrence of the outbreak

The procedures used for conducting an investigation of a suspected infectious disease outbreak can also be used to investigate other public health problems in the district.

In Ghana, districts have the primary responsibility for investigating outbreaks. In certain circumstances, health facilities such as district or regional hospitals may undertake some or all aspects of investigations.

This section describes the activities to be undertaken in investigating an outbreak.

4.1 Make a decision to investigate a reported outbreak

In general the following circumstances dictate carrying out an investigation:

- The district receives a report of a suspected outbreak of an immediately notifiable disease.
- An unusual increase is seen in the number of deaths during routine analysis of data.
- Alert or epidemic thresholds have been reached for specific priority diseases.
- Communities report rumours of deaths or of a large number of cases that are not being seen in the health facility.
- A cluster of deaths occurs for which the cause is not explained or is unusual (for example, an adult death due to bloody diarrhoea).

As was discussed in earlier sections, the “threshold” for reporting some communicable diseases, such as yellow fever, is set by national policy and thus does not vary by district or health facility. The same is true for the investigation stage: A single reported case triggers action. Districts should investigate suspected outbreaks of these diseases within 48 hours of notification, because, in the absence of a prompt and appropriate response, these diseases have the potential for explosive outbreaks or high case fatality rates.

For other diseases, such as meningitis, a decision to investigate is taken when a certain threshold is reached. Certain unusual health events, such as the occurence of one or more cases of a condition without obvious known cause or a run on a particular drug at pharmacies, also may call for an investigation. Health staff should then promptly investigate the problem and prepare to take a wider public health response.

Health facility thresholds for notifying the district about these diseases can be established using the following steps:

1. If data from previous years is available, review trends in cases and deaths due to these diseases over the last five years. Determine a baseline number to describe the current extent of the disease in the catchment area.

2. As appropriate, take into account factors for diseases with seasonal increases, such as malaria or cholera.

3. State the threshold clearly as a number of cases per month or week, so that health staff responsible for surveillance activities can readily recognise when the threshold is reached.

4. Periodically revise the epidemic threshold and adjust it according to past and current trends for the disease. If the extent of the disease's burden is changing (for example, cases are increasing), then adjust the threshold.

Alert and action thresholds are described in Section 3.3.3. Thresholds recommended by Ghana's MOH/GHS for taking action to implement interventions or investigations of a case or outbreaks are in Section 9 of these guidelines.

4.2 Record reported outbreaks and rumours

Tracking reported outbreaks ensures that the report of each suspected outbreak or rumour of outbreak is followed by some action and resolution. Keeping this record also contributes to later evaluation of the timeliness and completeness of the outbreak investigation and response process. A sample form for tracking reports of outbreaks is in Annex 20.

4.3 Verify the reported outbreak

Promptly verify reports of outbreaks received from health facilities or through community rumour. This is important to ensure that timely decisions are made and to prevent expending resources on investigating events that are not true outbreaks.

To verify a reported outbreak, consider the following factors:

- Source of information (Is the source of the rumour reliable? Is the report from a health facility?)
- Severity of illness
- Number of reported cases and deaths
- Transmission mode and risk for wider transmission
- Political or geographic considerations
- Public relations
- Available resources

The circumstances of a particular outbreak may cause the district to treat the investigation with more urgency than the above factors imply. For example, reports of a suspected case of viral haemorrhagic fever are treated with more urgency than a report of a neonatal tetanus case because the risk for wider transmission of the fever is greater. Regardless of the factors, health facilities must report suspected outbreaks (including immediately notifiable cases) within 48 hours.

4.4 Prepare to conduct an investigation

District health management teams should elaborate the objectives of outbreak investigation. These objectives will ensure that the essential information for implementing the most appropriate and relevant response is obtained. If epidemic response and preparedness activities have taken place in the district or health facility, staff who might be able to take part in the investigation should already be identified and trained.

4.4.1 Specify roles of health and non-health staff

Inform all staff about the tasks they will be expected to carry out and the functions they will support. Ensure adequate motivation for the investigation team. The investigation team/rapid response team should understand the link between the investigation and the selection of response activities for preventing additional cases and saving lives.

4.4.2 Define supervision and communication lines

Make a communication plan. Prepare a diagram showing who will report to whom and how information will move both within the investigation team and between the district and other levels, including the most local level. For example, define who will communicate with the Ministry of Health, the media and the community. State the methods for communicating and how often it should be done during an outbreak to keep officials informed. Methods may include daily updates by radiophone, facsimile, E-mail or conference calls.

Show on the diagram the lines of authority and the roles of each staff person on the team. Develop an appropriate supervisory checklist for use in monitoring outbreak investigation activities.

4.4.3 Decide where the investigation will take place

Review information already known about the suspected illness, including its mode of transmission and risk factors. Use this information to define the geographic boundaries and target population for conducting the investigation. Begin the investigation in the most affected place.

Contact nearby health facilities to see if they have seen similar cases or an increase in cases with the same diagnosis.

Involve the community and local health facility staff in planning and conducting the investigation. Information about local customs, culture and routines could affect the success of the outbreak investigation.

4.4.4 Obtain the required authorizations

Observe the appropriate authorizations, clearances, ethical norms and permissions that are required to do the investigation.

4.4.5 Finalise forms and methods for collecting information and specimens

The investigation team should review how to collect the required information and record it. For example, at a minimum, they should know how to gather and record information on a line list. Annexes 21, 22 and 23 contain forms for investigating acute flaccid paralysis, neonatal tetanus and guinea worm disease; these forms can be used as models to follow in developing forms for other illnesses.

Select the variables to identify, record and analyse for the disease being investigated. Depending on staff responsibilities, review how to identify and record information for preparing the following:

- Line list for summarising time, place and person analysis
- Epidemic curve (or "epi" curve)
- Spot map
- Analysis tables for risk factors, age group, gender, immunization status and so on

(Refer to Section 3 for information on how to develop these presentation methods.)

4.4.6 Arrange logistical and financial support

Make travel arrangements for getting to and from the site of the investigation and for travelling during the investigation. Make sure transportation for moving specimens to the appropriate laboratories has been arranged. In addition, ensure that any needed funds are available.

4.4.7 Gather supplies for collecting lab specimens

The district health management team should put together a rapid response kit that contains supplies and equipment for carrying out the investigation (see Annex 24). If a kit is not available in a district, look at the disease-specific programme guidelines and talk to laboratory specialists to find out the requirements for laboratory supplies for proper collection, storage and transport of relevant specimens. (Refer to the laboratory chart in Annex 5 and to the disease-specific guidelines in Section 9.)

4.5 Confirm the diagnosis

4.5.1 Review the clinical history

Examine the patient or patients to confirm that their signs and symptoms meet the case definition. For example, ask the following questions:

- What is your complaint?
- Where do you live?
- When did the symptoms begin?
- Who else is sick in your home (or workplace, village, neighbourhood)
- Where have you travelled recently?
- Where did you live within the two weeks prior to the onset of symptoms (residence at time of infection)?
- Were you visited by anyone within the last two weeks?

4.5.2 Collect laboratory specimens and obtain laboratory results

If the outbreak is confirmable by laboratory testing, refer to the laboratory chart in Annex 5 to determine the laboratory test and the specimen that is required. The chart also describes how to collect, store and transport the specimen, and how many specimens to collect to confirm an outbreak for a particular disease.

Review laboratory results with the investigation team, clinicians and laboratory persons at the health facility. Are the laboratory results consistent with the clinical findings? Seek additional assistance from national-level programme managers or technical experts for questions about the laboratory results.

4.6 Isolate cases as needed and treat them

Strengthen case management at the health facility (or where the patients are being seen). Provide the health facility with advice, support and supplies as indicated by the case management guidelines. For example:

- Monitor the patient's signs and symptoms
- Treat the patient with available recommended drugs and therapies
- Support the health facility in enhancing infection control as needed depending on the specific disease. Use standard precaution with all patients in the health facility, especially during an outbreak of a disease transmitted by contact with contaminated supplies and body fluids.

Annex 25 contains illustrative treatment protocols for four priority diseases. Annex 26 contains instructions for disinfecting an area around an outbreak.

4.7 Search for additional cases

Once the initial cases have been confirmed and treatment has begun, actively search for additional cases.

4.7.1 Search for cases in the health facility records

In the health facilities where cases have been reported, search for additional cases in the registers. Look for other patients who may have presented with the same or similar signs and symptoms as the disease or condition being investigated. Request health workers in neighbouring health facilities to search for similar cases in their clinic registers.

See Annex 27 for instructions on conducting a register review. Make sure to follow up any cases that have been allowed to go home.

4.7.2 Search for cases in the community

Identify areas of likely risk where the patients have lived, worked or travelled. Also talk to other informants in the community such as pharmacists/chemical sellers, or schoolteachers, community-based surveillance workers, traditional birth attendants, opinion leaders and unit committee members.

The disease and its mode of transmission may influence the areas for the search and factors of risk related to time, place and person analysis. Visit those places and talk to people who had or were likely to have had contact with the patient. Ask if they or anyone they know has had an illness or condition like the one being investigated. Find out if anyone else in the area around the case has been ill with signs or symptoms that meet the case definition. Collect information that will help to describe the magnitude and geographic extent of the outbreak.

Refer newly identified cases to the health facility for treatment.

4.8 Record information about the additional cases

For each new case either in the health facility register or in searches of the community that fits the surveillance case definition, record the collected information on either a case-based reporting form, line list or other recommended form.

4.8.1 Record information on a case-based reporting form

Record information on a case-based reporting form for at least the first five patients. Also record information on a case form for all those from which laboratory specimens will be taken. For each case, record at least:

- The patient's name, address, village or town and locating information. If a specific address is not available, record information that can be used to contact patients if additional information is needed or to notify the patient about laboratory and investigation results.
- The patient's age and gender. This information is used to describe the characteristics of the population affected by the disease.
- The date of onset of symptoms and date the patient was first seen at the health facility.
- Relevant risk factor information such as immunization status if the disease being investigated is a vaccine-preventable disease.
- The name and designation of the person reporting the information.

NOTE: To streamline data collection methods, it is recommended using the case-based reporting form as a laboratory transmittal slip. See the sample form in Annex 8.

4.8.2 Record information about additional cases on a line list

When more than five to 10 cases have been identified, and the required number of laboratory specimens have been collected, record any additional cases on a line list. Use the line list as a laboratory transmittal form if 10 or more cases need laboratory specimens collected on the same day and specimens will be transported off to the lab in a batch.

4.9 Analyse data about the outbreak

The methods for analysing and presenting outbreak data are similar to those used to analyse of routine summary data as described in Section 3. Data about the outbreak is analysed and reanalysed many times during the course of an outbreak.

During the initial analysis, summarise the outbreak and look for clues about where the outbreak is occurring, where it is moving, the source of the outbreak (for example, a single source such as a well or a funeral) and the persons at risk of becoming ill (for example, young children, refugees and persons living in rural areas). Present the data in the following way:

- Draw a histogram representing the course of the disease (an epidemic curve).
- Plot the cases on a spot map.
- Make tables of the most relevant characteristics for cases (for example, comparing age group with vaccination status).

During an outbreak, these data will need to be updated frequently (often daily) to see if the information being received changes the ideas regarding the causes and control strategies for the outbreak.

4.9.1 Analyse data by time

Prepare a histogram using data from the case reporting forms and line lists. Plot cases on the histogram according to the date of onset.

As the histogram develops, it will demonstrate an epidemic curve. Define the geographic area the curve will represent. For example, decide if the curve should describe the entire district or the health facility catchment area where the case occurred.

The results of the time analysis allow DHMTs and surveillance officers to look back at the outbreak and answer questions such as when were patients exposed to the illness and the length of the incubation period.

Highlight significant events on the histogram with arrows. For example, review the log of reported outbreaks and rumours to highlight the dates when:

- The onset of the first (or index) case occurred
- The health facility notified the district
- The first case was seen at the health facility
- The district began the case investigation
- An appropriate response began
- The district notified the national level
- Mass immunization was carried out

The purpose of highlighting these events with arrows is to evaluate whether detection, investigation and response to the outbreak was timely. For example, monitoring the interval between the onset of the first known case and when the first case was seen in the health facility is an indicator of the community's awareness of the disease's signs and symptoms and the need to refer cases to the health facility. These intervals are discussed further in Section 7.

4.9.2 Analyse data by place

Make a map of the area where the suspected and confirmed cases occurred. Use the place of residence on the case reporting forms or line lists to plot on a map and describe:

- Clusters of cases that are occurring in a particular area
- Travel patterns that relate to the method of transmission for this disease
- Common sources of infection for these cases.

Mark also the following:

- Roads, water sources, location of specific communities and other elements that could relate to the transmission risk for the disease under investigation. For example, a map for neonatal tetanus would include locations of traditional birth attendants and health facilities where mothers deliver infants.

- Location of the patients' residences or most relevant geographic characteristic for this disease or condition (for example, by village, neighborhood, work camp, or refugee settlement. Another example is, when mapping patients during a meningitis outbreak, locate the school where the patients attend.)

- Other locations that are appropriate to the disease being investigated. (Please see the disease-specific guidelines in Section 9 for specific recommendations for analysing data by place.)

4.9.3 Analyse data by person

Review the case forms and line lists and compare the variables for each person suspected or confirmed to have this disease or condition. For example, depending on the factors that must be considered in planning a specific response, compare the total number and proportion of suspected and confirmed cases according to:

- Age or date of birth
- Sex
- Urban and rural residences
- Immunization status
- Inpatient and outpatient status
- Risk factors
- Outcome of the episode, for example, whether the patient survived, died or the status is not known
- Laboratory results
- Final classification of the case
- Other variables relevant to this disease (death by age group, for example)

Use disease-specific information to decide which variables to compare. For example, if information has been collected about a measles outbreak, the age groupings that are targeted by the National Expanded Programme on Immunizations should be used.

4.10 Interpret analysis results

Review the analysis results and make conclusions about the outbreak. For example:

- What was the causal agent of the outbreak?
- What was the source of infection?
- What was the transmission pattern?
- What control measures were implemented and to what effect?

4.10.1 Interpret the time analysis results

Look at the histogram and observe the shape of the epidemic curve. Draw conclusions about when exposure to the agent that caused the illness occurred, the source of infection and the related incubation period.

- If the shape of the curve suddenly increases to develop a steep up-slope, and then descends just as rapidly, exposure to the causal agent was probably over a brief period of time. There may be a common source of infection.

- If exposure to the common source was over a long period of time, the shape of the epidemic curve is more likely to be a plateau rather than a sharp peak.

- If the illness resulted from person-to-person transmission, the curve will present as a series of progressively taller peaks separated by periods of incubation.

4.10.2 Interpret the place analysis results

Use the map to:

- Describe the geographic extent of the problem.
- Identify and describe any clusters or patterns of transmission or exposure. Depending on the organism that has contributed to this outbreak, specify the proximity of the cases to likely sources of infection.

4.10.3 Interpret the person analysis results

Information developed from the person analysis is essential for planning the outbreak response because it describes more precisely the population at risk for transmission of this disease or condition. For example, if yellow fever cases occurred in patients less than 15 years of age, then the immunization response action would need to target children less than 15 years of age.

For measles, if the proportion of cases in children younger than 5 years is high and immunization coverage is low, then there is a problem with immunization. If the coverage is high then the cold chain system will need to be reviewed.

4.10.4 Calculate case fatality rates

Refer to the steps in Section 3 that describe how to calculate case fatality rates.

Respond to Outbreaks and Other Public Health Problems

This section describes how to:

- Create and use a district epidemic management committee to improve preparedness for responding to epidemics and other public health problems
- Prepare the necessary resources for responding to epidemics and other public health problems
- Respond to epidemics and other public health problems
- Select appropriate public health responses based on investigation and analysis results and disease-specific recommendations for:
  - Strengthening case management of priority diseases and conditions
  - Updating health staff's skills
  - Conducting an emergency immunization campaign
  - Enhancing surveillance during an outbreak response activity
  - Informing and educating the community
  - Improving access to clean water
  - Ensuring safe disposal of human waste
  - Improving food handling practices
  - Reducing exposure to mosquitoes
  - Controlling animal vectors
- Report on lessons learned from the current response and recommendations for future response activities

5.0 Prepare and Respond to Outbreaks and Other Public Health Problems

This section describes steps for:

- Preparing well in advance, by developing procedures and obtaining adequate resources, to respond to epidemics and other public health problems
- Responding to a confirmed outbreak of a priority disease or other public health problem that is discovered through routine analysis
- Reporting on the response to the problem

Being prepared to respond to epidemics and other public health problems is an important part of the district's health care delivery services. Having procedures and resources in place in advance of a disease outbreak will increase the efficiency and effectiveness of the response to the problem.

When an outbreak of a priority disease occurs, the health system should respond immediately, directing the appropriate level of effort and resources to contain the outbreak. If preparations are adequate, the system will prevent deaths or disabilities that would otherwise result from the epidemic. The same is true for problems identified through analysis of routine data. For example, if the increase in the number of deaths in children under 5 years of age due to severe pneumonia persists despite the existence of a prevention programme, the current effort should be reviewed and action taken – for example, better assessment and treatment of pneumonia cases in that age group – to improve the programme.

No matter the problem, response planning should be led by the appropriate district staff and coordinated closely with health facility staff and others, as described in this section.

5.1 Prepare the response

5.1.1 Set up appropriate entities to manage the response

5.1.1.1 District epidemic management committee

Each district should create a district epidemic management committee (DEMC). Like the National Epidemic Management Committee, the DEMC should be multi-sectoral in nature. DEMC membership should include the district epidemic rapid response team (see below) to provide technical expertise. Also suggested for membership are the following:

From the public sector:

- District chief executive
- District police commander
- District community representative/traditional council member
- Representative of the National Disaster Management Organization (NADMO)
- District director of health services
- District public health nurse
- District disease control officer
- District environmental officer
- Clinician

- Laboratory technician/laboratory technologist from the district reference laboratory
- Representative from other sectors (e.g. water, education and agriculture)

From non-governmental organizations with health care activities in the area:
- Representatives from community health programmes/mission hospitals
- Representatives from other agencies operating in the district as necessary (e.g. Red Cross)

From the private sector:
- Clinician from private hospital, clinic or laboratory
- Pharmacist/chemical seller

5.1.1.2 District epidemic rapid response team

The district should establish a rapid response team with the appropriate technical expertise. The following members are suggested:
- An epidemiologist/public health specialist (disease control officer)
- Laboratory technologist/technician
- Clinician
- Environmental health officer

The district epidemic rapid response team will have the following responsibilities:
- Participate in the DEMC
- Conduct epidemiological investigation of suspected outbreaks
- Carry out disease control measures to contain the outbreaks
- Report progress regularly
- Evaluate the outbreak response

5.1.2 Hold regular meetings of the DEMC

A good surveillance system requires constant vigilance and preparation. This means that the DEMC should meet regularly – preferably every month, but at least every quarter – even in the absence of a disease outbreak. In the event of an outbreak, the DEMC should meet as soon as the epidemic is recognised and continue to hold meetings as often as needed to plan, implement, monitor and report on the response to the epidemic.

During meetings, the committee should do the following:

- Review surveillance data for trends that cause a concern for public health
- Make sure that the medical supervisors in all the health facilities in the district know and use protocols for recommended case management of priority diseases and conditions
- Make sure appropriate staff know the steps for obtaining laboratory confirmation
- Periodically review and update inventory of supplies needed for disease response to make sure they are dry, clean and ready for use (ideally, this is done every three months):
  - Equipment and supplies for treatment
  - Supplies for collecting and transporting specimens for confirmation
  - Vaccines and supplies for administering vaccinations

- Periodically review and update other resources:
  - Presence of trained staff
  - Resources for transportation and communication
  - Procedures for procuring additional, emergency stocks of vaccines and conducting a prompt vaccine response to an emergency

5.1.3 Prepare district epidemic response plan

As part of its overall health plan, every district should have in place an epidemic preparedness and response plan that is prepared by the district health management team and is based on an assessment of the district's existing state of preparedness. The plan should define resources (human, financial, medical, etc.) that would be needed in the event of a disease outbreak and therefore should be kept available at the district and individual health facility levels. More specifically, those resources are:

- Human resources to manage and implement response activities
- Financial resources to support investigation and control activities
- Emergency stocks of required drugs and other medical supplies according to the recommendation of the country's health system
- Laboratory support for confirmation of pathogens responsible for the epidemics. If a district does not have the laboratory facility, identify the reference laboratory and mechanism for appropriately collecting and transporting specimens to that laboratory. Make sure the transport procedure allows for the specimens to:
  - Be kept at the recommended temperature
  - Arrive at the laboratory as quickly as possible
- Logistics support (travel of rapid response team, accommodation arrangement, communication, other essential equipment)
- Related to the above, procedures to obtain additional, emergency support from the regional and national levels during an epidemic: for example, the district should know when to request additional support, whom to contact, what information will be needed to consider a request

The plan then must be presented to and approved by the DEMC. Once approval is secured, supplies and other resources required by the plan should be procured and maintained.

The plan should be periodically reviewed and updated as necessary at each DEMC meeting to ensure that the district as a whole and individual facilities are ready to respond to a disease outbreak at all times.

5.1.4 Update personnel skills

5.1.4.1 Train health staffs to carry out response

The preparedness and response plan emphasizes the need for health staff who can recognize and respond to disease outbreaks. An important component of preparedness therefore is the training – and retraining – of district and other health staff who will be directly involved in the management and implementation of response activities. Initial training is needed to impart skills; retraining is needed to maintain those skills and to update staff on

new procedures. The district should collaborate with the regional health management team to train/retrain the district epidemic rapid response team members, district health staff and health facility staff on the management of epidemic-causing diseases.

Training should emphasize the improvement of clinical practices and case management according to disease-specific recommendations. Reviews of clinical staff in each facility should be done periodically, to make sure staff know and use the protocols recommended for appropriate case management of priority diseases. Annex 25 contains recommendations for treating cases during an outbreak.

Other training topics should be selected depending on the district's risk of transmission for the specific disease, for example:

- Intensifying standard precautions (use of clean water, hand washing and safe sharps disposal)
- Barrier nursing and use of protective clothing
- Isolation precautions
- Treatment protocols such as delivering oral rehydration salts (ORS) and using intravenous fluids
- Disinfecting surfaces, clothing and equipment
- Disposing of bodies safely

5.1.4.2 Orient other personnel to response needs

In addition to training staff who will be directly involved with surveillance and response, DEMC members and other health and non-health personnel should be oriented to epidemic management based on the district's epidemic-causing diseases. This will ensure their continuous support of response activities during an epidemic.

5.1.5 Develop community education materials

Community education messages should be developed to help the population know how to recognize the illness in question, how to prevent transmission and when to seek treatment. In some cases, for example for diseases that occur periodically or cyclically, materials can be drafted and produced, and disseminated when the outbreak occurs. In cases where an outbreak is less predictable or where specific directives are needed, drafts can be prepared in advance, then quickly finalized, i.e., according to needs of particular situation, and produced if an outbreak occurs.

1. Decide **what to communicate** by referring to disease-specific recommendations in Section 9. Make sure to include:
   - Signs and symptoms of the disease
   - How to treat the disease at home, if home treatment is recommended
   - Prevention behaviours that are feasible and that have a high likelihood of preventing disease transmission
   - When to come to the health facility for evaluation and treatment
   - Immunization recommendations, if any

2. Decide **how to state the message**. Make sure that the messages:
   - Use local terminology
   - Are culturally sensitive
   - Are clear and concise
   - Work with local traditions
   - Address beliefs about the disease

Sample community education messages are in Annex 28.

3. Select appropriate communication methods that are available in the district, for example:
   - Radio
   - Television
   - Newspapers
   - Meetings with health personnel, and with trusted and respected community, religious and political leaders
   - Posters
   - Fliers
   - Presentations at markets, health centers, schools, women's and other community groups, service organizations, religious centers.

Make arrangements with media programmers, meeting planners, etc. on how public service announcements and other important information for the community can be presented in the event of a disease outbreak.

4. Appoint a community liaison officer or health staff to serve as spokesperson to the media in the event that an outbreak occurs. Prepare the person to serve in that capacity.

5.2 Implementing the response

5.2.1 Select an appropriate response

When an outbreak is confirmed or a need for public health action is identified, review the investigation results and data analysis conclusions. Refer to the disease-specific guidelines and select response activities that involve:

- Proven measures to prevent unnecessary deaths or disabilities due to the current outbreak
- A mix of control and prevention activities to curb the problem in the short term and reduce the risk of ongoing transmission in the long term
- Participation from the community, health care facilities and the district personnel.

Refer to Section 9 for disease-specific epidemic response activities.

5.2.2 Plan response activities specific to the outbreak

The district epidemic response plan outlines general, ongoing preparedness. Additional planning is needed once an outbreak has been identified, to address the contingencies of that specific outbreak, for example, the disease, the location of the outbreak, the need for additional resources. Consider the district response plan in conjunction with the needs of the current outbreak when finalizing the specific response. Address the following issues:

1. If emergency response funds are needed, implement the procedures set up for obtaining them from the regional or national level.

2. If suspected disease is laboratory confirmable, implement the procedures set up for correctly collecting and transporting specimens to the appointed laboratory. This is especially important for specimens coming from a remote location. As noted in the plan, make sure the specimens are:
   - Kept at the recommended temperature
   - Arrive at the laboratory as quickly as possible

3. Identify areas or populations at high risk for the disease or condition. Review the data analysis to refine the description of the outbreak characteristics. Review at least the:
   - Incidence rate for the outbreak disease
   - Extent of risk factors for the outbreak disease. For example, look at the case investigation results for information about the extent of unsafe delivery practices in a neonatal tetanus outbreak, unsafe food practices for diarrhoea, and the number of people who have forest-related occupations during a yellow fever outbreak
   - Rate of immunization coverage for the outbreak disease

4. Alert nearby districts or catchment areas about the outbreak. If they are experiencing a similar outbreak, coordinate response efforts. For example, combine efforts to:
   - Obtain supplies and resources
   - Develop and/or disseminate health education messages and materials
   - Conduct emergency immunization activities
   - Transport specimens to reference laboratory for confirmation

5. Review the lists of supplies and resources made by the epidemic response team. Use established procedures to obtain emergency supplies and set them aside at the district and local levels for emergency use.

6. If supplies are not available locally:
   - Contact the regional office to find out where they might be obtained quickly
   - Borrow from other services, activities or non-governmental organizations in your area
   - Identify practical low-cost substitutes

7. Assign clear responsibilities to individuals or units for specific response activities.

8. Prepare and produce last-minute health education materials, and make sure the spokesperson is ready to deal with the media.

9. Verify that health staff have the training and supplies needed to monitor the response, that is, to:
   - Keep detailed records on the response activities, for example, a tally sheet of individuals immunized; a list of the community education messages, communication channels and dates of community education activities; a list of individuals receiving bed nets
   - Review data on cases, laboratory confirmation and treatment
   - Identify problems and modify activities as necessary

5.2.3 Implement response activities

Refer to disease-specific guidelines in Section 9 for recommended responses. The response activities include the following:

- Monitor case management
- Fill gaps in health staff skills
- Conduct emergency immunization campaigns
- Enhance surveillance during the response activity
- Inform and educate the community
- Improve access to clean water

- Improve safe disposal of human waste
- Improve food handling practices
- Reduce exposure to mosquitoes
- Control disease vectors
- Disseminate the technical recommendations appropriate for the outbreak

5.2.3.1 Monitor case management

Section 5.1.4 emphasized the need for clinical staff to be trained and retrained in clinical protocols for case management guidelines. During an outbreak:

- Make sure that the clinical staff at each health facility know and use recommended protocols for case management of the outbreak disease.
- Make sure that clinicians get laboratory confirmation of the outbreak disease, if the disease is laboratory confirmable.
- In a large epidemic, ask the medical officer at each health facility to identify an area that can be used for a large number of patients.
- Make the necessary drugs and treatment supplies available.

5.2.3.2 Verify health staff skills

Give clear and concise directions to health staff taking part in the response.

While an emergency does not allow time for formal training, some on-the-job or one-on-one training may be needed and appropriate. For example, ask a clinician to demonstrate a skill on the wards. Make sure there is an opportunity for the trainer to observe the trainees using the updated or new skill.

5.2.3.3 Conduct an emergency immunization activity

Collaborate with the district or national EPI and disease control programme manager to conduct an emergency immunization activity, if indicated. Begin planning the emergency immunization activity as soon as possible, because obtaining and distributing vaccine takes some time. To do so:

- Determine the target population for the activity based on the case and outbreak investigation results.
- Refer to the guidelines of the National EPI for specific recommendations about delivery of the indicated vaccine.
- Use the procedures established in the district response plan for acquiring an emergency stock of vaccine.

Annexes 27-29 contain information related to emergency immunization activities: a worksheet for planning an emergency immunization activity is in Annex 29, one for estimating vaccine supplies is in Annex 30 and Annex 31 discusses recommended immunization practices.

5.2.3.4 Enhance surveillance

During a response to an outbreak, encourage health staff at all health facilities to be vigilant in surveillance of the disease or condition. Make sure that staff do the following:

- Search for additional persons who have the specific disease and refer them to the health facility or treatment centers for treatment (in the case of cholera, for example) or quarantine the household (in the case of plague, for example) and manage the patient.
- Update line lists and monitor the effectiveness of the outbreak or response activity.
- Analyse data regularly in order to monitor the evolution of the outbreak and the effectiveness of the response.

5.2.3.5 Inform and educate the community

Use the communication materials developed in the preparation phase (see Section 5.1.5) and other activities to keep the public informed about the outbreak. This will calm their fear and encourage their cooperation with the outbreak response. Begin community outreach as soon as an epidemic or public health problem is identified.

Give health education messages to the media, community groups and service organizations, and community leaders so that they can disseminate them to the public as previously planned.

As soon as the outbreak has been recognized, announce by name the spokesperson who will deliver communiqués about the outbreak and progress of control measures.

- So that the community receives clear and consistent information, release information from the epidemic management committee only through that spokesperson.
- Emphasize to the media that they will receive information only from that person.

So that the media and broader community can stay informed and help with disease control, have the spokesperson meet with the community on a regular basis to give:

- Updated information on the outbreak and response
- Clear and simple health messages that the media should use without editing

5.2.3.6 Improve access to safe water

Make sure the community has an adequate supply of safe water for drinking and other uses. The daily water needs per person during non-outbreak situations are shown in Table 7. Water needs are much higher during an outbreak situation, especially outbreaks of diarrhoeal diseases.

Table 7: Daily water needs per person during outbreak and non-outbreak situations

	Non-outbreak situation	During outbreak of Diarrhoeal disease
Home use	20 liters per day	50 liters
health care setting	40 to 60 liters per day	50 liters in wards 100 liters in surgery 10 liters in kitchen

Source: *Refugee Health: an Approach to Emergency Situations.* Medecins sans Frontieres. 1997. MacMillan.

Safe sources of drinking water include:

- Piped chlorinated water
- Exposed water sources (a river, pond or open well), if protected from contamination by people or animals. For example, make sure that the water source is at least 30 meters upstream from areas where people or animals defecate
- Protected water sources (for example, closed wells with a cover)
- Boiled water from any reliable source
- Chlorinated water

If a safe water source is not available during an emergency, a water supply may need to be brought in by truck. However, transporting water is expensive and difficult to sustain.

To make sure that families have safe drinking water at home provide:

- Community education on how to keep home drinking water safe
- Containers that prevent contamination of water, for example, containers with narrow mouths so that people cannot contaminate the water by putting their hands into the container
- Location site for defecation at least 30 meters or more from sources of water

5.2.3.7 Ensure safe disposal of human waste

To make sure that human feces are disposed of safely:

- Assign teams to inspect local areas for human waste disposal. Safe practices include disposing of feces in a latrine or burying them in the ground more than 10 meters from a water supply.
- Construct latrines appropriate for local conditions with the cooperation of the community.
- Conduct community education on safe sanitation practices, especially if unsafe practices are found.

5.2.3.8 Improve food handling practices

Make sure that people handle food safely in homes, restaurants, food vending sites and food-packaging factories. Refer to the nationally established standards and controls for the handling and processing of food. To ensure food hygiene:

- Conduct community education on food hygiene practices for the general public and those in the food industry.
- Visit restaurants, food vendors, food-packaging factories and so on to inspect food-handling practices. Look for safe practices such as proper hand washing, cleanliness and adherence to national standards.
- Close restaurants, vending areas or factories if inspection results show unsafe food handling practices.
- Strengthen national controls as necessary.

5.2.3.9 Reduce exposures to mosquitoes

Encourage prevention of mosquito-borne diseases by helping people reduce their exposure to mosquitoes during the day and at night. Work with the malaria control programme to:

- Implement a bednet programme
- Conduct community education on the proper use of bednets and how to avoid dawn-to-dusk mosquito bites

5.2.3.10 Control vectors

Encourage prevention of diseases carried by rodents by helping people reduce their exposure to these animals. For example, rodents can carry Lassa fever and they may be infested with fleas that carry plague. Work with the district vector control officer to encourage the community to:

- Avoid contact with the blood and saliva of dead rodents
- Keep food and water in the home covered to prevent making food available to rodents
- Keep home and cooking area clean and uncluttered, to remove places where rodents could nest

5.3 Reporting on the response

A detailed report on the response – both what worked and what needed improving – is useful for reviewing what can be learned from the experience and thus for planning for future outbreaks. As soon as the epidemic has been controlled, district staff who oversaw the response effort should write and disseminate a report and include:

- Details on the response activities, including dates, places and individuals involved in each activity as well as the “epi” curve, spot map, table of person analyses and the line list of cases
- Modifications made to the initial response activities

- Recommendations for improving epidemic response in the future, for example, ways to make the immunization strategy and programme more effective, and changes in the handling and transportation of laboratory specimens so that they reach the reference laboratory in better condition or more quickly

Annex 32 contains a report format. Annex 33 contains a form that the district and health facilities can use to self-evaluate their response to the outbreak. This information can be incorporated into the response report.

Provide Feedback

This section describes:

- The importance of providing feedback to lower levels of the surveillance system
- Types pf feedback
- How to prepare and disseminate information summary sheets, public health bulletins, newsletters, fact sheets and reports

6.0 Provide Feedback

Data are reported routinely from the lower to the higher levels of the health care system:
Community ⟶ Sub-district ⟶ District ⟶ Region ⟶ National.

Analysed data and feedback are not, however, sent regularly to lower levels. Moreover, information is not shared amongst surveillance participants at the same level. If these staff do not receive information that shows how the data they reported were used or what the data meant, they may think that their reporting is not important. This may result in their being less motivated to collect and report reliable data.

In other words, feedback reinforces health staff's participation in the surveillance system. It also raises awareness about certain diseases and any achievements of disease control and prevention activities in the area. There is therefore the need to institute regular and timely feedback to all levels of the health delivery system. When the district or regional health management teams or National Surveillance Unit receive and analyse data, they should promptly disseminate results to the entities that provided the data. Feedback may be oral, as in a telephone call or staff meeting, or written as in a report or bulletin.

This section focuses on district-level feedback, but the principles can also be applied in health facilities, and at the regional and national levels.

6.1 Verbal feedback

Verbal feedback from the district to the health facility can take place in various venues:

- Supervisory visits, telephone calls
- Meetings: weekly, monthly, quarterly, half-yearly and annually
- Community durbars

During the visit or meeting, give a verbal report or comment about the data that were reported by the health facility during a given period of time. Display the data in a simple table. Sit with the health staff and show them the data. Discuss the likely conclusions that can be drawn from the data. Consider conclusions not only for the health facility, but for the district as a whole.

6.2 Written feedback

Written feedback can take the following forms:

- Outbreak response report
- Information summary sheet
- Public health bulletin
- Newsletters/briefing reports
- Fact sheets

6.2.1 Outbreak response report

After an outbreak response has taken place, district staff who led the investigation should prepare a report (see Section 5.3). Use a copy of the report as feedback to the health facility that first reported the cases.

6.2.2 Information summary sheets

An information summary sheet is a "report" that presents data and its interpretation in a table or other graphic format. It is particularly useful as back-up to a verbal presentation. The summary sheet can be a simple table that shows how the data reported for this period differ from the data reported for some other period or target population: For example, show the number of cases of diarrhoea with dehydration in children less than 5 years of age from a given period last year. Compare this with data for the corresponding period this year, for example, after a water vessel project was implemented in a high-risk area.

Share information summary sheets with other surveillance entities, and use them to support requests made to higher levels for additional funds, supplies and other resources.

6.2.3 Public health bulletin

The purpose of a public health bulletin is to present facts in a limited format and time frame.

In Ghana, the National Surveillance Unit produces a weekly bulletin. Some regions produce a monthly bulletin. Similarly, other national vertical programmes produce disease-specific newsletters, such as the one by the Guinea Worm Eradication Programme. The bulletins are usually brief, from two to eight pages.

The bulletin should contain at least:

- A summary table showing the number of reported cases and deaths to date for the epidemic-prone diseases
- A brief, reader-friendly summary, commentary or message on surveillance of a given priority disease or other topic, such as health facility, sub-district or district performance
- A map showing geographical distribution of priority diseases
- Data reported from lower levels during the period. This will act as feedback, enabling units at the same level to compare their data with that of each other, and trigger correction of inaccurate data
- Alert messages on epidemic-prone diseases

If a national public health bulletin is sent to the district office, display it where others can see it. Make copies to distribute to health facility staff. Take copies of the bulletin on supervisory visits to show health staff how the data they report contributes to public health.

All levels are to produce a monthly bulletin covering the priority conditions and any other diseases relevant to the local area. The national level will continue to produce weekly and monthly bulletins on all the priority diseases.

6.2.4 District newsletter

The target audience for a newsletter is health staff in the district as well as other collaborators. The newsletter can be used to inform and motivate these health workers.

The newsletter can be produced simply with a computer-entered or typewritten text of two to four pages containing a summary of articles such as:

- District data for a given priority disease
- Report of progress towards a specific public health target
- Report of a specific achievement towards public health by an individual health worker or a group of health workers
- Description of special events or activities (public festivals, religious gatherings, floods etc.)

6.2.5 Fact sheets

Fact sheets are brief summaries of one to two pages. They are prepared by health staff for the general public. They usually deal with a single topic or message. For example, if the district would like to give the community information about a shigella outbreak, the fact sheet states the steps for hand washing and clean food preparation in addition to a table with the number of cases and deaths. These are sheets that could be hung on a bulletin board or distributed to community groups that are planning health education campaigns.

6.3 Other methods for providing feedback

Other methods of providing feedback to lower levels of the health reporting system include:

- Electronic reporting (E-mail, for example)
- Guidelines and technical manuals
- Health education materials
- Radio talks
- Briefing reports

Evaluate and Improve Surveillance and Response

This section describes how to:

- Monitor the quality of surveillance activities at the district level
- Report timeliness and completeness to higher levels
- Identify targets and indicators
- Supervise surveillance and response activities
- Evaluate district surveillance system
- Take action to improve surveillance and response in the following year's plan

7.0 Evaluate and Improve Surveillance and Response

Section 3 of these guidelines describes how, each week, month or quarter, the health staff responsible for surveillance at the health facility and at the district level review and analyse the data reported for the given period and make conclusions each month about the:

- Timeliness and completeness of reporting
  - Of immediately reportable diseases, outbreak investigations and responses
  - Of summary data on routine basis
- Readiness of prevention and control activities, so that when problems are detected, districts respond with appropriate action

When improvements have been made to the disease surveillance system in a district and the new activities have become routine, the system should be evaluated every year. The evaluation should determine whether:

- The surveillance objectives are being met
- Surveillance data are used for action
- The improved surveillance has had an impact on health events in the district e.g. immunization, morbidity, mortality
- Response to outbreaks is appropriate and timely

This section describes how to routinely monitor and annually evaluate the performance of the surveillance system and specific disease control and prevention programmes. The section focuses on monthly reporting.

7.1 Monitor the quality of the surveillance system

7.1.1 Monitor and evaluate detection of immediately reported diseases

Monitor and determine the interval between the onset of the first known case and when it was seen in the health facility. Delay in the use of health services is one of the factors affecting the evolution of the illness, and, therefore, its prognosis.

Other intervals to monitor for detection of immediately reportable diseases include monitoring reporting from the community to the health facility (within 48 hours of onset of illness), from the health facility to the district (within 48 hours) and from the time the threshold is reached to when a response appropriate to the particular disease or public health problem is made.

7.1.2 Monitor timeliness and completeness of monthly reporting

Important indicators of a quality reporting system are its timeliness and completeness. Timeliness means reports are sent and received on time, increasing the possibility of a prompt and effective response. Completeness of reporting refers to all the reporting units having reported as expected. If reports are late, or are not submitted, the aggregated information for the district (or other administrative area) will not be accurate. Outbreaks can go undetected, and opportunities to identify and respond to other problems will be missed.

Therefore, the receipt of reports should be routinely monitored to evaluate their timeliness and completeness. Use a monitoring tool such as the monthly record of reports in Annex 34. This form can be adapted to weekly and quarterly reporting.

If you routinely record and review the dates on which reports are received, the effectiveness of the system can be assessed easily each month during the analysis of routine and case-based data. For example, use the record of reports received to:

- Measure how many reporting units submitted reports for a given period
- Identify which reporting units have not reported
- Measure how many reports were submitted on time
- Measure how many reporting units submitted complete reports

7.1.3 Identify and seek solutions to problems in reporting

If the monitoring information shows that a health facility or other reporting unit has not provided a report, or if the report is not on time or complete, contact the surveillance focal person at the facility. Work with that person and other designated staff to identify what caused the problem. For example, one or more of the following situations may exist:

- Health staff lack an adequate or reliable supply of forms and other resources (e.g. transport, communication facilities) for reporting.
- A new staff has been posted to the facility and does not know the procedure for reporting.
- Health staff are not motivated to send the reports, because they do not think it is important.

Work with the facility staff to find solutions to the problem. For example, if the problem is lack of supplies, the district can advocate with higher levels in the system to improve the supply chain. Remind them that, when information is complete and timely, the district can assist them more efficiently to plan and implement responses to their public health problems.

7.1.4 Reporting to higher levels

When the district sends routine reports of the numbers of cases to the regional or national level, it should accompany those numbers with additional information. This will help the higher levels understand the situation more clearly and evaluate the quality of the data. For example, a report that states that two cases of measles were detected in the district during the month should also include the number (and percentage) of health facilities that reported, because it makes a difference if the two cases occurred among only 20% rather than among 100% of facilities.

7.1.5 Identify targets and indicators

Indicators are used to measure the progress that a programme or activity is making toward its own targets and to compare its level of achievement to other programmes or activities and to the overall recommended standard quality practices.

A surveillance system's ultimate goal is to improve the health of the population. First, however, it must measure the quality of its own operational targets. For example, a district may have as its goal the achievement of 100% completeness of reporting by a certain date. An indicator can be developed to measure the proportion or percentage of facilities that are reporting. This proportion is then used to evaluate progress toward the goal and, therefore, the quality of the service or activity.

Table 8 lists possible indicators to measure quality of surveillance and response at the district level. These indicators may relate to national goals and indicators, or they may be specific to the district. Select the indicators that are most relevant to the district's plan for improving surveillance this year, and that will provide information that the district can use.

Table 8: District-level indicators for monitoring quality of surveillance and response at the health facility

Function of surveillance	Indicator: Regularly monitor the number of health facilities that:
Identify and record suspected cases	■ Use case definitions ■ Use a clinical register ■ Correctly record information in the register
Confirm suspected cases	■ Have access to a functioning laboratory that can reliably process specimens (sputum, stool, blood, serum, cerebral spinal fluid, for example) for confirmation of priority diseases ■ Safely collect and properly package specimens for transport to higher-level laboratory
Review and analyse data	■ Keep up-to-date trend (line graphs) for each selected priority diseases ■ Have detected a new epidemic ■ Have an alert and epidemic threshold for epidemic-prone disease
Report data	■ Report case-based information for immediately reportable diseases ■ Have an adequate and reliable supply of reporting forms (at least 3 months stock) ■ Accurately record case register data on summary report forms ■ Submitted reports on time to the district during last 3 moths ■ Submitted required number of reports during last 3 months
Respond to outbreak thresholds and analysis results	■ Used local information to conduct a community disease prevention and control activity during the last 12 months ■ Implemented prevention and control measures based on local data for at least one epidemic-prone disease
Provide feedback	■ Received a bulletin or report from district or higher level about data health facility reported to these levels during the year ■ Met with community members to discuss investigation results during last 6 months
Maintain readiness for epidemic response	■ Use standard case management protocols for priority diseases ■ Use a minimum level of standard precautions with all febrile patients regardless of infection status ■ Maintain an emergency stock of urgent drugs and treatment supplies for responding to epidemic-prone diseases seen previously in the area
Supervision	■ Used a supervision checklist for surveillance during supervisory visit at least once in the last 6 months
Training	■ Conducted training for health staff on one or more of the following topics in the last 12 months: using case definitions, handling specimens safely, collecting and reporting data, analysing and interpreting trends, using thresholds for action, supervisory skills
Resources	■ Have reliable transportation (methods), with fuel source as needed (bicycles, motor-cycle, vehicle fuel) ■ Have access to reliable communication facilities (telephone, facsimile, radiophone, E-mail, others) ■ Have adequate supplies for carrying out outbreak investigations ■ Have adequate funds for implementing response actions

7.1.6 Select data to serve as indicators

For each indicator selected specify the numerator and the denominator. For example, a district has as its objective to have all health facilities keep trend lines in an analysis workbook for the selected priority diseases. The analysis workbooks are monitored during supervisory visits.

Indicator: The proportion of health facilities in the district that keep trend lines for priority diseases.
Numerator: The number of health facilities that keep trend lines for priority diseases.
Denominator: The number of health facilities in the district.

7.2 Conduct supervision

In a good system, supervision is not a fault-finding inspection by supervisors but rather a collaborative effort to help health staff to improve their work performance, with the further goal of providing high quality health services. Supervisors and health professionals work together to review progress, identify problems, decide what has caused the problem and develop feasible solutions.

7.2.1 Improve job descriptions to include surveillance tasks relevant to each category of health staff

Job descriptions are the basis for conducting supervision and assessing performance. Review the job descriptions of health staff who have a role in the surveillance and response system. Make sure that the job description states:

- The surveillance tasks the specific category of health staff should perform
- To whom the health staff person reports
- Other health staff who are supervised by the specific category or person.

7.2.2 Prepare a supervision plan

Include surveillance and response targets in the overall plan for supervision in the district. For example:

- Decide how often to monitor health staff performance. For example, a district should conduct a supervisory visit at least once a month for each health facility (clinic, health centre, etc.).

- Ask district supervisors to make a schedule for the coming year of the supervision they will conduct in their own facilities and in any community sites that report to the facility. Include private health facilities (centres) if feasible.

- Make sure that transport and other resources are available for supervision of surveillance activities. This includes coordinating travel and other logistics for surveillance visits with visits made by other programmes or activities.

7.2.3 Conduct supervisory visits

Begin regular scheduled supervision in the district to ensure that:

- Health workers know how to identify and use standard case definitions to record suspected cases of priority diseases seen in their health facility.

- Priority diseases are recorded in the case register according to the case definition (review sampled OPD cards or case notes).
- Data are analysed in the health facility to identify action thresholds both for routinely reported priority diseases (disease of public health importance) and case-based diseases (epidemic-prone diseases, and diseases targeted for eradication or elimination).
- Reported cases of diseases for which a single case is a suspected outbreak are investigated promptly.
- Response takes place when outbreaks are confirmed, or when problems are identified in routine reporting.
- Response actions are monitored and action is taken by the health facility to improve surveillance actions and readiness for outbreak response.

Make sure during the visit to:

- Provide feedback to the health staff. Let them know what is working well, including how the data they reported were used to detect and control disease outbreaks in the district. If improvements are needed, discuss solutions with the staff.
- Provide on-the-job training as needed if a problem is identified. For example, during a review of the analysis workbook, a supervisor notes that case fatality rates were not calculated correctly. The supervisor should meet with the health staff who do the calculation and review with them the steps for calculating the rate.
- Follow up on any request for assistance such as for emergency response equipment or supplies.
- If a solution to a pre-existing problem was identified in a previous visit, check to see how well the solution was implemented. Find out if problems are still occurring and modify the solution if necessary.

7.2.4 Use a supervisory checklist

Each health facility has unique issues that require specific problem-solving strategies and corrections. To maintain staff motivation to make needed changes, and to avoid overwhelming them with the changes, develop a graduated, or prioritised, supervisory checklist to guide the supervisory visits. Once the facility has achieved one objective (using standard case definitions consistently, for example), the supervisor works with facility staff to tackle a new objective or indicator for monitoring performance (using thresholds for action, for example). Use the checklist during visits to help health staff monitor their activities and progress towards an improved system.

A district surveillance officer making a supervisory visit to a health facility can use the checklist in Table 9 to monitor how well health staff are carrying out the recommended surveillance functions.

Table 9: Surveillance function and supervisory activities

Surveillance function	Supervisory activity
Identify and register cases	■ Check in the clinic register to see if the diagnosis correspond to the recommended case definition. ■ Check the register to see if all the columns in the registry are filled out correctly.
Confirm cases	■ Compare the laboratory records for priority diseases with the number of cases seen in the clinic for the same period of time. For example, compare the number of positive malaria slides with the reported number of hospitalized malaria cases.
Reporting	■ Ask to see copies of the most recent reports or for the most recent reporting period. Compare the number of cases of priority diseases that were reported with the number recorded in the register. ■ Check the date on which the case report was sent against the date recommended for sending the report. ■ Check the reports to make sure they are complete and accurate.
Review and analyse data	■ Verify that trend lines for priority diseases are prepared and kept up-to-date. ■ Ask to see the "Health Facility Analysis Book", if these are in use in the district. Look to see if the trend lines for selected disease are up-to-date.
Preparedness	■ Look at the stocks of emergency drugs, supplies, and protective clothing to be sure there is an adequate supply.

In addition Annex 35 lists questions to be answered during the supervisory visit. The questions can be adapted or modified to meet the specific concerns and extent of progress within a given health facility. To the extent possible the supervisor should internalise these questions to avoid making supervision mechanical.

7.2.5 Write a report of the supervisory visit

After making a supervisory visit, a district surveillance officer should summarise the findings in a report. The report should include facility achievements and shortcomings that were noted during the visit, the actions planned with the health staff to address the problems and the funds or other resources needed to resolve the problems.

7.3 Use all supervisory visits to improve surveillance activities in the district

Visits of surveillance supervisors and regional disease control and other programme officers are good opportunities to discuss and improve district disease control. For example, if a national malaria control person visits the district, discuss why the inpatient malaria deaths have not declined. Ask about additional ideas or resources that the malaria control programme can provide.

7.4 Annually evaluate quality of surveillance and response

7.4.1 Determine indicators and programme targets

Each year, a district should select its evaluation indicators that are based on the current status of its surveillance programme and are appropriate for the objectives it hopes to achieve during the year. Selected indicators are likely to be the following:

- Indicators for measuring quality of surveillance in general. For example, to evaluate timeliness of reporting, select as an indicator the percentage of health facilities that reported routine information on time.

- Indicators for measuring quality of surveillance for specific diseases. For example, to monitor response to surveillance data about meningitis, select as an indicator the percentage of health facilities where meningitis outbreaks were detected and which were laboratory-confirmed.

Annex 36 contains suggested indicators.

7.4.2 Compile and organise monitoring and other results

Gather data from several sources. For example:

- Review the objectives for the year listed in the district's annual plan for improving surveillance and response.

- Gather monthly summaries of cases and deaths reported to the district, spot maps and other analysis results performed by the district.

- Collect any results from special surveys or studies that were done in the district over the last year.

- Include case investigation forms and reports of outbreak response activities that took place in the district.

- Gather summary information from the community and also from health staff.

7.4.3 Analyse results

As you evaluate the summary data for the year, decide:

- Were the reports complete, on time and accurate?
- What were significant changes in disease trends during the year?
- If an increase occurred, was the problem identified?
- If additional cases are still occurring, why are they occurring? Where are they occurring?
- Were appropriate and timely actions taken in response to the surveillance data?
- Were supervisory visits conducted as planned and follow-up tasks carried out as planned?
- Did the community feel that response activities were successful?
- Were any actions taken to address health staff requests or suggestions about services or surveillance?

7.4.4 Identify problems and their causes

If problems occurred, and the district did not meet an expected target or reach a desired level of performance with any indicator, look to see what caused the difference between what was planned and what actually occurred. If a problem is identified, talk with the district team and health facility staff to find out the possible causes of the problem.

7.4.5 Prioritise plans for improvements to surveillance and response in the following year's plan

Include in the district plan for the following year successful activities that should continue and feasible solutions to problems that were identified by the current evaluation.

Plan to implement the solutions. For example:

- State the new activity and its objectives.
- Specify the personnel who will carry out the activity.
- Estimate the cost of the activity.
- Develop a timetable for the activity. Define the sequence of activities in logical order.
- Specify the logistics for the new activity (equipment, personnel, transportation, resource allocation).

7.4.6 Provide feedback to health facilities about the evaluation

Provide a report that gives feedback to health facilities and others in the district about the evaluation findings. Include in the report:

- The objectives for the year
- What was actually achieved
- Likely reasons for differences between what was planned and what was achieved
- Recommendations, including prioritised activities, for improving district surveillance and response

Community-based Surveillance

This section describes:

- What community-based surveillance is
- The rationale for a CBS system
- The design of a CBS system

8.0 Community-based Surveillance

Community-based surveillance is one component of the integrated disease surveillance and response system. As the name implies, its overarching objective is to establish a sustainable, community-level surveillance system in which persons resident in the community keep watch to detect occurrences of infectious diseases as well as unusual health events that might indicate the presence of disease, and take timely and appropriate action including reporting the disease cases and health events to health authorities for investigation and further action.

8.1 Rationale for a CBS system

Only a small proportion of the rural population in Ghana is within easy reach of a health facility with trained personnel. In addition, illiteracy and ignorance of the causes of disease and the availability of services to prevent and treat disease preclude the people's use of the health facilities that do exist. As a result, very little is known about the health status and needs of these populations because such information is based on the data gathered at health facilities.

In an effort to extend health coverage to these remote groups, outreach services were introduced to cover all the villages within the catchment area of each health facility. However, taking as an example areas such as the Northern Region, where facilities are few and settlements are kilometres apart, the outreach system increased coverage by only a small proportion, to less than 40% of the population. Therefore health authorities fail to learn about many health events that occur in the communities. The CBS system, modelled on the use of Northern Region community volunteers to detect and report cases of guinea worm disease, attempts to remedy this situation.

Communities play an important role in the detection, notification and reporting of a single case or a broader outbreak of a communicable disease. Community members can be mobilised to recognize and to report adverse events to the nearest health authorities especially if they are trained to be aware of the signs and symptoms of designated priority diseases and of the risk of epidemic posed by the diseases. Outbreak of diseases such as meningitis and cholera that may currently rage for some time before health authorities learn of them are instead observed by the CBS worker because he – or she – knows virtually everybody in the community, then reported and recorded.

Community-based surveillance can also be used to overcome cultural barriers to the reporting of disease. For example, due to cultural beliefs in many parts of Ghana, neonatal death is not considered to be death, so it is not reported or registered in mortality data. A mother dying during labour is considered a bad death; it is best not to discuss it and, as a result, it too is seldom recorded. Like health facilities, authorities that register and issue births, deaths and burial certificates are stationed in only a few towns. Because they are not available in many small communities, they record only a small proportion of these events.

While a CBS system is not meant to replace the facility-based surveillance system but rather to complement it, the range of parameters that CBS can measure is very wide and useful.

8.2 Design of a CBS system

8.2.1 Specific objectives

- To establish a surveillance system that originates from the community and empowers community

members to take action in the event of a disease outbreak or other adverse health event

- To demonstrate that the surveillance system will promptly identify and report the information, indicators and parameters selected for surveillance
- To present the data collected graphically in a manner that will facilitate easy interpretation and quicker response
- To strengthen the organizational capacity of the community and the health institutions to respond with action to the information from the surveillance
- To establish a reliable information transmission system between the village, sub-district, district, regional and national levels

8.2.2 The role of information

Information is integral to an effective effort to detect and control communicable diseases and to gain knowledge about the health status of a nation. As repeated many times in these guidelines, all levels of the population and health system are needed to participate in the effort.

8.2.2.1 Data collection and reporting

The data to be collected is based on:

- The priority information needs of the surveillance system but will expand to cover other indicators needed by other sectors
- The information that the CBS agents will be capable of identifying and collecting
- What is useful for planning, intervention, monitoring and evaluation

Baseline data to be collected by CBS personnel are the following:

- Name of village and location, geographic coordinate
- Population and number of ethnic groups in the village, type of economic activity
- Existing infrastructure
    - Health facilities
    - Schools number and types
    - Number of safe water points
    - Number of dams, dugout wells, surface water
    - Electricity
    - Church/mosque etc.
    - Availability of Mutual Health Organizations

CBS workers will be trained to use simple case definitions (see Annex 3) to detect priority diseases and to recognize significant health events. In some cases, diseases will simply be recorded in community registers and reported to the sub-districts on a monthly basis. The workers will also be trained to report epidemic-prone and other selected diseases and conditions (e.g. AFP for poliomyelitis), and unusual health events that must be reported immediately to the sub-district. The sub-district will follow up by confirming disease outbreaks and taking the necessary action to combat them. Data collection tools and training materials are already developed and are being adapted to region and district situations.

Minimum **disease and other health data** to be collected by CBS worker are:

- Cases and deaths of priority diseases under surveillance (e.g. guinea worm disease, meningitis, measles)
- Number/list of births
- Number/list of deaths in general, and causes if known
- Number/list of maternal deaths
- Number/list of neonatal deaths

8.2.2.2 Data analysis, response and feedback

Surveillance data will be analysed at the sub-district level, the district level and subsequently at the regional level of the health system in the timeliest fashion possible to determine the public health response required from each level. Those actions include:

- Notification, investigation and intervention of epidemics
- Programme management
- Impact monitoring
- Problem identification
- Planning
- Social mobilization

The sub-district and district will design simple graphs and charts to illustrate the data collected for each community, so that disease trends, other public health problems and responses can be visualised. The spatial distribution of the data collected can best be presented and interpreted if projected on a map. The Geographic Information System (GIS) will be most suitable for the handling of CBS data.

During supervisory visits, the health worker will discuss with CBS worker and community opinion leaders the interpretation and implications of the data collected and the interventions needed.

In addition to visits, the sub-district and district will generate monthly updates of surveillance status to describe the coverage and events being recorded and preventive action undertaken. Reports will be disseminated on periodic bases in a format easily understood by those collecting and utilizing the information for decision making: local leaders, health facility or sub-district, media and collaborating agencies.

8.2.3 The role of the CBS worker

8.2.3.1 Worker duties

The CBS worker is the first line of the surveillance process and as such is expected to carry out the following duties:

- Cover a community of about 500 inhabitants; larger communities will need additional workers, with coverage assignments related to:
  - Area or spread of the community
  - Number and divergence of ethnic groups inhabiting the village
- Keep a monthly register of the data collected
- Report on pre-selected events that require immediate intervention

- Participate in information dissemination. The supervising health worker will do analysis and feedback to the village chief and CBS worker, who then will release the information to the community for discussion and action to be taken. Other fora for feedback in the village such as community durbars will be created

- Discharge other duties as identified by the supervisor

8.2.3.2 Worker selection

Experience in implementing the CBS system so far shows that for the system to be sustainable the CBS workers should be volunteers. To sustain volunteer involvement, care must be taken in worker selection. This should include a process of proper community entry and involvement, choosing people who are well informed about the communities being dealt with. Procedures for community entry must be in accordance with the culture of that community. Discussions with the community leaders need to:

- Explain CBS objectives and potential benefits to the community that actively participates and supports its volunteer in his work
- Make it clear that the CBS job is voluntary and unpaid
- Make the duties of the CBS volunteer very clear to the people
- Discuss in detail the selection criteria as outlined below

Main selection criteria are that the volunteer must be:

- Resident in the community
- Gainfully employed
- Well-known and respected
- Accepted by the community so as to be able to visit houses
- Literate enough to record events/data on the register provided. Data collection tools have been designed to be user friendly to workers with little education; alternatively, an illiterate volunteer can use a literate assistant to record data.

There are additional guiding principles:

- The volunteer must have the community's welfare at heart.
- Gender should not be a barrier to participation. The advantages of a female volunteer must be stressed.
- Where ethnic and religious differences exist and are likely to be a problem, the groups must be identified and involved in the selection.

8.2.3.3 Worker training

- Appropriate methods and materials (surveillance forms, case definition, health education materials, etc.) must be developed for training the CBS worker.

- Health workers from the sub-district level will be trained to carry out the training of CBS workers within a given catchment area.

- Timing of training sessions will be at the convenience of the CBS worker, e.g. during the dry season when they are less busy. Sub-district staff will be trained on how to handle the surveillance data from the community and their capacity to manage patients they see.

- Apart from the aggregation of individual community data into district- and higher-level data analysis, data should be plotted on maps and other visual displays for local use, so that the community can better understand its health status.

8.2.3.4 Worker supervision

- Outreach health workers will make monthly community visits that combine activities such as collection of data from community registers, surveillance, supervision, ongoing training and service delivery.
- Supervisors will take time during the visit to explain to the CBS volunteer and the community development committee or town health committee the implications of the data collected and what needs to be done.
- Sub-district health service is already supervised by DHMT, and will cover inspection and analysis of data collected from community level and actions taken at the sub-district level in response to findings.
- Feedback on the impact resulting from their contribution to surveillance is discussed. The DHMT will be responsible for producing feedback analysis to the sub-district.

8.2.3.5 Worker motivation and incentive

Volunteers in general need motivation more than any other cadre of workers. Studies on the performance of CBS volunteers have identified a number of motivating factors that encouraged sustained volunteer participation in the programme:

- Training: Knowing more about a subject than the rest of the people in the community is highly appreciated and being able to educate fellow community members on the subject is a motivation to the CBS volunteer.
- Promotional items: Having items – posters, filter cloth etc. – to distribute free of charge enhances the popularity of the worker, motivating him/her to stay active.
- Recognition: Being asked for by people arriving from outside the village, such as a health worker doing a supervisory visit or a politician commending the volunteer for his/her work, is highly appreciated.
- Material incentives: While regular remuneration, however small, must be avoided, community volunteers have been called in for periodic training for which their transportation cost is paid and refreshment provided. T-shirts with the programme logo that cannot be bought anywhere are given out exclusively to CBS volunteers. These are highly appreciated and provide additional incentive.

8.2.3.6 Worker evaluation

Continuous monitoring of the surveillance system will be undertaken to identify the strengths and weaknesses and enable corrective measures to be taken. Independent evaluation of the programme will be carried periodically.

Summary Guidelines for Specific Priority Diseases and Conditions

This section describes how to:

- Take action to respond to alert and epidemic thresholds for specific diseases
- Identify surveillance goals and objectives for each priority disease
- Identify data to analyse and interpret for each priority disease
- Prepare to use the district analysis workbook

This section provides summary guidelines for each of the priority diseases targeted for integrated disease surveillance by the Ministry of Health/Ghana Health Service. It begins with a model table that outlines the contents of the disease-specific tables that follow. Each table contains summary guidelines for a given priority disease. Detailed guidelines for each disease or condition are available from WHO/AFRO or the MOH National Surveillance Unit or the district director of health services.

Name of priority disease for integrated disease surveillance

Background	This section contains general information about: ■ The disease, the agent that causes the disease or infection, the geographic range affected, and other epidemiologic information ■ Transmission routes such as person-to-person, unprotected contact with infectious body fluids or contaminated materials and vector-borne ■ Why the disease is a priority disease for surveillance. For example, the disease is responsible for a high number of deaths, disability and illness, especially in Ghana. ■ General risk factors and specific risk factors in Ghana ■ Any additional background information that might serve the district surveillance team
Surveillance goal	This section states the purpose for surveillance of this disease. Generally, the purpose for surveillance of these priority diseases is for early detection and response to the leading causes of death, illness and disability.
Recommended case definition	***Suspected case:*** A definition is provided for suspecting a case or outbreak of this disease. ***Confirmed case:*** A definition is provided for classifying a case as confirmed through laboratory diagnostic testing.
Respond to alert threshold for epidemic-prone diseases **or** **Respond to a suspected outbreak for other diseases of public health importance**	*For epidemic-prone diseases, and for diseases targeted for elimination or eradication*, a single case is a suspected outbreak. Prompt responsive action should be taken such as: immediately reporting the case, treating the case, collecting specimens for confirming the case and investigating the case to determine if it is an outbreak, and, if so, determining the risk factors associated with the case. Some diseases have specified thresholds for alerting the health facility or district to a problem. *For other priority diseases of public health importance*, an outbreak is suspected when there is any unusual increase in the number of cases in a given time period when compared with a previous given periods. This should prompt a response such as reporting the increase and investigating what might have caused the increase. If laboratory confirmation is indicated, specimens should be collected for laboratory confirmation.
Respond to epidemic threshold for epidemic-prone diseases **or** **Respond to a suspected outbreak for other diseases of public health importance**	*For epidemic-prone diseases, and for diseases targeted for elimination or eradication*, a confirmed case should trigger a response action such as conducting an emergency immunization activity, enhancing access to safe drinking water, conducting community education campaigns, and improving case management. *For other priority diseases of public health importance*, a confirmed outbreak should prompt an appropriate response such as improving coverage for specified immunizations, strengthening case management for Integrated Management of Childhood Illnesses (IMCI) diseases, and providing information, education and communication (IEC) about preventing and controlling the disease.
Public health action	Appropriate response activities necessary to control the disease.

Analyse and interpret data	This section contains generic information about the data to collect, analyse and interpret. The data may be from outbreak response or for more long-term analysis. The key points to consider for interpreting the data and specific elements for analysis are stated (time, place, person).
Reference	Appropriate references for further information are available from WHO. The most relevant to the district level is stated for each disease.

Acquired Immune Deficiency Syndrome (AIDS)

Background	■ Acquired Immunodeficiency Syndrome (AIDS) is an infection of human lymphocytes (types of white blood cells) and other organs. It is caused by a retrovirus, the human immunodeficiency virus (HIV). The virus is transmitted from human to human through sexual intercourse, needle injections, transfusions, transplacental or transvaginal routes, breast milk or other direct contact with infected human bodily fluids. ■ AIDS results in late-stage HIV infection and immunosuppression, which reduces numbers and function to T-lymphocytes. Primary HIV-related organ involvement and a variety of opportunistic infections result in death unless the growth of the virus is slowed by drugs that can suppress it (antiretroviral therapy). When HIV infection progresses to illness, the symptoms are usually due to failure of the immune system to resist other infectious diseases called opportunistic infections (OI). These include tuberculosis (TB), bacterial pneumonia or sepsis, oropharyngeal candidiasis, chronic diarrhoea, chronic skin infections, recurrent herpes zoster, and others. ■ HIV/AIDS is now the leading cause of mortality due to infectious and parasitic diseases in Ghana. Based on the year 2000 sentinel site results the MOH estimated that 3% of adult Ghanaians were HIV-infected in 2000. It was also estimated that by the end of that same year, 353,000 people in the country were living with HIV/AIDS, of which 199,000 were women and 31,000 were children. Reported cases for the year 2000 alone was 6,289 as compared to a total of 37,298 for the period 1986-1999. ■ Incubation period is approximately 1 to 3 months from the time of infection to the time that antibodies can be detected in a laboratory process. The time from HIV infection to the onset of AIDS is generally 7 to 9 years. ■ Risk factors: populations at high risk of acquiring HIV are commercial sex workers with or without other sexually transmitted infections (STIs). Some STIs may increase HIV transmission. Others at risk include intravenous drug users (IDU), recipients of unscreened blood products and neonates born to HIV-infected mothers. ■ TB, visceral leishmaniasis, trypanosomiasis, and other sub-acute or chronic bacterial, parasitic, and viral infections may cause similar syndromes.
Surveillance goal	■ Monitor the impact of HIV/AIDS interventions in trends of incidence and prevalence of HIV infections, AIDS and STIs through sentinel sites, surveys and special studies (according to guidelines for second generation surveillance of HIV/AIDS) ■ Estimate the burden of HIV/AIDS in the district using available information from HIV sentinel populations so that each new AIDS case is counted. ■ Monitor local STI epidemiology as possible cofactor for HIV transmission. ■ Monitor local opportunistic infection epidemiology, including TB. ■ Improve percentage of suspected HIV/AIDS cases confirmed via serology. ■ Improve HIV/AIDS screening.

Case definition	Ghana uses the Modified Bangui Classification for AIDS as follows: ***Adults*** ▪ At least two (2) major signs or symptoms plus at least one (1) minor sign or symptom together with a POSITIVE HIV antibody test OR ▪ Three (3) major signs plus an additional requirement that these must be in the absence of immuno-suppression and chronic malnutrition. ***Children*** ▪ Same conditions as for adults plus the absence of immuno-suppression and chronic malnutrition {**Major Signs:** More than 10% weight loss; chronic diarrhoea for more than one month; and prolonged fever (intermittent or constant) for more than one month} {**Minor Signs:** Persistent cough for more than one month; generalised pruritic dermatitis; recurrent herpes zoster; oropharyngeal candidiasis; chronic progressive and disseminated herpes virus infection and generalised lymphadenopathy} **HIV** A positive ELISA for confirming HIV and a rapid test for confirming the positive results are sufficient for an epidemiological case definition for HIV.
Public health action	▪ Monitor local STI and opportunistic infections, including TB, as possible cofactor for HIV. ▪ Improve percentage of suspected HIV/AIDS cases confirmed via serology. ▪ Monitor use of condoms by commercial sex workers. ▪ Provide voluntary counseling and testing services at district and sub-district levels. ▪ Treatment of individual cases with antiretroviral therapy is not yet widely available in most African countries. Rapid diagnosis and treatment of AIDS-related OI may prolong life expectancy but this has not been widely evaluated in developing countries. ▪ Promote condom use, especially among high-risk individuals. ▪ Treat STIs, especially syphilis and chancroid diseases, as well as other ulcerative processes. ▪ Mobilise non-paid blood donors and promote appropriate use of blood. ▪ Promote good infection control practices within health facilities in the district. ▪ Educate HIV/AIDS patients and their sexual partners to refrain from donating blood, tissues, semen or breast milk.
Analyse and interpret data	**Time:** Count new AIDS cases and report monthly. Include trends for HIV sero-surveillance. STI surveillance and results of any special studies (socio-behavioural studies drug sensitivity to anti-microbial agents, and so on). **Place:** Plot data on map by place of residence. **Person:** Analyse by number of cases confirmed with serology. At the end of the year, calculate the total number of cases by age, sex and occupation.
Reference	*Guidelines for Sexually Transmitted Infections Surveillance*. Geneva. UNAIDS and World Health Organization. WHO/CDS/CSR/EDC/99.3. UNAIDS/99.33E

Buruli Ulcer

Background	■ Buruli ulcer is an infectious disease involving the skin, caused by *Mycobacterium ulcerans* and characterized by a painless nodule, papule, plaque or oedema evolving into a painless ulcer with undermined edges, often leading to invalidating sequelae. ■ Buruli ulcer is a disease that has terrible consequences if not promptly diagnosed and treated. In terms of number of cases, Buruli ulcer is probably the third most common mycobacterial disease in immunocompetent humans after tuberculosis and leprosy. ■ It is endemic in at least 25 countries worldwide, mostly in tropical regions. However, due to lack of precise data, the burden of the disease at global and national levels is not entirely known. A survey done in one of the endemic districts (population 106,500) in Ghana estimated the prevalence at 3.19 per 1000. In some communities in the country, Buruli ulcer has affected 16 – 22% of the population. ■ Awareness of this disease is low and may lead to significant under-recognition and under-reporting. There is little knowledge on the extent of the disease at national and international levels. ■ The disease most commonly affects impoverished inhabitants in remote rural areas with limited access to health care. It often occurs in close proximity to slow-flowing or stagnant bodies of water. All age groups, but particularly children under 15 years of age, are affected. No racial or socioeconomic group is exempt. Interestingly, HIV infection is not a risk factor. As of today, the mode(s) of transmission is not entirely known. The organism probably enters the body through small breaks in the skin from contaminated soil, water or vegetation. Recent evidence suggests that in some cases insects may be involved in the transmission of the disease. There is no anecdotal evidence to support person-to-person transmission. ■ A good surveillance system is needed to provide better data on the disease and to allow monitoring for control.
Surveillance goal	Generally, the purpose for surveillance of Buruli ulcer is for early detection and response to leading causes of illness and disability.
Case definition	**Suspected case:** Two types active or inactive. The active types presents with different clinical forms. ***Active*** ■ Papule: painless and raised skin lesion less than 1cm in diameter ■ Nodule: painless palpable firm lesion, 1-2cm in diameter, situated in the subcutaneous tissue and usually attached to the skin ■ Plaque: usually painless, well-demarcated, elevated, indurated lesion more than 2cm in diameter ■ Oedema: diffuse, extensive, non-pitting, ill-defined margin, firm, and may be painful with or without colour change over the affected skin ■ Ulcer: painless skin lesion characterised by a necrotic centre, undermined edges and oedematous skin. An early ulcerative lesion has a diameter of less than 2cm and a late ulcerative lesion has a diameter of more than 2cm. ***Inactive*** ■ Healed lesion with characteristic depressed stellate (star-like) scar without sequelae. A sequelae of Buruli ulcer is defined as a complication resulting either directly from the disease (contracture deformities, loss of organs such as breasts, eye and genitalia) or as result of treatment (amputation of limbs). **Confirmed case:** Suspected case that is laboratory confirmed by one or more of the following: ■ Demonstrations of alcohol-acid-fast bacilli (AFB) in a smear from necrotic base of ulcers ■ Positive culture of M. ulcerans

	■ Characteristic histopathology on biopsy specimen ■ Positive polymerase-chain reaction (PCR)-based test for M. ulcerans. **Categories of patients** ***New:*** A patient with no previous history of treatment for Buruli ulcer. ***Recurrent:*** A patient with a previous surgical treatment for Buruli ulcer who is now presenting with another lesion at same or different site within one year of the end of the last treatment.
Public health action	**IE&C messages** ■ Dissemination of information on the disease ■ Early detection and reporting of all skin lesions to the nearest health facility for screening ■ Proper care of all injuries ■ Proper personal and environmental cleanliness ■ Wearing of protective clothing as applicable ■ Avoidance of contact with swampy areas. **Other control measures** ■ Setting up of an accessible system for excision of all suspicious skin lesions before ulceration ■ BCG vaccination of all infants ■ Provision of potable water ■ Subsidised or free services for Buruli ulcer patients ■ Rehabilitation of those already deformed by the disease.
Analyse and interpret data	The following reporting forms have been recommended for use: BU 01, BU 02, BU 03. **Person:** Age and sex distribution of the cases. The following output indicators are needed on quarterly basis ■ Number of cases ■ Proportion of various form of the disease ■ Proportion of cases confirmed ■ Ratio of nodules to ulcers ■ Proportion of patients presenting with disabilities ■ Proportion of patients with sequelae after treatment ■ Recurrence rate ■ Mortality rate **Place:** Maps showing distribution of cases by community, district and region **Time:** Graph quarterly cases by month and region
Reference	*Buruli Ulcer – Mycobacterium ulcerans infection*, WHO/CDS/CPE/GBUI/2001

Cholera

Background	■ Acute illness with profuse watery diarrhoea caused by Vibrio cholerae serogroups O1 or O139. The disease is transmitted mainly through eating or drinking contaminated food or water; that is, cholera is spread through the fecal-oral route. ■ In Ghana, there were over 9,000 cholera cases in 1999 with approximately 250 deaths. Cholera is now endemic in parts of the country. ■ Incubation period is from a few hours to 5 days, usually in the range from 2 to 3 days.

	■ Cholera may cause severe dehydration in only a few hours. The case fatality rate (CFR) may exceed 50% in untreated patients with severe dehydration. If patients present at the health facility and correct treatment is received, the CFR is usually less than 1%. In Ghana the CFR for 2000 is currently an average of 2.7%. At least 90% of the cases are mild, and they remain undiagnosed. ■ Risk factors: eating or drinking of contaminated foods such as uncooked seafood or shellfish from estuarine waters, lack of continuous access to safe water and food supplies, attending large gatherings of people including ceremonies such as weddings or funerals, contact with persons who died of cholera. ■ Other enteric diseases may cause watery diarrhoea, especially in children less than 5 years of age.
Surveillance goal	■ Detect and respond promptly and appropriately to cases and outbreaks of water diarrhoea promptly. ■ Immediately report case-based cases (case-based reporting) and deaths when an outbreak is suspected. ■ Investigate and respond to suspected cases within 48 hours.
Case definition	**Suspected case:** In a patient age 5 years or more, severe dehydration or death from acute watery diarrhoea (rice water stool). If there is a cholera epidemic, a suspected case is a person age 5 years or more with acute watery diarrhoea, with or without vomiting. **Confirmed case:** A suspected case in which *Vibrio cholerae* O1 or O139 has been isolated in the stool.
Respond to alert threshold	**If a single case is suspected:** ■ Report case-based information immediately. ■ Manage and treat the case according to national guidelines. ■ Enhance strict handwashing and isolating procedures. ■ Conduct case-based investigation to identify similar cases not previously reported and confirm the outbreak. ■ Obtain stool specimens from 5 patients within 5 days of onset of acute watery diarrhoea, and before antibiotic treatment is started. See laboratory guidelines for information on how to prepare, store and transport specimens. To confirm an outbreak, collect stool specimens to be transported to the lab in Cary-Blair medium. ■ Mobilise community early to enable rapid case detection and treatment. ■ Survey the availability of safe drinking water.
Respond to epidemic threshold	**If a suspected case is confirmed:** ■ Establish treatment centre in locality where cases occur. Treat cases onsite rather than asking patients to go to standing treatment centres elsewhere. ■ Strengthen management and treatment of cases. ■ Work with community leaders to limit the number of funerals or other large gatherings for ceremonies or other reasons, especially during an epidemic. ■ Reduce sporadic and outbreak-related cases through continuous access to safe water. Promote safe preparation of food (especially seafood, fruits and vegetables). Promote safe disposal of human waste.
Analyse and interpret data	**Time:** Graph weekly cases and deaths and construct an epidemic curve during outbreaks. Report case-based information immediately and summary information weekly and monthly for routine surveillance. **Place:** Plot the location of case by community/village.

	Person:	Count weekly total cases and deaths for sporadic cases and during outbreaks. Analyse age distribution and distribution according to sources of drinking water, and assess risk factors to improve control of sporadic cases and outbreaks.
Reference	*Management of the patient with cholera*, World Health Organization, 1992. WHO/CDD/SER/91.15 Rev1 (1992) *Epidemic diarrhoeal disease preparedness and response—Training and practice.* Facilitator and participant manuals. World Health Organization, 1997. WHO/EMC/DIS/97.3 and WHO/EMC/DIS/97.4 *MOH Surveillance data 2000*	

Diarrhoea with blood (dysentery)

Background	■ *Shigella dysenteriae* is the most common cause of enteric infections and is transmitted from person-to-person through fecal-oral spread. ■ Large-scale outbreaks may be caused by Shigella dysenteriae type 1 (SD1), with up to 30% of populations infected. The case fatality rate may approach 20% among young children and elderly persons with severe dehydration. ■ The incubation period is from 1 to 4 days. ■ Clinical illness is characterized by acute fever and bloody diarrhoea, and can also present with systemic symptoms and signs as well as dehydration especially in young children. ■ Risk factors: overcrowded areas with unsafe water and poor sanitation ■ SD1 id frequently resistant to multiple antibiotics including trimethoprimsulfamethoxazole. ■ Enterohaemorrhagic and enteroinvasive *E. coli* and other bacteria or parasites such as *Entamoeba histolytica* may also cause bloody diarrhoea.
Surveillance goal	■ Detect and respond to dysentery outbreaks promptly. ■ Improve percentage of laboratory-confirmed cases and evaluate proportion verified as type 1 (SD1). ■ Determine antibiotic sensitivity pattern of the agents isolated (especially SD1) both for routine surveillance and during outbreaks.
Case definition	**Suspected case:** A person with diarrhoea with visible blood in stool. **Confirmed case:** Suspected case with stool culture positive for *Shigella dysenteriae 1*.
Respond to alert threshold	**If you observe that the number of cases or deaths is increasing over a period of time:** ■ Report the suspected case to the next level of the health system. ■ Treat the suspected cases with oral rehydration and antibiotics based on recent susceptibility results, if available. ■ Obtain stool or rectal swab specimen for confirming the outbreak. ■ Investigate the case to determine risk factors contributing to transmission.

Respond to epidemic threshold	**If a suspected case is confirmed:** ■ Search for additional cases in locality of confirmed case. ■ Strengthen case management and treatment. ■ Mobilise community to enable rapid case detection and treatment. ■ Identify high-risk populations using person, place and time data. ■ Reduce sporadic and outbreak-related cases by promoting handwashing 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.
Analyse and interpret data	**Time:** Graph monthly trends in cases and deaths. Construct an epidemic curve for outbreak cases. **Place:** Plot the location of case by community/village. **Person:** Count cases and deaths each month. During an outbreak, count outbreak-related cases by week. Routinely analyse age distribution. Assess risk factors to improve control and prevention of sporadic diseases and outbreaks.
Reference	*Guidelines for the control of epidemics due to Shigella dysenteriae type 1*, WHO/CDR/95.4 *Safe Water Systems for the Developing World: A Handbook for Implementing Household-based Water Treatment and Safe Storage Projects.* U.S. Department of Health & Human Services, Centers for Disease Control and Prevention. Atlanta. 2000

Diarrhoea with dehydration in children less than 5 years of age

Background	■ Diarrhoea with dehydration in children less than 5 years of age is due to infections of the gastrointestinal tract caused by viruses (especially *Rotavirus*), bacteria (*E. Coli, Salmonellae, shigellae, Campylobacter, Yersinia,* and others), and parasites (*Giardia, Entemoeba, cryptosporidia, cyclospora*). These diseases are transmitted through eating contaminated food or water, or through fecal-oral spread. ■ Diarrhoea diseases represent the second leading cause of death among children less than 5 years of age in many African countries, with more than 3 million deaths per year. In Ghana, annual reports of diarrhoeal diseases for the past two years is an average of 128,000 cases. ■ Different epidemiological patters (for example, seasonality) are observed for different pathogens. ■ The MOH/GHS advocate that each district team use the IMCI strategy to reduce morbidity and mortality of childhood diarrhoea.
Surveillance goal	■ Detect diarrhoea outbreaks promptly. ■ Monitor anti-microbial resistance during outbreaks of bacterial origin. ■ Ensure appropriate management of cases.
Case definition	**Suspected case:** Passage of 3 or more loose or watery stools in the past 24 hours with or without dehydration (restlessness, irritability; sunken eyes; thirst; skin pinch goes back very slowly). **Confirmed case:** Suspected case confirmed with stool culture for a known enteric pathogen. *Note:* Laboratory confirmation of specific agent causing outbreak is not routinely recommended for surveillance purposes.

Public health action	**If you observe that the number of cases or deaths is increasing over a period of time:** ■ Report the problem to the next level. ■ Investigate the cause of the increased number of cases or deaths and identify the problem. ■ Make sure that cases are managed according to national/IMCI guidelines. ■ Encourage home-based therapy with oral rehydration. **If the number of cases or deaths increases to two times the number usually seen in a similar period in the past:** ■ Assess health worker practice of national/IMCI guidelines for managing cases and improve performance for classifying diarrhoea with dehydration in children less than 5 years of age. ■ Teach mothers about home treatment with oral rehydration. ■ Conduct community education about boiling and chlorinating water, and safe water storage and preparation of foods.
Analyse and interpret data	**Time:** Graph cases and deaths to compare with same period in previous years. Prepare graphs for outpatient diarrhoea with some dehydration and for diarrhoea with severe dehydration. Construct an epidemic curve when outbreaks are detected. **Place:** Plot location of case by community/villages. **Person:** Report monthly totals due to diarrhoea with some dehydration and also for diarrhoea with severe dehydration from outpatient services. Also report monthly inpatient total cases and deaths due to diarrhoea with severe dehydration.
Reference	*Management of childhood illness: Clinical skills training course for first level health facilities.* World Health Organization. WHO/CDR/95.14 *Integrated Management of Childhood Illness: A WHO/UNICEF Initiative Bulletin of the World Health Organization.* Vol.75, Supplement 1, 1997. ISBN 92 4 068750 5. MOH survey data.

Dracunculiasis

Background	■ Dracunculiasis is commonly known as guinea worm disease. It is caused by a large nematode, a disabling parasite that emerges through the skin of the infected person. ■ This is an old disease, which leads to socio-economic consequences. It is transmitted through the drinking of water containing a crustacean (cyclops) that had earlier on ingested the immature form of the nematode (infective larvae). The cyclops lives in stagnant water sources (lakes, swamps and rivers) in rural areas in African countries. The female nematode discharges from the host's skin when there is contact with water. The incubation period is 9 to 12 months. There is no treatment or vaccine against the illness. ■ Successful disease control strategies conducted by an international coalition and its partners has pushed Dracunculiasis towards eradication. By the end of the year 2000, 7,402 cases of Guinea worm were reported in Ghana compared to 179,556 cases in 1989, a reduction of 96%. ■ The illness is endemic in 13 countries in Africa: Benin, Burkina Faso, Central African Republic, Le Cote d'Ivoire, Ghana, Ethiopia, Mali, Mauritania, Niger, Nigeria, Sudan, Togo and Uganda.

	■ In Ghana, the disease was endemic in all districts at the start of the programme in 1989; by the end of 2000 only 55 of the 110 districts from all the 10 regions, with five districts in three regions reporting imported cases only.
Surveillance goal	■ Active detection and investigation of each case at the community level. ■ Appropriate and prompt control measures initiated according to national guidelines. ■ In areas where guinea worm has been eradicated, maintain active searches for any new case. ■ Report all imported cases to countries of areas of origin.
Case definition	**Suspected case:** A person presenting or having presented in the last 12 months with a skin lesion in an endemic area. **Confirmed case:** A person presenting or having presented in the last 12 months with a skin lesion in an endemic area and emergence of guinea worm or pre-emerged worm confirmed by surgical extraction. No laboratory confirmation required.
Public health action	**If a single case is suspected:** ■ Report the case according to national programme guidelines for eradication of Dracunculiasis. ■ Treat case according to national guidelines. ■ Conduct case investigation to confirm risk factors. ■ Improve access to safe water according to national guidelines. ■ Ensure that the patient does not contaminate the sources of drinking water.
Analyse and interpret data	**Time:** Graph cases monthly and quarterly. **Place:** Plot distribution of communities/villages and work sites for cases that have been reported. **Person:** Count quarterly cases, and analyse age distribution. Report monthly to next levels.
Reference	*Dracunculiasis or guinea-worm,* Geneva, World Health Organization, WHO/CDS/CEE/DRA/99.2, 1999

Leprosy

Background	■ Leprosy is a chronic mycobacterial disease of the skin, the peripheral nerves and upper airway mucous membranes. The disease is transmitted mainly through airborne spread from nasal secretions of patients infected by *Mycobacterium leprae* and also through inoculation into broken skin. Leprosy is endemic in several tropical areas around the world, including Africa.
	■ Patients are classified into two groups, depending on presence of skin and nerve signs:
	  ▪ Paucibacillary patients (PB) with 1 to 5 skin patches and a single nerve enlargement.
	  ▪ Multibacillary patients (MB) with more than 5 skin patches and several nerve enlargements.
	■ Leprosy control has improved greatly through use of WHO-recommended multidrug therapy (MDT). Multiple drug therapy combining 2 or 3 drugs (rifampicin, clofaximine and dapsone) is very effective in curing leprosy. At the end of 1999, leprosy point prevalence in African countries was 1.6 cases per 10,000 population with about 70,000 registered cases.

	■ Since 1985 Ghana has been working towards an elimination target of less than one case per 10,000 population. At a prevalence rate of 1.15/10,000 population, the country is close to achieving the elimination goal. The prevalence reduced from more than 15,000 in 1985 to a little more than 2,000 by the end of 1997. ■ Incubation period is 6 months to 20 years or more. Infection is probably frequent but clinical disease is rare, even among the closest contacts of patients. Multibacillary patients are most contagious, but infectiousness is reduced rapidly as soon as MDT begins. Leprosy can be complicated by neuritis and leprosy reactions, resulting in impairment and disabilities of hands, feet and eyes. ■ Leprosy has historically been associated with social isolation and psychosocial consequences. The social stigma still persists in Ghana. ■ Some skin diseases such as tinea versicolor, mycosis, vitiligo, scleroderma, psoriasis, systemic lupus erythematosus and Von Recklinghausen disease may be mistaken for leprosy.
Surveillance goal	■ Observe national trends towards the leprosy elimination target, defined as a reduction in prevalence to less than 1 case per 10,000 population. ■ Monitor resistance of *mycobacterium leprae* (Hansen's bacillus) to drugs used for MDT on an ongoing basis. ■ As leprosy nears elimination, supplement routine surveillance with community-based surveillance.
Case definition	**Suspected case:** A person showing one of three cardinal signs of leprosy: hypopigmented or reddish skin lesion, loss or decrease of sensations in skin patch, enlargement of peripheral nerve. **Confirmed case:** A person showing at least two cardinal signs of leprosy and who has not completed a full course of treatment with MDT.

Public health action	**If a single case is suspected:**
	■ Report the suspected case to the appropriate level of the health system.
	■ Investigate case for risk factors.
	■ Begin appropriate case management:
	  ▪ MB patients must be treated for 12 months with a 3-drug regimen (12 MB blister packs to be taken in a period of 18 months).
	  ▪ PB patients must be treated for 6 months with a 2-drug MDT regimen (6 PB blister packs to be taken in a period of 9 months).
	
	If a suspected case is confirmed:
	■ Examine patients for skin and nerve signs at each contact patient has with a health worker to diagnose and care for leprosy reactions and impairments.
	■ Examine risk factors for treatment interruption (for example, inadequate supplies of MDT in the health center and poor accessability of patients' villages. Give sufficient blister packs for a full course of treatment to patients unable to attend a health center monthly.
	■ Identify any fast increase or decrease of new cases during a period. Assess adequacy of surveillance in areas where under- or over-reporting is suspected. Monitor distribution of MDT drugs.

Analyse and interpret data	**Time:** Graph cases by date diagnosed and treatment begun. **Place:** Plot cases by communities/villages and disease classification (MB or PB). **Person:** Count newly detected cases monthly by the type of leprosy (MB or PB). Analyse age and disability distribution and treatment outcomes (cases cured, defaulted, relapsed).

Reference	*A guide to eliminating leprosy as a public health problem, Second Edition 1997.* Action Programme for the Elimination of Leprosy, World health Organization. WHO/CTD/LEP/94.2

Lymphatic Filariasis

Background	■ The disease is caused by microfilarial worm known as *Wuchereria bancrofti*. ■ The disease is prevalent in much of Asia, Africa, the Western Pacific and certain part of the Americas. Recent estimates suggest that at least 120 million persons are infected with lymphatic filariasis worldwide. The number of physical disabilities due either to lymphoedema, hydrocoele and recurrent infections or to the newly recognised sub-clinical abnormalities of lymphatic and renal function is currently estimated at 43 million. Bancroftian filariasis accounts for almost 40 million of these cases. ■ In Ghana, the most endemic areas are the three northern regions and the coastal belt stretching from Axim to Ada. Microfilarial prevalence in some of the communities is as high as 40%. ■ Though the disease is transmitted through the bite of an infected Culex mosquito elsewhere, in Ghana, it is transmitted through the bite of an infected female anopheles mosquito; the same species that causes malaria. ■ It is the second leading cause of permanent long-term disability.

Surveillance goal	■ Identify previously undetected foci of infection.
	■ Monitor the reduction of microfilaria resulting from elimination efforts.
	■ Three strategies for surveillance:
	  ▪ Routine monthly reporting of aggregated data on cases from periphery to intermediate level and to central level or
	  ▪ Sentinel population surveys (standardized and periodic) or
	  ▪ Active case finding through surveys of selected groups or through mass surveys.

Case definition	**Clinical case definition:** Hydrocoele or lympohedema in resident of an endemic area for which other causes of these findings have been excluded. **Confirmed case:** A person who is Microfilaria positive or antigent positive with or without hydrocoele or lymphoedema.

Public health action	■ Mass treatment with ivermectin and albendazole in endemic areas.
	■ Repeated yearly treatment accompanied by monitoring of microfilaria levels using Community Directed Treatment strategy.
	■ Community education.
	■ Promotion of use of insecticide treated nets.
	■ Vector control.
	■ Case management as relevant:
	  ▪ Care of lymphoedema by regular washing, etc.
	  ▪ Hydrocoelectomy

Analyse and interpret data	**Time:** Number of cases by month. Calculate monthly and yearly incidence. **Place:** Plot the prevalence per community and districts and calculate point prevalence (if active case detection) by geographic origin. **Person:** Analyse number of new cases, laboratory confirmed cases, chronic conditions (hydrocoele or lymphoedema). Calculate point prevalence (if active detection) by sex.
Reference	*WHO Recommended Surveillance Standards, Second Edition.* - October 1999.

Malaria

Background	■ Malaria is a highly prevalent tropical illness with fever following the bite of infective female Anopheles mosquitoes, which transmit a parasite, Plasmodium falciparum, p. ovale, P. vivax or P. malariae. Serious malarial infections are usually due to P. falciparum and may result in severe anaemia and cerebral involvement. ■ Malaria is hyperendemic in Ghana (transmission is high and stable throughout the year). ■ It accounts for 40% of all OPD cases, 36.9% of admissions, 13.2 % of all deaths and 25% of deaths among children under 5. ■ Three main plasmodium species cause disease: P. Falciparum accounts for 80-90% of all cases, P. Malariae accounts for 10-20% whilst P. Ovale accounts for 0.15%. ■ Children under 5 years and pregnant women are at most risk of developing severe malaria with accompanied death. ■ Incubation period from the time of being bitten to onset of symptoms is 7 to 30 days. ■ P. Falciparum choloquine-resistant strains have emerged in some parts of the country, with levels of resistance ranging from 6% to 19%. However, chloroquine is still effective as the first-line drug.
Surveillance goal	■ Improve percentage of inpatient malaria cases confirmed microscopically (from current 17% to 50%). ■ Monitor anti-malarial resistance using district sentinel sites.
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 and 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 test for malaria. In addition, the person may have any of the following: change in behaviour (confusion or drowsiness), altered consciousness, general weakness (prostration), convulsions, hypoglycemia (sugar<2.2mmol/l), difficulty in breathing, renal failure (reduced urine output), severe anemia/pallor (Hb<5g/dl), coca-cola dark urine, jaundice/yellow urine, hyperpyrexia (Temp>39.5oc), spontaneous bleeding (DIC). **Malaria with severe anemia:** Any child 2 months up to 5 years with malaria and, if an outpatient, with severe palmar pallor (Hb<5g/dl), or if an inpatient, with a laboratory test confirmong severe anemia. *(Note: Young infants less than 2 months are usually classified as serious bacterial infection and are referred for further evaluation.)*
Public health action	■ Treat with appropriate anti-malarial drugs according to national programme recommendations. ■ Make sure new cases in children age 2 months up to 5 years are managed according to IMCI guidelines. ■ Educate mothers/child caretakers and community on early recognition and treatment of malaria, importance of prompt referral for emerging signs/symptoms of severe malaria. ■ Promote use of insecticide-treated bednets especially for children under 5 years and pregnant women. ■ Give malaria chemo-prophylaxis to pregnant women.

	■ Promote environmental sanitation: clearing of weeds, burying of empty cans and bottles, clearing of stagnant water.
Analyse and interpret data	**Time:** ■ Graph the number of malaria cases in uncomplicated clinically diagnosed, on outpatient basis by month. ■ Graph number of malaria cases in uncomplicated laboratory confirmed on outpatient and inpatient basis. ■ Graph number of severe malaria cases (inpatient) by month. ■ Graph inpatient malaria cases with severe anaemia by month. ■ Graph clinical malaria cases in pregnant women by month. ■ Graph lab-confirmed malaria cases in pregnant women by month. **Place:** ■ Plot location of households for news cases and deaths. **Person:** ■ Number of uncomplicated clinical diagnosed malaria cases by age for ages less than 5 years by month. ■ Number of uncomplicated clinical diagnosed malaria cases by age (age groups) for ages greater or equal to 5 years by month. ■ Number of uncomplicated lab-confirmed malaria cases by age for ages less than 5 years by month. ■ Number of uncomplicated lab-confirmed malaria cases by age (age groups) for ages greater or equal to 5 years by month. ■ Number of inpatient severe malaria cases by age group by month. ■ Number of inpatient malaria cases with severe anaemia by age group by month. ■ Number of clinical malaria cases in pregnant women by age group by month. ■ Number of lab-confirmed malaria cases in pregnant women by age group by month.
References	*Malaria epidemics: Detection and control, forecasting and prevention.* Geneva. World Health Organization. WHO/MAL/98.1084 RBM Strategic Plan for Ghana *Manual for District Health Workers in Malaria Management.* WHO/CDP/May 2000

Measles

Background	■ Measles is a febrile rash illness due to paramyxovirus *(Morbillivirus)* transmitted human-to-human via airborne droplet spread. It is the fourth leading cause of death in children less than 5 years of age in many African countries. ■ The incubation period is 7 to 18 days from exposure to onset of fever. ■ Among children with vitamin A deficiency and malnutrition, measles may result in severe illness due to the virus itself and associated bacterial infections, especially pneumonia; only the minority of cases is severe. ■ Measles is among the most transmissible of human infections. Large outbreaks occur every 2-3 years in areas with low vaccine coverage and where there is an accumulation of persons who have never been infected or vaccinated. The true incidence of measles far exceeds reported cases. ■ Risk factors include low vaccine coverage (<85 % to 90%), which allows accumulation of susceptible persons at high risk for measles. Outbreaks can be explosive in areas of high population density. ■ Other viral illnesses such as rubella may cause or contribute to similar outbreaks.

Surveillance goal	■ Detect outbreaks of fever with rash illness promptly. ■ Immediately report (case-based reporting) suspected cases and deaths of fever with rash illness; confirm first five cases of measles in a health facility per week with a laboratory test (usually serum IgM).
Case definition	**Suspected case:** Any person with fever and maculopapular (non-vesicular) generalised 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 outbreak.
Respond to an alert threshold	**If an outbreak is suspected (more than 5 cases reported by a health facility per week):** ■ Report suspected case to the next level. ■ Collect blood samples for confirming the outbreak. ■ Treat cases with oral rehydration, vitamin A, and antibiotics for prevention of bacterial superinfection. Use airborne isolation precautions where feasible. ■ Investigate the case or outbreak to identify causes for outbreak.
Respond to an epidemic threshold	**If an outbreak is confirmed:** ■ Improve routine vaccine coverage through the EPI, and lead supplemental vaccination activities in areas of low vaccine coverage. ■ Mobilise the community early to enable rapid case detection and treatment.
Analyse and interpret data	**Time:** Graph weekly cases and deaths. Construct epidemic curve for outbreak cases. **Place:** Plot location of cases by communities. **Person:** Count total cases and analyse by age group and immunization status.
Reference	*Using surveillance data and outbreak investigations to strengthen measles immunization programmes,* Geneva, World Health Organization. WHO/EPI/GEN/96.02

Meningitis

Background	■ Acute infection of the central nervous system usually caused by *Neisserria meningitidis, Haemophilus influenzae*, or *Streptococcus pneumoniae*, encapsulated bacteria transmitted human-to-human via airborne droplet spread. ■ Incubation period is 2 to 10 days. ■ Attack rates are highest among children age less than 15 years. Case fatality rates are usually 10% to 20% among treated patients, and >70% among untreated cases. ■ In Ghana, large outbreaks due to *N. meningitidis* (incidence greater than 1 case per 1,000 population) may occur November through May in regions in the northern sector. Outside the meningitis belt, smaller outbreaks may occur year-round. ■ Reported cases in 1998 and 2000 was an average of 1,000, in 1999 half that number of cases were reported. The case fatality rate over the period has ranged between 21% and 25%. ■ Antimicrobial resistance to chloramphenicol has not yet been detected in Africa. Resistance to sulfonamides is widespread. ■ Viral or tuberculous meningitis and HIV-related opportunistic infections are among the conditions that may mimic this disease. Meningitis due to Haemophilus influenzae occurs principally in children less than 5 years of age.
Surveillance goal	■ Promptly detect meningitis outbreaks and confirm etiology of first 5 to 10 cases. Perform lumbar puncture and Gram stain of cerebral spinal fluid (CSF) on all cases of suspected meningitis where feasible to confirm etiology of meningitis for improved surveillance.

Surveillance goal	■ Use a rapid latex slide agglutination test to confirm *N. meningitidis* during outbreaks. ■ Perform periodic serogrouping to determine if cause of outbreak is vaccine-preventable. ■ Perform periodic susceptibility testing for penicillin and chloramphenicol.
Case definition	**Suspected case:** Any person with sudden onset of fever (>38.5 C rectal or 38.0 C axillary) and one of the following signs: neck stiffness, altered consciousness or other meningeal sign. **Confirmed case:** A suspected case confirmed by isolation of *N. meningitidis* from CSF or blood.
Respond to an alert threshold	**Alert threshold is reached when in:** ■ Population greater than 30,000, there are 5 cases per 100,000 inhabitants per week. ■ Population less than 30,000, there are 2 cases in 1 week or an increase in the number compared to the same time in previous years. **Respond to alert threshold:** ■ Inform next level of health system and investigate the cases. ■ Confirm the cases. ■ Treat and manage cases appropriately with oily chloramphenicol. ■ Intensify surveillance for additional cases in the area. ■ Prepare to conduct a mass vaccination campaign.
Respond to an epidemic threshold	**Epidemic threshold is reached when in:** ■ Population greater than 30,000: In one week, 15 cases per 100,000 inhabitants confirms epidemic in all situations. ■ If no epidemic during last 3 years and vaccine coverage against meningococcal meningitis is <80%, epidemic threshold is 10 cases per 100,000 inhabitants per week. ■ Population less than 30,000, 5 cases in 1 week or doubling of the number of cases over a 3-week period. **Respond to epidemic threshold:** ■ Begin mass vaccination campaign. ■ Distribute treatment supplies to health centers. ■ Treat according to epidemic protocol. ■ Inform the public. ■ Define the age group at highest risk (usually persons age 1 through 30 years) and complete a mass vaccination campaign within 10 days of outbreak detection. ■ Mobilise community to permit early case detection and treatment, and improve vaccine coverage during mass vaccination campaigns for outbreak control. *Note: In any district adjoining districts with outbreak, their alert threshold automatically becomes their epidemic threshold during that period.*
Analyse and interpret data	**Time:** During epidemic season, graph weekly cases and deaths. Otherwise, graph monthly trends in cases and deaths. Construct an epidemic curve for outbreak cases. **Place:** In epidemics (not in endemic situations), plot location by community/village and district. Estimate distance to the nearest health facility. **Person:** Count total sporadic and outbreak cases. Analyse age distribution. **Target case fatality rate: <10%**
Reference	*Weekly Epidemiological Record N 38, September 2000* (http://www.who.int/wer/pdf/2000/wer7538.pdf)

Neonatal tetanus

Background	■ A neuromuscular toxin-mediated illness caused by the anaerobic spore-forming soil bacterium *Clostridium tetani*. The disease is transmitted when spores enter open wounds (injections, cutting the umbilical cord) or breaks in the skin. ■ While tetanus may occur in adults, infection primarily affects newborns. Neonatal tetanus (NNT) has decreased dramatically in countries with improved maternal tetanus immunization rates. As a result, tetanus is targeted for elimination in many African countries including Ghana. ■ Incubation period is 3 to 21 days, with an average of approximately 6 days. ■ Risk factors: Unclean cord care practices during delivery for neonates. Lack of antibody protection in incompletely immunized mothers.
Surveillance goal	■ Detect cases of neonatal tetanus immediately to confirm the case and prevent additional cases by immunizing at least pregnant women in area around the confirmed case. ■ Identify high-risk areas and target tetanus toxoid campaigns to women of childbearing age.
Case definition	**Suspected case:** Any newborn with a normal ability to suck and cry during the first two days of life, and who, between the 3rd and 28th day of age, cannot suck normally, and becomes stiff or has convulsions or both. **Confirmed case:** No laboratory confirmation recommended.
Public health action	**If a single case is suspected:** ■ Report case-based information immediately to the next level. ■ Conduct an investigation to determine the risk of transmission. ■ Treat and manage the case according to national recommendations, usually with supportive care and, if feasible, in intensive care. No routine isolation precautions are needed. **If a case is confirmed through investigation:** ■ Immunize the mother with at least 2 doses of tetanus toxoid and other pregnant women in the same locality as the case. ■ Conduct a supplemental immunization activity for women of childbearing age in the locality. ■ Improve routine vaccine coverage through EPI and maternal immunization programme activities. ■ Educate birth attendants and women of childbearing age on the need for clean cord cutting and care. Increase the number of trained birth attendants.
Analyse and interpret data	**Time:** Graph cases and deaths monthly. The target should be the elimination target for Ghana. **Place:** Plot location of case households and location of birth attendants. **Person:** Count monthly cases and deaths. Analyse each case of NNT by cord care practices.
Reference	*Field manual for neonatal tetanus elimination.* Geneva, World Health Organization. WHO/V&B/99.14

Onchocerciasis

Background	■ Filarial infection of the skin and eye caused by *Onchocerca volvulus* transmitted through the bite of female *Simulium* black flies. ■ Nearly all of the world's estimated 18 million infected persons (of whom more than 250,000 are blind) live within 26 African countries. Onchocerciasis is the second leading infectious cause of blindness worldwide. ■ In Ghana the Onchocerciasis Control Programme's (OCP) efforts have led to the elimination of the disease in most parts of the country in which the disease was previously endemic. Control is now being carried out mainly by regular treatment with Ivermectin. ■ It causes debilitating skin problems, leading to significant decrease in productivity in areas where it is endemic. Entire villages have relocated away from the fertile lands near rivers where black flies breed. ■ Incubation period is years to decades since repeated infection is necessary for disease manifestations. Clinical illness is unusual in children even in endemic areas. ■ Other filaria (for example, *Loa loa* and *Mansonella*) and other chronic skin and eye disease can produce similar clinical findings.
Surveillance goal	■ Early detection with goal of reducing the recurrence of transmission of the parasite in areas where it has been eradicated (zones covered by the Onchocerciasis Programme). ■ Conduct periodic surveillance in sentinel villages: screen using diethylcarbamzaine (DEC); in case of a positive reaction to DEC, confirm with a microscopic examination of a skin biopsy from each suspected case.
Case definition	**Suspected case:** In an endemic area, any person with fibrous nodules in subcutaneous tissues. **Confirmed case:** A suspected case that is laboratory confirmed by presence of one or more of the following: microfilatiae in skin snips, adult worms in excised nodules, or typical ocular manifestations (such as slit-lamp observations of microfilariae in the cornea, the anterior chamber, or the vitreous body).
Public health action	**If a single case is suspected:** ■ Report the case according to national guidelines. ■ Collect specimen for confirming the case (the role of patch test). ■ Investigate the case to determine the cause of the case. ■ Treat the case according to national guidelines. **If a case is confirmed:** ■ Conduct a migration investigation to identify the origins of infection and initiate control activities. ■ Carry out vector control activities according to OCP guidelines. ■ Conduct periodic mass treatment with Ivermectin in areas with endemic onchocerciasis during the last 10 years. ■ Conduct active case finding via population-based surveys and skin snips.
Analyse and interpret data	**Time:** Graph cases quarterly. **Place:** Plot distribution of cases by community/village, district or region. **Person:** Count case quarterly and analyse by age and sex distribution.
Reference	WHO Recommended Surveillance Standards, Second Edition. WHO/CDS/CSR/ISR/99.2

Pneumonia

Background	■ Infection of the lower airways caused by bacteria or viruses transmitted person-to person via aerosolized respiratory droplet spread. The main bacterial causes of pneumonia among children are *Streptococcus pneumoniae* (the pneumococcus) and *Haemophilus influenzae* type b (Hib). ■ Acute respiratory infections (ARIs) and pneumonia represent the number one cause of mortality among children less than 5 years of age. ■ Incubation period is usually less than 7 days, depending on the etiology. ■ MOH/GHS recommends the use of Integrated Management of Childhood Illness (IMCI) strategy to reduce morbidity and mortality attributable to childhood pneumonia. Early anti-microbial therapy has been shown to reduce mortality. ■ Viruses such as respiratory syncytial virus (RSV) may also cause ARI and pneumonia.
Surveillance goal	■ Early identification of pneumonia cases and epidemics using clinical definitions. ■ Monitor anti-microbial resistance routinely and during outbreaks. ■ Reducing the proportion of severe pneumonia cases compared to non-severe pneumonia cases to monitor quality of interventions.
Case definition	**Suspected case definition (IMCI) for pneumonia:** A child presenting with cough or difficult breathing and: ■ 50 or more breaths per minute for infant age 2 months up to 1 year. ■ 40 or more breaths per minute for young child 1 year up to 5 years. *(Note: A young infant age 0 up to 2 months with cough and fast breathing is classified in IMCI as "serious bacterial infection" and is referred for further evaluation.)* **Suspected case definition (IMCI) for severe pneumonia:** A child presenting with cough or difficult breathing and any general danger sign, or chest in-drawing or stridor in a calm child. General danger signs for children 2 months to 5 years are: unable to drink or breast feed, vomits everything, convulsions, lethargy, or unconciousness. **Confirmed case:** Radiographic or laboratory confirmation of pneumonia will not be feasible in most districts.
Public health action	**If you observe that the number of cases or deaths is increasing over a period of time:** ■ Report the problem to the next level. ■ Investigate the cause for the increase and identify the problem. ■ Make sure that cases are managed according to IMCI guidelines. ■ Treat cases appropriately with recommended antimicrobial drugs. **If the number of case deaths increases to two times the number usually seen during a similar period in the past:** ■ Assess health worker practices of IMCI guidelines for assessing, classifying and treating children with pneumonia and severe pneumonia. ■ Identify high-risk populations through analysis of person, place and time. ■ Conduct community education about when to seek care for pneumonia.
Analyse and interpret data	**Time:** Conduct month-to-month analysis for unexpected or unusual increases. Graph cases and deaths by month. Plot month-to-month data and compare to previous periods. **Place:** Plot cases by community/village, district or region. **Person:** Count monthly pneumonia and severe pneumonia cases. Count pneumonia deaths. Analyse age distribution.
Reference	*Integrated Management of Childhood Illesses.* World Health Organization. WHO/CDR/95.14.1

Poliomyelitis (Acute flaccid paralysis)

Background	■ Poliovirus (genus Enterovirus) serotypes 1, 2, and 3 are transmitted from person-to-person via fecal-oral spread. ■ Incubation period is 7 to 14 days for paralytic cases and the range is approximately 3 to 35 days. The virus may be shed for several years by immuno-compromised persons. ■ Infection is usually asymptomatic, but may cause a febrile syndrome with or without meningitis. In less than 5% of infections paralysis results, often of a single leg. ■ Polio infection occurs almost exclusively among children. Infection may occur with any of 3 serotypes of poliovirus. Immunity is serotype-specific and lifelong. ■ Paralytic polio, though not fatal, has devastating social and economic consequences among affected individuals. ■ The Polio Eradication Programme has nearly halted ongoing wild-type polio transmission worldwide through use of oral poliovirus vaccine (OPV). Globally, poliovirus type 2 appears to have been eliminated. Serotypes 1 and 3 poliovirus still circulate in several African countries, and surveillance is not yet adequate to assure eradication in many countries. ■ Ghana has been participating actively in regional efforts to eliminate poliomyelitis and has seen a reduction in the number of cases since the program begun five years ago. ■ Areas with low vaccine coverage may allow ongoing wild-type transmission. ■ Other neurologic illnesses may cause acute flaccid paralysis (AFP), for example, Guillain-Barré syndrome and transverse myelitis.
Surveillance goal	■ Immediate case-based reporting of all AFP cases. Monthly summary reporting of cases for routine surveillance and outbreaks. ■ Detect cases of acute flaccid paralysis and obtain laboratory confirmation of the etiology of all suspected AFP cases. Obtain two or more stool specimens (24 hours apart) within 14 days of the onset of paralysis for viral isolation. ■ Surveillance for AFP is used to capture all true cases of paralytic poliomyelitis. Target for surveillance performance to provide certification of polio eradications is at least 1 case of non-polio AFP per year per 100,000 population aged less than 15 years.
Case definition	**Suspected case:** Any child under 15 years of age with acute flaccid paralysis or any person with paralytic illness at any age in whom the clinician suspects poliomyelitis. **Confirmed case:** A suspected case with virus isolation in stool.
Respond to an epidemic threshold	**If a single case is suspected:** ■ One case of confirmed AFP due to wild poliovirus is an epidemic. If wild poliovirus is isolated from stool specimen, refer to national Polio Eradication Programme guidelines for recommended response actions. The national level will decide which actions to take and may include: ▪ Specify reasons for non-vaccination of each unvaccinated case and address the identified deficiencies. ▪ Immediately conduct “mopping-up” vaccination campaign around the vicinity of the case. ▪ Conduct surveys to identify areas of low OPV coverage during routine EPI activities, and improve routine vaccine coverage of OPV and other EPI antigens. ▪ Lead supplemental vaccination campaigns during National Immunization Days (NIDs) or Sub-National Immunization Days (SNIDs). Focus supplemental vaccination activities in areas of low vaccine coverage during EPI. Consider use of house-to-house vaccination teams in selected areas.

Analyse and interpret data	**Time:**	Graph monthly cases (which should be zero to very few cases per area per year), or weekly cases during an outbreak. Evaluate the percent of suspected cases reported within 48 hours and the percentage with adequate laboratory evaluation. Analyse the proportion of stool specimen collected within 14 days of the onset of paralysis.
	Place:	Plot location of case households. Investigate the circumstances of poliovirus transmission in each case thoroughly. Examine the possibility of other potential areas of transmission.
	Person:	Count monthly routine and outbreak-related cases. Analyse age distribution. Assess risk factors for low vaccine coverage.
Reference	*Field Guide for Supplementary Activities Aimed at Achieving Polio Eradication*. World Health Organization.	

Schistosomiasis

Background	■ Is the second most prevalent tropical disease (following malaria).
	■ There are two types of clinical disease:
	  ▪ Urinary schistosomiasis caused by *S. hematobium*.
	  ▪ Intestinal schistosomiasis caused by *S. mansoni, S. japonicum, S. intercalantum, S. mekongi* (In Ghana, the predominant cause of intestinal schistosomiasis is *S. mansoni*).
	■ 600 million people all over the world are at risk; 200 million are infected of whom 20 million are severely ill.
	■ A leading cause of severe morbidity in large parts of Africa, Asia and South America.
	■ In Ghana the disease is endemic in some areas especially along the Volta river basin.

Surveillance goal	Control of the disease so that it is no longer of public health importance.
Case definition	**Urinary schistosomiasis:** *Endemic areas (moderate or high prevalence):* **Suspected case:** Not applicable **Confirmed case:** A person with visible haematuria or with positive reagent strip for hematuria or with eggs of S. hematobium in urine (microscopy) *Non-endemic areas and areas of low prevalence:* **Suspected case:** A person with visible haematuria or with positive reagent strip for hematuria **Confirmed case:** A person with eggs of S. hematobium in urine (microscopic) **Intestinal schistosomiasis:** *Endemic areas (moderate or high prevalence):* **Suspected case:** A person with chronic or recurrent intestinal symptoms (blood in stool, bloody diarrhoea, diarrhoea, abdominal pains) or at a later stage hepatosplenomegaly **Confirmed case:** A person with eggs of S. mansoni in stools (Microscopy) *Non-endemic areas and areas of low prevalence:* **Suspected case:** A person with chronic or recurrent intestinal symptoms (blood in stool, bloody diarrhoea, diarrhoea, abdominal pains) or at a later stage hepatosplenomegalu **Confirmed case:** A person with eggs of S. mansoni in stools (Microscopy), a person with positive reaction to immonoblot test

Public health action	■ Case finding and treatment. ■ Mass treatment with Prazinquantel. ■ IEC and social mobilisation. ■ Vector control. ■ Improved water and sanitation. ■ Routine monthly reporting of aggregated cases. ■ Organisation of surveys to assess the magnitude of the problem.
Analyse and interpret data	**Time:** Graph cases monthly. **Place:** Map cases in affected communities and districts. **Person:** Calculate point prevalence from survey data.
Reference	*WHO Recommended Surveillance Standard, Second Edition - October 1999.*

Sexually transmitted infections (Urethral discharge, male and female genital ulcer)

Background	■ Sexually transmitted infections (STI) are infections of the human genito-urinary and reproductive systems transmitted via human sexual contact. The most common causes of male urethral discharge are a) the gonococcus *Neisseria gonorrheaea* and b) *Chlamydia trachomatis*. The most common causes of male and female genital ulcer are c) syphilis (*Treponema pallidum*), d) herpes simplex virus (HSV1 or 2) and e) chancroid (*Haemophilus ducreyi*). ■ STIs are endemic in most countries of the world, including Ghana. In Ghana STI reporting is integrated into the general surveillance system. More than 10,000 cases were reported throughout the country in the year 2000. ■ Syndrome management is used for diagnosis especially at district level. ■ Multiple simultaneous STIs are common (for example, gonorrhea plus chlamydia). STIs may be highly prevalent in areas where HIV occurs and may facilitate HIV transmission. ■ STIs are a leading cause of abortion and stillbirth, prematurity and congenital infections. They may lead to pelvic inflammatory disease (PID), a major cause of decreased fertility. ■ Incubation periods for gonorrhea are 2 to 7 days; chlamydia 7 to 14 days (or longer); syphilis, 10 days to 12 weeks (usually around 3 weeks), and chancroid, 3 to 14 days. ■ STIs are more commonly diagnosed in men, in whom clinical evidence of infection is/may be more readily apparent.
Surveillance goal	■ Early detection and treatment of STI reduces transmission rates. Active efforts to diagnose latent syphilis may prevent significant disability. ■ Improve early and effective treatement of STIs using simple algorithms based on syndromic diagnosis for index cases and partners. ■ Carry out laboratory-based anti-microbial sensitivity monitoring and modify treatment guidelines accordingly at the national level. ■ Compare surveillance data for both STIs and HIV/AIDS since STIs may reflect co-presence of HIV.
Case definition	**Suspected case:** ■ *Genital ulcer syndrome (non-vesicular)*: Any male with an ulcer on the penis, scrotum or rectum, with or without inguinal adenopathy, or any female with ulcer on labia, vagina or rectum, with or without inguinal adenopathy. ■ *Urethral discharge syndrome*: Any male with urethral discharge with or without dysuria. **Confirmed case:** ■ *Genital ulcer syndrome (non-vesicular)*: Any suspected case confirmed by a laboratory method. ■ *Urethral discharge syndrome*: A suspected case confirmed by a laboratory method (for example, Gram stain showing intracellular Gram-negative diplococci).

Public health action	■ Conduct active case finding for specific target groups. ■ Conduct primary prevention activities such as promotion of safer sex behaviours, social marketing and provision of condoms. ■ Assess use of algorithms for detection and treatment of STIs, and improve health worker practice with algorithms. ■ Include STI prevention and care services in maternal and child health, and family planning services. ■ Target acceptable and effective STI prevention and care services to populations identified as vulnerable to STI transmission. ■ Promote early STI health seeking behaviour.
Analyse and interpret data	**Time:** Graph cases each quarter. **Place:** No recommendation for analysis of place. **Person:** Count quarterly cases and analyse cases by age, occupation and marital status.
Reference	*Guidelines for Sexually Transmitted Infections Surveillance.* Geneva. UNAIDS and World Health Organization. WHO/CDS/CSR/EDC/99.3. UNAIDS/99.33E

Trachoma

Background	■ Trachoma is an infectious eye disease, which causes inflammation and scarring of the conjunctiva, the inner lining of the eyelid, thus leading to blindness. ■ It is caused by microorganism, Chlamydia trachomatis, which gives rise to the inflammation of the conjunctiva covering the inside of the eyelids. ■ Environmental factors such as shortage of potable water, and poor personal and environmental hygiene practises are the main risk factors. ■ It is the second largest cause of blindness in the world after cataract. ■ It is a very common disease, particularly in developing countries. There are at least 150 million people in the world suffering from active disease, 6 million of whom have gone blind due to the disease. ■ In Ghana, the disease is a public health problem especially in Northern and Upper-West regions of the country. ■ After several years of disease, this inflammatory may cause scarring of the eyelid, later leading to inturned eyelashes that rub on the cornea. Subsequent loss of vision occurs because of scarring of the normally transparent cornea. Scarring is common in older children but the serious complication of inturned eyelashes and cornea scarring do not usually appear before the adult age. Thus the blindness due to trachoma is most common in adults.
Surveillance goal	■ Early detection and prompt treatment of cases with the goal of reducing the occurrence of blindness among affected individuals. ■ Conduct specific prevalence surveys in endemic communities and carry out appropriate treatment.
Case definition	The case definition is based on classification of the disease. There are two forms of classification. *The presence or absence of ongoing trachomatous inflammation* ■ **"Active" trachoma**: This implies the presence of ongoing trachomatous inflammation corresponding to TF with or without TI. ■ **"Cicatricial", "healed" or "inactive" trachoma**: Signs of trachomatous inflammation are not visible, but scarring (TS with or without TT) is present. *The stage of development of the disease* ■ **TF** = Presence of trachomatous inflammation, indicating current infection. ■ **TI** = Presence of intense trachomatous inflammation, indicating severe current infection with increased risk of scarring.

	■ **TS** = Presence of scarring, showing that the patient has or has had trachoma. ■ **TT** = Presence of trichiasis (inturned eyelashes), indicating patients who will develop cornea opacity and visual loss; this is therefore a **potentially disabling lesion**, which may rapidly lead to blindness. These patients need corrective lid surgery. ■ **CO** = Presence of corneal opacity indicating people who have a visual impairment or blindness. This is a **disabling lesion**.
Public health action	**If there is an unusual increase in the number of new trachoma cases as compared to the same period in previous years:** ■ Report unusual increase to the next level. ■ Treat with individual cases with appropriate antibiotics according to national programme recommendations. ■ Investigate the cause for the increase in new cases. ■ Carry out community prevalence surveys and treatment as follows: ▪ 20% or more children 1-10 yrs with infection grade TF or 5% or more children 1-10 yrs with infection grade TF - Mass tropical antibiotic treatment with selective antibiotic treatment of severe cases. ▪ 5-20% of children 1-10 yrs with infection grade TF - Mass or individual/family treatment with additional selective systemic antibiotic treatment of severe cases. ▪ Less than 5% of children 1-10 yrs with infection grade TF - Individual tropical antibiotic treatment. ■ Conduct community education for prompt detection of cases and access to health facilities. **If the number of new cases exceeds the upper limit of cases seen in the same period in previous years:** ■ Evaluate and improve, as needed, prevention strategies, such as promotion of face washing, surgery for potentially disabling lesions, intensive community education and mass treatment where appropriate especially for young children and other high-risk populations.
Analyse and interpret data	**Time:** Conduct month-to-month analysis for unexpected or unusual increases. Graph cases by month. Plot month-to-month data and compare to previous periods. **Place:** Plot location of affected communities/villages and districts. **Person:** Count monthly trachoma cases. Analyse age distribution.
Reference	*Primary Health Care Level Management of Trachoma, WHO Programme for Prevention of Blindness/ Edna McConnell Clark Foundation; WHO/PBL/93.33* *Trachoma Rapid Assessment Using TRA3 in the Northern and Upper West regions, Ministry of Health Ghana, 1999 (Unpublished Report)*

Tuberculosis

Background	■ Infection of the lungs and other organs usually caused ny Mycobacterium tuberculosis transmitted person-to-person by droplet infection through coughing, sneezing or spitting. Clinically, the pulmonary form of the disease is more common than the extra-pulmonary form. The cardinal symptoms of pulmonary tuberculosis (TB) are chronic cough, weight loss, fever, loss of appetite and night sweats. ■ TB is a leading cause of infectious illness and death worlwide. In Ghana 30,000 cases are expected annually. It is estimated that between 30% and 50% of all new TB cases detected are infected with HIV and 40% of all AIDS deaths are due to TB globally. Those who are at highest risk of dying from TB include people with HIV/AIDS, malnutrition and other immuno-compromising conditions, the very young, and the very old.

	■ The global HIV pandemic has been a major cause of increasing TB cases, especially in Ghana. ■ Incubation period is approximately 1 to 3 months. ■ WHO recommends the Direct Observed Therapy, Short-course (DOTS) strategy to maximize compliance and treatment efficacy and to reduce development of drug-resistant strains. The DOTS strategy has been implemented in Ghana with varying degrees of successes, depending sometimes on resources, motivation for diagnosis, treatment and mechanism for patient follow-up. ■ Clinically, bacterial pneumonia, malaria, trypanosomiasis, HIV/AIDS and a variety of other bacterial, parasitic, and viral infections may cause similar syndromes of fever, cough, fatigue, and weight loss, or may themselves precipitate active TB in an already infected individual. Abdominal or other extrapulmonary sites of infection may occur after ingestion of unpasteurized cows milk *(M. bovis)*.
Surveillance goal	■ Early detection of persons with infectious lung disease to improve chances of cure and reduce transmission of TB. ■ Improve percentage of TB cases confirmed by microscopy.
Case definition	**Suspected case:** Any person with a cough of 3 weeks or more. **Confirmed case:** *Smear-positive pulmonary TB*: a) a suspected patient with at least 2 sputum specimens positive for acid-fast bacilli (AFB), or b) one sputum specimen positive for AFB by microscopy and radiographic abnormalities consistent with active pulmonary TB as determined by the treating medical officer, or c) one positive sputum smear by microscopy and one sputum specimen positive on culture for AFB. *Smear-negative pulmonary TB*: a patient who fulfills all the following criteria: a) two sets taken at least 2 weeks apart of at least two sputum specimens negative for AFB on microscopy, radiographic abnormalities consistent with pulmonary TB and a lack of clinical response despite one week of broad spectrum antibiotic, a decision by a physician to treat with a full course of anti-TB chemotherapy, or b) a patient who fulfills all the following criteria: severely ill, at least two sputum specimens negative for AFB by microscopy, radiographic abnormalities consistent with extensive pulmonary TB (interstitial and miliary), a decision by a physician to treat with a full course of anti-TB chemotherapy, or c) a patient whose initial sputum smears were negative, who had sputum sent for culture initially, and whose subsequent sputum culture result is positive.
Public health action	**Number of cases or deaths increasing over a period of time:** ■ Report problem to the next level, or according to national guidelines. ■ Treat individual cases with DOTS including a treatment supporter. ■ Where feasible, isolate persons using respiratory infection control practices, especially if multi-drug resistant TB is suspected. ■ Investigate cause of increase, including performance of DOTS programme in your area. **Number of cases or deaths increases to two times the number usually seen in a similar period in the past:** ■ Assess health worker performance with detection and treatment of smear-positive pulmonary TB and improve practices as needed. ■ Assess DOTS programme and take action to make identified improvements. ■ Conduct drug susceptibility tests to establish patterns of resistance in collaboration with the National Public Health Reference Laboratory.

Analyse and interpret data	**Time:**	Graph cases and deaths monthly.
	Place:	Plot distribution of case households and workplaces.
	Person:	Count monthly cases and deaths. Analyse age and sex distribution monthly.
Reference	*Treatment of Tuberculosis: Guidelines for National Programmes.* WHO/TB/97.230 *Policy Statement of Prevention Therapy Against TB in People Living with HIV.* WHO/TB/98.255	

Viral haemorrhagic fevers

Background	■ Viral haemorrhagic fever is a haemorrhagic disease syndrome caused by the following viruses: Ebola-Marburg (filoviruses), Lassa fever, Rift Valley fever (RVF), Congo-Crimean haemorrhagic fever (CCHF) and dengue haemorrhagic fever (DHF). No DHF has been reported in Africa. ■ The disease is transmitted from person-to-person (Ebola, Marburg, Lassa, CCHF) or via mosquitos (RVF, dengue), ticks (CCHF), rodents (Lassa) or contact with infected animals (RVF, CCHF). Ebola and Marburg may be transmitted via sexual contact. ■ Some viral haemorrhagic fevers (VHF) have explosive outbreak potential: international reporting to WHO is required within 24 hours. ■ Incubation period is variable, from 3 to 21 days depending on etiology. ■ The minority of cases has haemorrhagic symptoms, but among those with these symptoms, the case fatality rate is high (15% to 90%). ■ Risk factors: In the health care setting, outbreaks may be amplified when standard barrier precautions are not taken, or in ceremonies involving touching ill or deceased infected persons or their secretions. Sporadic cases may arise from sexual contact or via sylvatic exposures (for example, occupation) or possibly following direct contact with infected animals. ■ Other haemorrhagic conditions that may mimic VHF include yellow fever, dengue, anthrax, leptospirosis, rickettsial infections, relapsing fever and other infectious agents and toxic exposures.
Surveillance goal	■ Detect haemorrhagic fever cases and outbreaks promptly and seek laboratory verification of the etiology of all cases of suspected VHF. ■ In outbreak settings, the disease spectrum of VHF agents may include non-haemorrhagic febrile syndromes, and laboratory testing should be considered among persons with milder symptoms suggestive of viral illness.
Case definition	**Suspected case:** Illness with onset of fever and no response to treatment of usual causes of fever in the area, and at least one of the following signs: bloddy diarrhoea, bleeding from gums, bleeding into skin (purpura), bleeding into eyes and urine. **Confirmed case:** A suspected case with laboratory confirmation (positive IgM antibody or viral isolation), or epidemiological link to confirmed cases or outbreak.
Respond to an alert threshold	**If a single case is suspected:** ■ Report case-based information immediately to the appropriate levels. ■ Begin VHF isolation precautions immediately and enhance standard precautions throughout the health care setting. Use protective clothing, disinfect surfaces and spills, dispose safely materials used for patient care and patient waste. ■ Treat and manage the patient with supportive care. ■ Collect specimen safely to confirm case.

Respond to epidemic	**If a single case is confirmed:** ■ Maintain strict VHF infection control practices throughout the duration of the outbreak. ■ Mobilise the community for early detection and care. ■ Conduct community education about the confirmed case, how the disease is transmitted, and how to use infection control in the home care settings. ■ Conduct active searches for additional cases that may not come to the health care setting (older women or small children, for example) and provide information about prevention in the home and when to seek care. ■ Request additional help from national levels as needed. ■ Establish isolated ward to handle additional cases that may come to the health center.
Analyse and interpret data	**Time:** Graph cases and deaths monthly. Construct an epidemic curve during the outbreak. **Place:** Plot location of case households and work sites using precise mapping. **Person:** Immediate case-based reporting of cases and deaths. During the outbreak, count and report cases and deaths. Analyse age and sex distribution. Assess risk factors immediately and consider request for assistance to improve outbreak control.
Reference	*Infection control for VHF in the African health care setting,* WHO, 1998. WHO/EMC

Viral Hepatitis

Background	■ An acute viral illness which may be caused by six different kinds of viruses namely: Hepatitis A, B, Non A, Non B, C, D, E. ■ Transmission is mainly oral-faecal for hepatitis A and E, percutaneous for hepatitis B, C, and D, sexual and through transfusion of infected blood and blood products for hepatitis B. ■ Estimates suggest that worldwide, there are 385 million carriers of hepatitis B virus and 170 million carriers of hepatitis C virus. More than one million deaths each year are attributable to hepatitis B. ■ Over 6,000 cases were reported in 2000 in Ghana through the routine reporting system. ■ Most infections occur in early childhood. A variable proportion of adult infections are asymptomatic.
Surveillance goal	To reduce incidence and prevalence of the disease so that it is no longer of public health problem.
Case definition	**Suspected case:** Any person with acute illness typically including: acute jaundice (within one week of onset of fever); dark urine; anorexia; malaise; extreme fatigue; and right upper quadrant abdominal tenderness. **Confirmed case:** A suspected case that is laboratory confirmed **or**, for hepatitis A only, a case compatible with the clinical description, in a person who has epidemiological link with a laboratory confirmed case of Hepatitis A (i.e. household or sexual contact with an infected person during the 15-50 days before the onset of symptoms.
Public health action: Respond to unexpected trends	**If there is an unusual increase in the number of new viral hepatitis cases or deaths as compared to the same period in previous years:** ■ Report unusual incease to the next level. ■ Manage cases according to national treatment guidelines. ■ Investigate all outbreaks immediately and confirm serologically.

	■ Conduct community education for prompt detection of cases and access to health facilities. ■ Routine monthly reporting of aggregated data of cases should be carried out. Zero reporting is required at all levels.
Public health action: Respond to a lack of decline in cases/ deaths	**If the number of new cases exceeds the upper limit of cases seen in a previous non-epidemic period in previous years:** ■ Evaluate and improve, as needed, prevention strategies, such as ▪ Immunization of children and at risk groups ▪ Transfusion safety ▪ Safe and appropriate use of injection ▪ Intensive public education ▪ Routine screening of food handlers
Analyse and interpret data	**Time:** Graph the number of cases by month. Calculate incidence of acute viral hepatitis by month. Construct an epidemic curve during outbreaks. **Place:** Plot location of households for new cases and deaths. **Person:** Count the number of new hepatitis cases and deaths by month and analyse age groups and time of onset. Calculate hepatitis B vaccine coverage of infants.
Reference	WHO recommended Surveillance Standards. Secone Edition - October 1999. WHO/CDS/CSR/ISR/99.2

Yaws

Background	■ An infectious disease caused by a spirochaetal organism *Treponema pertenue*. It is an endemic disease found in the tropics, especially in rural areas among low socio-economic groups. ■ Infection usually takes place in childhood, especially among children 5-15 years but no age is exempt. It is transmitted by direct contact between individuals. Non-biting insects such as common houseflies are suspected to play a role. ■ Yaws is a serious impediment especially to farmers as plantar yaws makes work difficult. The crippling effects of the disease also contribute to absenteeism among school children. Similarly, it leads to productivity loss in the rural areas and contributes to rural poverty. The disease is therefore an obstacle to socio-economic develpment. ■ Yaws was controlled in the early 1980s but subsequently, due to competing health priorities and financial constraints, the control programme suffered with the result that the disease is now again highly endemic in many parts of Ghana. The estimated prevalence is now over 1000 per 1,000,000. ■ Risk factors: Poor personal hygiene.
Surveillance goal	The goal for surveillance of this disease is to eliminate it. ■ All cases reporting to health institutions should be reported monthly. ■ Community-based surveillance should be in place to capture all these cases. ■ Periodic surveys to supplement data from institutions.
Case definition	**Infectious Types:** Macules: Circumscribed areas that are not elevated; seen, not felt. Person with a patchy erythematous rash. Papilloma: Granulomatous eruption on the skin with scab which oozes blood after scab is removed. **Non-infectious Types:** Plantar and palmer hyperkeratosis, Saber tibia, Gangosa, Dactylitis, and Goundou.

Public health action	■ Case finding and contact tracing
	■ Treatment of cases and chemoprophylaxis of contacts
	  ▪ Individual treatment of cases and contacts
	  ▪ Mass treatment
	  ▪ *Total mass treatment* (TMT) for prevalence of active yaws above 10% in an area, all persons living there receive treatment (Hyper-endemic zone).
	  ▪ *Juvenile mass treatment* (JMT) for prevalence of active yaws between 5 and 10% in an area all persons ages 1-15 years as well as contacts receive treatment (Mesoendemic).
	  ▪ *Selective mass treatment* (SMT) for prevalence active yaws less than 5% in an area, members of households and other obvious contacts of infectious cases (e.g. classmates) receive treatment.
	  ▪ Community health education on personal hygiene

Analyse and interpret data	**Time:** Graph number of cases monthly. **Place:** Plot location of affected households, communities and districts. **Person:** Count monthly cases. Calculate the proportion of persons affected in a particular community. Analyse age distribution.
Reference	*Guidelines for the management and control of yaws, Disease Control Unit, Ghana Health Service, October 2000.*

Yellow fever

Background	■ Viral hemorrhagic disease caused by a flavivirus transmitted human-to-human via *Aedes* mosquitos (urban epidemics) or via forest mosquito species and forest primate reservoirs (jungle cycle). ■ Large-scale outbreaks every 3 to 10 years in villages or cities. Sporadic cases can occur regularly in endemic areas. Resurgence of disease in Africa since mid-1980s. True incidence far exceeds reported cases. ■ Incubation period 3 to 6 days after the bite from an infected mosquito (aedes aegypti). ■ 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. ■ Risk factor: sporadic cases often linked to occupation or village location near woods or where monkeys are numerous. Also non-vaccinated persons. ■ International reporting to WHO required within 24 hours. ■ VHF and other infections causing haemorrhage may mimic yellow fever.
Surveillance goal	Detect haemorrhagic fever cases and outbreaks promptly, and seek laboratory verification of the etiology of all cases of suspected yellow fever. (Other viral haemorrhagic fevers, dengue, anthrax, leptosspirosis, rickettsial diseases, malaria, and other infectious agents and toxic exposures may cause similar epidemics.)
Case definition	**Suspected case:** A person with acute onset of fever followed by jaundice within two weeks of onset of first symptoms. Haemorrhagic manifestations and renal failure may occur. **Confirmed case:** A suspected case with laboratory confirmation (positive IgM antibody or viral isolation) or epidemiologic link to confirmed cases or outbreaks.
Respond to alert threshold	**If a single case is suspected:** ■ Report case-based information immediately to the next level. ■ Treat and manage the patient with supportive care administered under a bednet (ORS for dehydration, paracetamol for fever) and strict isolation procedures.

	■ Collect specimen for laboratory confirmation. ■ Investigate the case to determine how transmission occured. ■ Plan for an immunization activity.	
Respond to epidemic threshold	**If a single case is confirmed:** ■ Mobilise 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 mosquitos. ■ Improve routine and mass vaccination campaigns to include yellow fever in high-risk areas.	
Analyse and interpret data	**Time:**	Graph cases and deaths monthly. During an outbreak, graph cases and deaths daily. Construct an epidemic curve during outbreaks.
	Place:	Plot location of case households and occupation with precise mapping.
	Person:	Report immediate case-based information for cases and deaths. Report summary totals monthly. During outbreak, count cases and deaths weekly. Analyse by age. Assess risk factors to improve prevention of sporadic outbreaks.
Reference	*District guidelines for yellow fever surveillance*. WHO 1998	

Using Assessment Results to Improve Surveillance and Response at the District Level

Ghana has begun work on the WHO/AFRO integrated disease surveillance and response effort, which provides guidance in how existing surveillance and response systems can be improved. As a first step toward improvement, Ghana carried out an assessment of its surveillance system. The assessment used a tool adapted from a WHO/AFRO protocol. Its findings identified where improvements are needed in the quality and timeliness of information provided about disease outbreaks and other public health problems, in how the information is used to plan and implement responses to the health problems, and in evaluating the resources needed to ensure good surveillance. The assessment tool also allowed Ghana to plan and prioritize actions to rectify existing shortcomings in the surveillance system, and activities are already being carried out.

If an individual district wants to update its assessment profile, it can use a checklist such as the one below to help identify problems and select priority activities to improve surveillance and response capacity.

1. _____ Define the sources of information about health events in the district, including points of contact between the community and health services. Use the table in Annex 4 to list these district reporting sites and their contact information. Examples of report sites follow:

   - ☐ Health facilities and hospitals
   - ☐ Community health workers/community-based surveillance (CBS) volunteer
   - ☐ Traditional birth attendants
   - ☐ Rural community leaders who have knowledge of health events in the community (village elders, traditional healers, school teachers, leaders of faith-based communities)
   - ☐ Public health officers
   - ☐ Private sector practitioners
   - ☐ Public safety officers (fire, rescue or police departments, etc.)
   - ☐ Others (please describe) _____

2. _____ Identify surveillance focal points for each source. Identify and specify the opportunities for community involvement in surveillance of health events.

3. _____ Describe how communication about surveillance and response takes place between the district and the surveillance focal points. Include methods such as monthly meetings, newsletters and telephone calls. Update the description periodically.

4. _____ Describe the laboratory referral network for confirming priority diseases and conditions in the district. For example, list the following:

   - ☐ Public, private or NGO facilities with reliable laboratory services for confirming priority diseases
   - ☐ Prevention, control or special surveillance activities in the district with laboratory access (for example, any HIV sentinel surveillance sites)

5. _____ Improve practices of the district epidemic response team so that assessing preparedness is a routine agenda item of the team. Specify and disseminate schedules for:

- ☐ Meeting to routinely assess preparedness for response and discuss current problems or activities
- ☐ Outbreak response meetings

6. _____ Describe the communication links between the community and health facilities and the District Epidemic Management Committee that can be activated during an outbreak and for routine activities.

7. _____ Specify the priority diseases and conditions for surveillance within the district and those directed by national policy. List the following:

- ☐ Epidemic-prone diseases
- ☐ Diseases targeted for eradication and elimination
- ☐ Other diseases of public health importance

8. _____ For each priority disease or condition selected, state the available public health response activity.

9. _____ For each disease or condition that the district can respond to, specify the target, alert threshold or analysis results that would trigger an action.

10. _____ For each priority disease or condition, review the minimum data element that health facilities and other sources should report. State when it should be reported, to whom, and how. For example:

- ☐ State the information that should be reported from inpatient and outpatient sources. For example, a minimum requirement would be to report all cases and deaths for the selected diseases and conditions.
- ☐ State the diseases or conditions that require immediate reporting and communicate the list to health facilities in the district.
- ☐ Define the means for reporting data to the district (by phone, by form, by voice).
  If there is electronic reporting, do all facilities have access to computers and modems?
- ☐ Define how often the required data should reported.

11. _____ Define the data management tools available in the district and how they should be used in an integrated system

- ☐ Routine reporting forms
- ☐ CBS reporting forms
- ☐ Line lists for use in outbreaks of more than five cases
- ☐ Tables for recording summary totals
- ☐ Graphs for time analysis of data
- ☐ Maps for place analysis of data
- ☐ Charts for person analysis of data

12. _____ Define the exact data management requirement for each reporting site. For example, develop and disseminate a policy and specify the procedures so that reporting sites know they must each month:

- ☐ Tally, compile and report summary totals
- ☐ Analyze monthly summaries in graphs, tables or maps
- ☐ Provide some interpretation to the district level

13. _____ Periodically update the availability of relevant reporting supplies at each reporting site. (Note: If a reporting site has capacity for electronic reporting, does it also have the electronic format that is compatible with the format used at the district, regional and national levels? If the site cannot report electronically, do the focal persons who are required to manage data have a reliable supply of paper, coloured pencils, graph paper etc.)

14. _____ Decide if current forms address the priorities of integrated disease surveillance and response. For example, do current forms provide the information necessary for detecting problems and signalling a response to the priority integrated disease surveillance diseases?

15. _____ Decide if additional indicators will be evaluated and plan how to monitor and evaluate timeliness and completeness of reporting.

16. _____ Define methods for informing and supporting health staff in the implementation of integrated disease surveillance. For example:

- ☐ List the current opportunities for training health staff in surveillance, response or data management in the district.
- ☐ Coordinate training opportunities between disease programmes that take advantage of overlapping skills such as supervision, report writing, budgeting, data analysis and using data to set priorities.
- ☐ Define the training needs for each category of health staff for either initial training in surveillance and response skills or refresher training in how to integrate surveillance activities.

17. _____ Review and update feedback procedures and methods between the district, health facilities and community as well as between the district and higher levels of the health system. For example, specify the feedback methods and update as necessary:

- ☐ Bulletins summarizing data reported by health facilities to the district
- ☐ Periodic meetings to discuss public health problems and recent activities
- ☐ Supervisory visits

18. _____ Gather and present relevant data about the district that can be used to advocate for additional resources for improving surveillance and response activities in the district. (For example: Health staff has documented an increase in malaria cases, and they know that an effective response is available with insecticide-treated bednets. The district surveillance officer uses data to show the expected reduction in malaria cases if some of the community's bednet cost could be supported by local businesses.)

19. _____ State three objectives you would like to achieve for improving surveillance in the country over the next period.

Case Definitions for Identification and Reporting of Priority Diseases or Conditions

The following are the case definitions for identification and reporting of priority diseases and conditions. Please refer to additional disease-specific information in Section 9.

Table A-1. Case definitions for identification and reporting of priority diseases or conditions

Epidemic-prone diseases	
Cholera	Any person 5 years of age or more who develops severe dehydration or dies from acute watery diarrhoea (rice-water stools)
Diarrhoea with blood	Any person with diarrhoea (passage of 3 or more watery or loose stools within the past 24 hours) and visible blood in the stool
Measles	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
Meningitis	Any person with sudden onset of fever (>38.5^{0}C rectal or >38.0^{0}C axillary) and one of the following signs: neck stiffness, altered consciousness or other meningeal signs
Viral haemorrhagic fevers	Any person with severe illness, fever and at least one of the following signs: bloody stools, vomiting blood or unexplained bleeding from gums, nose, vagina, skin or eyes
Yellow fever	Any person with sudden onset of high fever (>39C), followed by jaundice within two weeks of onset of first symptoms
Diseases targeted for eradication	
Acute flaccid paralysis (poliomyelitis)	Any child less than 15 years of age with sudden (within three days) onset of flaccid paralysis or a person of any age in whom the clinician suspects polio
Dracunculiasis (guinea worm disease)	Any person with a history of skin lesion and emergence of guinea worm within one year of the skin lesion
Diseases targeted for elimination	
Leprosy	Any person with one or more of three cardinal signs of leprosy: ▪ Hypopigmented or reddish skin lesion ▪ Loss or decrease of sensations in skin patch ▪ Enlargement of peripheral nerve with or without bacteriological diagnostic confirmation and requiring chemo therapy (excluding patients released from treatment)
Neonatal tetanus	Any newborn with a normal ability to suck or cry during the first two days of life, and who, between 3 and 28 days of age, cannot suck normally and becomes stiff or has spasms or both
Lymphatic filariasis	Any person living in an endemic area who experiences recurrent attacks of fever, adenolymphangitis, or epidydimo-orchitis OR ▪ Hydrocoele or lymphoedema in a resident of an endemic area for which other causes of these findings have been excluded OR ▪ Laboratory confirmation of lymphatic filariasis (i.e. microfilaria positive, antigen positive or biopsy positive) even if the patient does not meet the clinical case definition

Diseases of special public health focus	
AIDS[7]	***In an adult*** AIDS is diagnosed if the patient has either: ▪ 3 major symptoms/signs OR ▪ at least two major symptoms/signs and at least one minor symptom/sign and positive HIV antibody test OR ▪ Kaposi sarcoma and positive HIV antibody test OR ▪ Cryptococcal meningitis and positive HIV antibody test ***In a child <12yrs:*** AIDS is diagnosed if the patient has ▪ At least two major symptoms/signs and at least 2 minor symptoms/signs and a positive HIV antibody test ***Major signs***: more than 10% weight loss; chronic diarrhoea (for more than 1 month); prolonged fever (intermittent or constant, for more than 1 month). ***Minor signs***: persistent cough (for more than 1 month); generalised pruritic dermatitis; recurrent herpes zoster; oropharyngeal candidiasis; chronic progressive and disseminated herpes virus infection; generalised lymphadenopathy.
Malaria	***Uncomplicated malaria*** Any person with fever or fever with headache, back pain, chills, sweats, myalgia, nausea and vomiting diagnosed clinically as malaria. The person may feel unwell or tired. Young children may have abdominal pain and poor feeding alone or in addition to any of the above symptoms. Uncomplicated malaria cases are those managed on an outpatient basis. ***Uncomplicated malaria, lab-confirmed*** Any person with fever or fever with headache, back pain, chills, sweats, myalgia, nausea and vomiting and with laboratory confirmation of diagnosis by malaria blood film or other diagnostic test for malaria parasites ***Severe malaria*** Any person hospitalized with primary diagnosis of malaria and confirmed by a positive blood smear or other diagnostic test for malaria. In addition, the person may have any of the following: Change in behaviour (confusion or drowsiness), altered consciousness, general weakness (prostration), convulsions, hypoglycaemia (sugar < 2.2 mol), difficulty in breathing, renal failure (reduced urine output), severe anaemia/pallor (Hb < 5g/dl), coca-cola dark urine, jaundice/yellow urine, hyperpyrexia (temp > 39.5°C), spontaneous bleeding (DIC).

[7] HIV surveillance is being carried out at some sentinel antenatal clinic sites and screening of blood donors at some blood banks.

Tuberculosis	***Smear-positive pulmonary tuberculosis*** Any patient with cough for 3 weeks or more and: ▪ At least 2 sputum specimens positive for acid-fast bacilli by microscopy OR ▪ 1 sputum specimen smear positive for acid-fast bacilli and radiographic abnormalities consistent with active pulmonary tuberculosis as determined by the treating medical officer OR ▪ One sputum specimen smear positive for acid-fast bacilli and one sputum specimen culture positive for acid-fast bacilli
Other diseases of public health importance	
Buruli ulcer	Any person with painless nodule, papule, plaque or oedema evolving into a painless ulcer with undermined edges, often leading to invalidating sequelae in an endemic area. The different clinical forms of the active type of the disease are as follows: ▪ Papule: painless and raised skin lesion less than 1cm in diameter ▪ Nodule: painless palpable firm lesion, 1-2 cm in diameter situated in the subcutaneous tissue and usually attached to the skin ▪ Plaque: usually painless, well-demarcated, elevated, indurated lesion more than 2 cm in diameter ▪ Oedema: diffuse, extensive, non-pitting, ill defined margin, firm, and may be painful with or without colour change over the affected skin ▪ Ulcer: painless skin lesion characterized by a necrotic center, undermined edges and oedematous skin. An early ulcerative lesion has a diameter of less than 2 cm and a late ulcerative lesion has a diameter of more than 2 cm
Diarrhoea in children less than 5 years of age	***Diarrhoea with some dehydration*** Any child less than 5 years of age with diarrhoea (passage of 3 or more watery or loose stools within the past 24 hours) and 2 or more of the following conditions: ▪ Restless or irritable ▪ Sunken eyes ▪ Drinks eagerly, thirsty ▪ Skin pinch goes back slowly ***Diarrhoea with severe dehydration*** Any child less than 5 years of age with diarrhoea and 2 or more of the following conditions: ▪ Lethargic or unconscious ▪ Sunken eyes ▪ Not able to drink or drinking poorly ▪ Skin pinch goes back very slowly
Viral hepatitis	Any person with acute illness typically including: acute jaundice (within one week of onset of fever); dark urine; anorexia; malaise; extreme fatigue; and right upper quadrant abdominal tenderness

Pneumonia in children less than 5 years of age	***Pneumonia*** Any child 2 months to 5 years of age with cough or difficult breathing and ▪ Breathing 50 breaths or more per minute in an infant 2 months to 1 year of age ▪ Breathing 40 breaths or more per minute for a child 1 to 5 years of age *(Infants less than 2 months with fast breathing – 60 breaths or more per minute – are referred for serious bacterial infection.)* ***Severe pneumonia*** Any child 2 months up to 5 years of age with cough or difficult breathing, and with any general danger sign, or chest indrawing, or stridor in a calm child. General danger signs are: unable to drink or breastfeed, vomits everything, convulsions, lethargy or unconsciousness.
Onchocerciasis	In an endemic area, any person with fibrous nodules in subcutaneous tissues.
Schistosomiasis	***Urinary schistosomiasis*** Any person with terminal haematuria. ***Intestinal schistosomiasis*** A person with chronic or recurrent intestinal symptoms (blood in stool, bloody diarrhoea, diarrhoea, abdominal pains) or at a later stage, hepatosplenomegaly
Sexually transmitted infections (STIs)	***Genital ulcer syndrome*** Any male with an ulcer on the penis, scrotum or rectum, with or without inguinal adenopathy, or any female with an ulcer on the labia, vagina, cervix or rectum, with or without inguinal adenopathy ***Urethral discharge syndrome*** Any male with urethral discharge with or without dysuria
Trachoma	Any person with recurrent inflammation and scarring of the conjunctiva and inner lining of the eyelid. The late stage of the disease may manifest as in-turned eye lids (entropion) with the eyelashes rubbing on the cornea (trichiasis)
Yaws	***Primary yaws*** The presence of granulomatous ulcers (usually on the face or extremities) accompanied by enlargement of the regional lymph glands within 2–8 weeks of the spirochaetal infection which disappear several weeks later.

Case Definitions for Use in Community Surveillance

Inform community health workers, traditional healers, birth attendants, health workers who conduct outreach activities and community leaders about the priority diseases and conditions under surveillance in your area. Use case definitions such as those in the following table to help the community to recognise when a person with these signs should be referred to the health facility.

Table A-2. Case definitions for community surveillance

Epidemic-prone diseases	
Cholera	Any person 5 years of age or more with lots of watery diarrhoea and sometimes vomiting profusely as well In case of cholera outbreak anybody who passes watery/loose stool
Diarrhoea with blood	Any person who has passed 3 or more watery stool containing blood in the past day
Measles	Any person with fever and rash
Meningitis	Any person with fever and neck stiffness
Viral haemorrhagic fevers	Any person who has an unexplained illness with fever and bleeding or who died after an unexplained severe illness with fever and bleeding
Yellow fever	Any person with fever and yellow discoloration of the eyes
Diseases targeted for eradication	
Acute flaccid paralysis (poliomyelitis)	Any person who develops sudden weakness in the limbs
Dracunculiasis (guinea worm)	Any person with worms emerging from any part of the body
Diseases targeted for elimination	
Leprosy	Any person with skin patch of a lighter colour with diminished or loss of sensation
Neonatal tetanus	Any newborn who is normal at birth and then, after 2 days, becomes unable to suck or feed
Lymphatic filariasis	In an endemic area, any person who suffers from any of the following: ▪ Repeated attacks of fever with painful swellings in the groin, testes, leg, breast or vulval area ▪ Swollen legs (elephantiasis) ▪ Swollen scrotum (hydrocoele)
Diseases of special public health focus	
Severe malaria	Any person who has an illness with high fever and a danger sign (Danger signs are severe pallor, lethargy, unconsciousness, confusion, sleeping all the time, yellowing of the eyes, passing dark or coca-cola urine, vomits everything, convulsions, inability to sit or stand and, in children less than 5 years, inability to drink or breastfeed)
Tuberculosis	Any person with cough for 3 weeks or more

Other diseases of public health importance	
Buruli ulcer	Any person who develops a firm, painless, often itchy swelling or an extensive swelling with/without colour change over the affected skin in a place where a lot of residents suffer from big sores with undermined edges and “dirty cotton wool-like” centre on different parts of the body in endemic areas
Diarrhoea in children less than 5 years of age	Any child that has passed 3 or more watery stools within the past day
Viral hepatitis	Any person with fever and yellow discoloration of the eyes
Pneumonia in children less than 5 years of age	Any child less than 5 years of age with cough and fast breathing or difficulty breathing
Onchocerciasis	Skin rash and nodules
Urinary schistosomiasis	Any person passing blood during or after urination
Trachoma	Any person with repeated discharge and redness of the eyes or the in-turning of the eyelids or the eyelashes rubbing on the eyes.
Yaws	Any person with small swellings on the skin looking like a boil which when peeled off, results in bleeding of the area instead of discharge of pus.

List of District Reporting Sites

Record information for contacting the health staff who provide information about surveillance and outbreak detection to the district. For example, include community health workers, trained birth attendants, village leaders and public safety officials.

Name of health facility or point of patient contact with health service	Address or location of facility or point of contact	Designated focal person for surveillance and response	Telephone or facsimile number (or other contact information such as e-mail)

Laboratory Tests for Confirming Priority Diseases and Conditions

Laboratory testing to confirm diagnoses of infectious diseases is essential to the surveillance and response process. Laboratory results are used to:

- Accurately diagnose illness in and thus treat an individual patient, and
- Verify the cause (or etiology) of a suspected outbreak and thus allow for the most appropriate public health response.

Therefore, it is important that specimens arrive in the laboratory in good condition so that processing provides reliable results and does not need to be repeated. This means that specimens should be collected safely, stored in an appropriate medium and kept within a specific temperature range.[8] Delays between collecting the specimen and processing it at the laboratory should be minimal, so that health personnel can respond promptly. In some cases, implementing public health measures even before the laboratory confirmation is complete may be necessary.

The reference chart on the following pages lists recommended laboratory tests for confirming priority diseases and conditions. The table contains information about:

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

The chart is intended for use as a rapid reference chart when suspected priority diseases or conditions are reported from the health facility or when a suspected outbreak is reported. Refer to the disease-specific guidelines in Section 9 for additional information about confirming outbreaks of priority diseases and conditions.

[8] Many factors can affect the reliability of interpretation of a laboratory test report. For example, results are difficult to interpret when:

- A serum specimen has been collected inappropriately and becomes hemolyzed.
- There has been a delay in transportation or refrigeration resulting in bacterial overgrowth in the collected specimen.
- The storage medium is not adequate, causing reduced viability of the suspected organism or antibody.
- The specimens are not plated on the appropriate media or expired reagents.

A positive result for serum IgM or isolation of pathogens from any sample (blood, serum, urine, cerebral spinal fluid [CSF] or tissue) usually confirms a suspected condition. In situations when a negative result is received for testing of serum IgM or viral isolation, repeating the laboratory test may be indicated.

Table A-3: Specimens for laboratory confirmation for priority diseases at the district level

Suspected disease or condition	Diagnostic test	Specimen	When to collect	How to prepare, store and transport	Results
Acute flaccid paralysis (polio) **REFERENCE:** WHO global action plan for laboratory containment of wild polio viruses. WHO/V&B/99.32, Geneva, 1999 Manual for the virological investigation of polio WHO/EPI/GEN/97.01 Geneva, 1997	Isolation of polio virus from stool	Stool **Note:** If no specimen is collected, re-evaluate patient after 60 days to confirm clinical diagnosis of polio (AFP).	Collect a sample from every suspected AFP case. Collect the first specimen when the case is investigated. Collect a second specimen on the same patient 24 hours later.	▪ Place stool in clean, leakproof container and label clearly. ▪ Immediately place in refrigerator or cold box not used for storing vaccines or other medicines. ▪ Transport specimens so they will arrive at designated polio laboratory within 72 hours of collection. ▪ When there is a delay, and specimen will not be shipped within 72 hours, freeze specimen at -20°C or colder. Then transport frozen specimen with dry ice or cold packs also frozen at -20°C or colder.	Preliminary test results are usually available 14-28 days after receipt of specimen by the laboratory. If wild polio virus is detected, the national programme will plan appropriate actions.
Buruli ulcer	Isolation of *Mycobacterium Ulcerans* from ulcer.	Wound swab OR Tissue from the ulcer	Collect the specimen for one case if diagnosis uncertain.	▪ If sending directly to the lab, place swab or tissue in a dry clean test tube and transport at room temperature. ▪ If sending to lab within 6 hrs of collection, place swab or tissue in about 2 mls of saline in a clean test tube. ▪ When there will be a delay of about 2 or more days, keep in the refrigerator at 4-8°C.	Zeihl-Neelsen (ZN) staining and microscopy should be completed **within 24 hours** of arrival of specimen in the laboratory. Culture and sensitivity results should be ready in **6-9 weeks** of arrival at the laboratory.

Suspected disease or condition	Diagnostic test	Specimen	When to collect	How to prepare, store and transport	Results
Cholera **REFERENCE:** "Laboratory Methods for the Diagnosis of Epidemic Dysentery and Cholera". CDC/WHO, 1999 CDC, Atlanta, GA, USA	Isolate *V. cholerae* from stool culture and determine O1 serotype using polyvalent antisera for *V. cholerae* O1. If desired, confirm identification with Inaba and Ogawa antisera. If specimen is not serotypable, consider, *V. cholerae* O139 (see note in Results column	Liquid stool or rectal swab	Collect stool sample from the first suspected cholera case. If more than one suspected case, collect until specimens have been collected from 5 to 10 cases. Collect stool from patients fitting the case definition and: ▪ onset within last 5 days, and ▪ before antibiotics treatment has started. **Do not delay treatment of dehydrated patients.** Specimens may be collected after rehydration (ORS or IV therapy) has begun.	▪ Place specimen (stool or rectal swab) in a clean, leakproof container and transport to lab within 2 hours. ▪ If more than 2-hour delay is expected, place stool-soaked swab into Cary-Blair transport medium. If Cary-Blair transport medium is not available and specimen will not reach the lab within 2 hours: ▪ Store at 4°C to 8°C ▪ Do not allow specimen to dry. Add small amount of 0.85% NaCl if necessary. ▪ To ship, transport in well marked, leakproof container. ▪ Transport container in cold box at 4°C to 8°C. Cary-Blair transport medium is stable and usually good for at least one year after preparation. It does not require refrigeration if kept sterile and in properly sealed container. If color changes (medium turns yellow) or shrinks (depressed meniscus), do not use the medium.	Cholera tests may not be routinely performed in all laboratories. Culture results usually take **2-4 days** after specimen arrives at the laboratory. The O139 serotype has not been reported in Africa and only in a few places in southwest Asia. Serological determination of Ogawa or Inaba is not clinically required. It is also not required if polyvalent antisera results are clearly positive.

Suspected disease or condition	Diagnostic test	Specimen	When to collect	How to prepare, store and transport	Results
Diarrhoea with blood *(Shigella dysenteriae* type 1 (SD1) and other shigellae **Note:** SD1 infections are epidemic-prone and associated with high levels of antibiotic resistance. SD1 is the most significant of the shigellae due to the high levels of mortality in the young and elderly and due to its association with hemolytic uremic syndrome (HUS). **REFERENCE:** "Laboratory Methods for the Diagnosis of Epidemic Dysentery and Cholera". CDC/WHO, 1999 CDC, Atlanta, GA, USA	Isolate SD1 in culture to confirm shigella outbreak. If SD1 is confirmed, perform antibiotic sensitivity tests with appropriate drugs. After confirmation of an initial 5-10 cases in an outbreak, sample only a small number of cases until the outbreak ends. Refer to disease-specific guidelines in Section 9 for additional information about the epidemic potential of *Shigella dysenteriae* 1	Stool or rectal swab.	Collect sample when an outbreak is suspected. Collect stool from 5-10 patients who have bloody diarrhoea and: • Onset within last 4 days, and • Before antibiotic treatment has started. Preferably, collect stool in a clean, dry container. Do not contaminate with urine. Sample stool with a swab, selecting portions of the specimen with blood or mucus. If stool cannot be collected, obtain a rectal swab sample with a clean, cotton swab.	• Place stool swab or rectal swab in Cary-Blair transport medium. Transport to laboratory refrigerated. • If Cary-Blair not available, send sample to lab within 2 hours in a clean, dry container with a tightly fitting cap. Specimens not preserved in Cary-Blair will have significant reduction of shigellae after 24 hours. ▪ If storage is required, hold specimens at 4C to 8C, do not freeze.	Culture results are usually available **2-4 days** after receipt by the laboratory. SD1 isolates should be characterized by antibiotic susceptibility.
Dracunculiasis	**Routine laboratory confirmation for surveillance is not required.**				
HIV/AIDS **REFERENCE**: Guidelines for Second Generation HIV Surveillance, WHO and UNAIDS, 2000 WHO/CDC/CSR/EDC/2000.5	ELISA for HIV PLUS Rapid Agglutination Test OR Two different ELISA tests	Serum	Collect sample when diagnosis is required for clinical or epidemiological purposes.	**Use universal precautions to minimize exposure to sharps and any body fluid. Collect 5-10 mls of venous blood.** ▪ Let clot retract for 30 to 60 minutes at room temperature or centrifuge to separate serum from red blood cells. ▪ Aseptically pour off serum into sterile, screw-capped tubes. ▪ Store serum at 4°C. ▪ Transport serum samples using appropriate packaging to prevent breakage or leakage.	HIV testing is highly regulated with strict controls on release of information. Results are usually available within **one week** from arrival in the laboratory.

Suspected disease or condition	Diagnostic test	Specimen	When to collect	How to prepare, store and transport	Results
Lymphatic filariasis	▪ Antigen Detection Assay-Immuno Chromatography Test (ICT) for filarial antigens OR	Peripheral blood	Specimen can be collected at any time.	*For ICT test:* ▪ Firmly prick the middle finger of the patient with a lancet. ▪ Fill a 100 µL glass capillary with the blood. Try not to get air bubbles in the tube by holding the tube level with the finger ▪ Place the blood drop by drop onto the bottom of the ICT test card ▪ Wait for a minute for blood to soak into the pad and close it so that both sides stick firmly together	*For ICT test:* Results should be ready within **5 mins.** Negative – 1 pink line Positive – 2 pink lines Test faulty and must be repeated – no pink line
	▪ Blood film microfilaria		Specimen should be taken during the night between 10 p.m to 2.00 a.m.	*For blood film:* ▪ Collect 20 µL of blood and make a thick smear. ▪ Air dry. ▪ Carry out giemsa staining.	*For blood film:* Thick smear results should be ready within **30 mins** of collecting blood sample
Severe malaria **REFERENCE:** "Basic Laboratory Methods in Medical Parasitology" WHO, Geneva, 1991	▪ Presence of malarial parasites in blood films for suspected cases admitted to inpatient facility	Blood Usually finger-stick sample	*For blood smear:* prepare blood film for all suspected cases admitted to inpatient facility, or according to national malaria case management guidelines.	*For blood smear:* Collect blood directly onto correctly cleaned and labeled microscope slides and prepare thick and thin smears. ▪ Allow smears to dry thoroughly. ▪ Stain using the appropriate stain and technique. ▪ Store stained and thoroughly dried slides at room temperature out of direct sunlight.	Thick and thin smear results can be available **the same day** as preparation. Microscopic examination of malarial slides may also reveal the presence of other blood-borne parasites.
	▪ Hematocrit or hemoglobin for suspected malaria in children 2 months to 5 years in age.	Fingerprick or other accepted method for collecting blood from young children	*For hematocrit or hemoglobin*: In the inpatient setting, perform a laboratory test confirming severe anaemia.	*For hematocrit or hemoglobin:* Collect specimen according to instructions in national guidelines.	

Suspected disease or condition	Diagnostic test	Specimen	When to collect	How to prepare, store and transport	Results
Measles **REFERENCE:** WHO Guidelines for Epidemic Preparedness and Response to Measles Outbreaks WHO/CDS/CSR/ISR/99.1	Presence of IgM antibodies to measles virus in serum.	Serum	Collect blood samples on 5 suspected measles cases when the number of cases exceeds the measles outbreak threshold (usually more than 5 cases in a facility in a district per week). *In countries with an elimination target:* ▪ Collect specimen from every suspected case of measles ▪ Collect serum for antibody testing at first opportunity or first visit to the health facility.	▪ For children, collect 1 to 5 ml of venous blood depending on size of child. Collect into a test tube, capillary tube or microtainer. ▪ Separate blood cells from serum: – Let clot retract for 30 to 60 minutes at room temperature. Centrifuge at 2000 rpm for 10-20 minutes and pour off serum into a clean glass tube. – If no centrifuge, put sample in refrigerator overnight (4-6 hours) until clot retracts. Pour off serum the next morning. ▪ If no centrifuge and no refrigerator, let blood sit at an angle for at least 60 minutes (without shaking or being driven in a vehicle). ▪ To prevent bacterial overgrowth, ensure that the serum is poured into a clean glass test tube. The test tube does not need to be sterile, just clean. ▪ Avoid shaking of specimen before serum has been collected. ▪ Store serum at 4°C. ▪ Transport the serum in an EPI hand vaccine carrier at 4°C to 8°C to prevent bacterial overgrowth (up to 7 days). If not refrigerated, serum stored in a clean tube will be good for at least 3 days. ▪ Transport serum samples using appropriate packaging to prevent breaking or leaks during transport. ▪ The specimen should arrive at the laboratory within 3 days of being collected.	Results are usually available after 7 days. If as few as two of five suspected measles cases are laboratory confirmed, the outbreak is confirmed.

Suspected disease or condition	Diagnostic test	Specimen	When to collect	How to prepare, store and transport	Results
Meningitis **REFERENCE:** "Laboratory Methods for the Diagnosis of Meningitis Caused by *Neisseria meningitis, Streptococcus pneumoniae and Haemophilus influenzae*". WHO document WHO/CDS/EDC/99.7 WHO, Geneva	Microscopic examination of CSF for Gram negative diplococci Culture and isolation of *N. meningitis* from CSF. This is technically difficult. Latex slide agglutination test of CSF for *N. meningitis*	Cerebral spinal fluid (CSF) **Note:** CSF is the specimen of choice for culture and microscopic exam. If CSF not available, collect blood (10 ml adults, 1-5 ml for children) for culture.	Collect specimens from 5 to 10 cases once the alert or action threshold (see "Meningitis" in Section 9) has been reached. Collect sample before the administration of antibiotics	▪ Prepare the patient and aseptically collect CSF into sterile test tubes with tops. ▪ Immediately place 1 ml of CSF into a pre-warmed bottle of trans-isolate medium. Trans Isolate medium (TI) is stable. If properly stored at refrigerator temperature (4°C) it can be kept for up to two years after preparation. In the refrigerator, the liquid phase turns gelatinous but reliquifies at room temperature. Unused TI bottles should be kept tightly sealed. If there is any color change (yellowing or clouding of the liquid medium) or obvious drying or shrinkage of the agar slant, the medium should not be used. ▪ Incubate at body temperature (36°C to 37°C). ▪ Never refrigerate specimens that will be cultured. ▪ Keep CSF for microscopic exam and chemistry in the original syringe (replace cap). Refrigerate the capped syringe and send it to the laboratory as soon as possible.	Isolation of *Neisseria meningidis*, a fastidious organism, is expensive, and difficult. It requires excellent techniques for specimen collection and handling and expensive media and antisera. Initial specimens in an outbreak or for singly occurring isolates of *N. meningitis* should be serotyped and an antibiogram performed to ensure appropriate treatment. Results for microscopy and latex slide agglutination test should be ready **within 30 minutes**. Culture and sensitivity results should be available **within 72 hours.**
Neonatal tetanus	**Laboratory confirmation is not required.**				

Suspected disease or condition	Diagnostic test	Specimen	When to collect	How to prepare, store and transport	Results
Onchocerciasis	**Routine laboratory confirmation for surveillance is not required.**				
Schistosomiasis	Prescence of S. *haematobium* eggs in urine OR Prescence of S. *mansoni* stool.	Urine Stool	Collect sample when diagnosis required for clinical and epidemiological purposes	Collect sample into clean bottle. Should be transported at room temperature to the lab within 2 hours	Results should be ready **within 24 hours.**
Sexually transmitted infections (STIs)	**Routine laboratory confirmation for surveillance is not required.**				
Trypanosomiasis	**Routine laboratory confirmation for surveillance is not required.**				
Tuberculosis (Smear positive pulmonary tuberculosis) **REFERENCE:** Laboratory Services in Tuberculosis Control, Parts I, II and III. WHO publications WHO/TB/98.258	Presence of acid fast bacillus (AFB) in Ziehl Neelsen stained smears	Deep-chest sputum	Collect sputum (not saliva) for direct smear microscopy and examine at least two stained specimens taken on different days.	Smear should be examined at health facility where the specimen is taken.	TB microscopy results should be ready **within a day**. Quantification of observed mycobacteria are reported using various reporting methods. Refer to the criteria used by the examining laboratory.
Viral hemorrhagic fevers (VHF) **REFERENCES:** Infection Control for Viral Hemorrhagic Fevers in the African Health Care Setting WHO/EMC/ESR/98.2 Viral Infections of Humans; Epidemiology and Control. 1989. Evans, A.S. (ed). Plenum Medical Book Company, New York	Presence of IgM antibodies against Ebola, Marburg, CCHF, Lassa or Dengue fever OR Presence of Ebola in post-mortum skin necropsy	*For ELISA*: Whole blood, serum or plasma *For PCR*: Whole blood or blood clot, serum/plasma or tissue *For Immunohisto-chemistry:* Skin or tissue specimens from ***fatal*** cases	Collect specimen from the first suspected case. If more than one suspected case, collect until specimens have been collected from 5 to 10 suspected cases.	**Handle and transport specimens from suspected VHF patients with extreme caution. Wear protective clothing and use barrier precautions.** *For ELISA or PCR:* ▪ Refrigerate serum or clot. ▪ Freeze (-20C or colder) tissue specimens for virus isolation. *For Immunohistochemistry:* ▪ Fix skin snip specimen in formalin. Specimen can be stored up to 6 weeks. The specimen is not infectious once it is in formalin. ▪ Store at room temperature. ▪ Formalin-fixed specimens may be shipped at room temperature.	Diagnostic services for VHF are not routinely available. Advance arrangements are usually required for VHF diagnostic services. Contact the National Surveillance Unit or WHO.

Suspected disease or condition	Diagnostic test	Specimen	When to collect	How to prepare, store and transport	Results
Viral hepatitis	Detection of presence of antigen in serum by means of Latex Agglutination Test OR ELISA Test	Serum	Collect sample when diagnosis is required for clinical or epidemiological purposes.	1. **Use universal precautions to minimize exposure to sharps and any body fluid.** 2. Collect 5-10 mls of venous blood. ▪ Let clot retract for 30 to 60 minutes at room temperature or centrifuge to separate serum from red blood cells. ▪ Aseptically pour off serum into sterile, screw-capped tubes. ▪ Store serum at 4°C. 3. Transport serum samples using appropriate packaging to prevent breakage or leakage.	Results are usually available within **24 hours** from arrival in the laboratory
Yaws	**Routine laboratory confirmation for surveillance not required.**				

Suspected disease or condition	Diagnostic test	Specimen	When to collect	How to prepare, store and transport	Results
Yellow fever **REFERENCES:** District guidelines for Yellow Fever Surveillance, WHO/ GPVI/EPI/98.09 Yellow Fever. 1998. WHO/ EPI/Gen/98.11	ELISA for the presence of yellow fever IgM antibodies	Serum	Collect specimen from the first suspected case of yellow fever. If more than 1 suspected case, collect until specimens have been collected from 5 to 10 suspected cases.	▪ Collect 10 ml of venous blood from adults, 1-5 ml from children. In a standard glass test tube, capillary tube or vacutainer: ▪ Separate blood cells from serum: – Let clot retract for 30 to 60 minutes at room temperature. Centri fuge at 2000 rpm for 10–20 minutes and pour off serum into a clean glass tube. – If no centrifuge, put sample in refrigerator overnight (4–6 hours) until clot retracts. Pour off serum the next morning. – If no centrifuge and no refrigerator, let blood sit at an angle for at least 60 minutes (without shaking or being driven in a vehicle. Pour off serum into a clean tube. ▪ Avoid shaking of specimen before serum has been collected. ▪ Store serum at 4°C. ▪ To prevent bacterial overgrowth, ensure that the serum is poured into a clean glass test tube. The test tube does not need to be sterile – just clean. ▪ Transport the serum in an EPI hand vaccine carrier at 4°C-8°C to prevent bacterial overgrowth (up to 7 days). If not refrigerated, serum stored in a clean tube will be good for at least 3 days. Transport serum samples using appropriate packaging to prevent breaking or leaks during transport. The specimen should arrive at the laboratory within 3 days of being collected.	Laboratory results are usually available within 3 days.

List of Laboratories for Confirming Priority Diseases and Conditions

Periodically update the list of laboratories or those specified by the national level for confirming priority diseases in your district. Also record whom to contact for assistance.

Name of disease	Available laboratory tests	Name, address, and phone number for laboratory contact

Maintaining Clinic Registers for Recording Priority Diseases and Conditions

Each health facility should maintain registers for recording cases of priority diseases and conditions seen in the health facility. At a minimum, the clinic register should have spaces for recording the following information:

Outpatient

- The patient's serial number
- The patient's name
- The patient's age
- The patient's sex
- The patient's address (residence/town)
- The patient's principal diagnosis
- Other diagnoses
- Laboratory results, if case was confirmed with laboratory specimen
- The date the patient was seen
- The patient's treatment or outcome
- Remarks relevant to patient's disease, treatment or outcome

Inpatient

- The patient's serial number
- The patient's name
- The patient's age
- The patient's sex
- The patient's address (residence/town)
- The patient's principal diagnosis
- Other diagnoses
- Laboratory results, if case was confirmed with laboratory specimen
- The date the patient was admitted
- The date the patient was discharged
- Treatments the patient received
- Surgical procedures the patient received
- Cost of treatment
- Outcome of admission (alive, dead, absconded, referred, unknown)
- Remarks relevant to patient's disease, treatment or outcome

Case-based Surveillance Report Form

Immediately reportable diseases targeted for eradication and elimination – acute flaccid paralysis, neonatal tetanus and dracunculiasis (guinea worm disease) – have their own forms on which to report information about individual cases of the diseases. A more generic case-based reporting form is to be used for all diseases of epidemic potential: cholera, diarrhoea with blood[9], measles, meningitis, viral hemorrhagic fevers, yellow fever, and diseases of unknown aetiology.

If the health facility suspects a case of these diseases or conditions, health facility staff should contact the district immediately by telephone, facsimile, e-mail or other prompt communication, and send the form as a follow-up to the verbal report.

The sample form on the next page has two sections. In the first part of the form (items 1-16), the health facility or district records information about the individual case. This information can be used to plan a more detailed case investigation. A copy of this section should be sent with any specimen that is sent to a laboratory for testing.

The second part of the form (items 17-24) is a laboratory transmittal slip. The first two items (17-18) are completed by the facility that collects and submits the specimen. The remaining items (19-24) record laboratory results and information about the timeliness of the laboratory testing.

Specific instructions for completing the form follow the form.

[9] *Not every case of bloody diarrhoea is reported. Use the case-based form as a laboratory test request form to obtain laboratory testing of a stool sample when a Shigella dysenteriae-type outbreak is suspected either because there has been a death of an adult patient who had diarrhoea with blood, or when a reporting threshold has been reached. Please see disease specific guidelines in Section 9 for guidance on when to report a suspected outbreak of shigella.

Case-based surveillance reporting form
(from health facility/worker to district health team and laboratory)

1. District Case ID No.:

2. _____ _____ _____ _____

Reporting Health Facility | Sub-district | District | Region

3. Disease: ☐ Cholera ☐ Diarrhea with Blood/Shigella ☐ Measles ☐ Meningitis ☐ Viral Hemorrhagic Fever ☐ Yellow Fever _____ Other

---

4. Name of patient: _____ **5. Date of birth:** _____/_____/_____ **Age:** **(If DOB unknown)** _____ **years** _____ **months**

6. Sex: ☐ M=Male F=Female

7. Patient's residence: Community/Sub-district _____ **Urban/Rural:** ☐ U=Urban R=Rural

Town/City: _____ **District of residence:** _____

8. Locating information:_____
(If applicable, name of mother and father if neonate or child/landlord)

---

9. Date seen at health facility: _____/_____/_____

(For cases of measles, yellow fever, and meningitis)

12. Number of vaccine doses received ☐ 9=unknown
(For measles, YF–documented by card. For meningitis, by history.)

10. Date health facility notified district: _____/_____/_____

11. Date of onset: _____/_____/_____ **Date of last vaccination:** _____/_____/_____
(measles, yellow fever, and meningitis only)

Additional variable_____ **13. In/Outpatient:** ☐ 1=Inpatient 2=Outpatient **14. Outcome:** ☐ 1=Alive 2=Dead 9= unknown

Additional variable _____

15. Person completing form **Name:** _____

Signature: _____ **Date sent form to district:**_____/_____/_____

Date: _____

16. Final classification: ☐
(To be completed by district)
1=Confirmed (Lab test Pos)
2=Discarded (Lab test Neg.)
3=Suspected (Lab test Not Done)

If laboratory specimen collected

For health facility: If lab specimen is collected, complete the following information. And send a copy of this form to the lab with the specimen.

17. Date of specimen collection: _____/_____/_____
Date specimen sent to lab: _____/_____/_____
Time specimen sent to lab: _____/_____/_____

18. Type of Specimen: Stool Blood CSF _____ Other

For the laboratory: Complete this section and return the form to district team and clinician.

19. Date specimen received by lab: _____/_____/_____
Time specimen received by lab: _____/_____/_____

20. Specimen condition: Adequate Not adequate (Circle as appropriate)

21. Results: Circle below as appropriate:

Disease/ Condition	Type of test	Results (+ve=positive) (-ve=negative)	Disease/ Condition	Type of test	Results
Cholera	Culture	+ve -ve	Yellow Fever	IgM	+ve -ve
	Direct Exam	+ve -ve _____ Method used for Direct Exam	Measles	IgM	+ve -ve
Meningitis	Culture	+ve -ve	Rubella	IgM	+ve -ve **Virus detection**
N. meningitidis*	Culture	+ve -ve	RVF	IgM	+ve -ve +ve -ve
S. pneumonia	Culture	+ve -ve	Ebola	IgM	+ve -ve +ve -ve
H. influenza	Latex	+ve -ve	CCHF	IgM	+ve -ve +ve -ve
N. meningitidis	Latex	+ve -ve	Lassa	IgM	+ve -ve +ve -ve
S. pneumonia	Latex	+ve -ve	Marburg	IgM	+ve -ve +ve -ve
H. influenza	Culture	SD type 1 Other shig No shig			
Shigella Dysenteriae	Culture	+ve -ve			
Plague	IFA>1: 64	+ve -ve			

* If N. meningitidis is +ve specify serotype _____

Other lab results: _____

22. Date lab sent results to district: _____/_____/_____

23. Name of lab sending results:_____ **Other pending tests**: _____

Name of person reporting:_____

Signature of person reporting:_____

24. Date district received lab results: _____/_____/_____ **Date lab results sent to clinician by district**: _____/_____/_____

NOTE: District is responsible for ensuring lab results get to clinicians. Failure to do so will undermine cooperation with clinicians on reporting of cases in the future.

Instructions for completing case-based surveillance report form

To be completed by the district (items 1 and 16) and health facility (items 2-15, also items 17-18 if laboratory specimen collected):

1. Record the unique identification number (ID number) for the case in the field for "ID number".

2. Complete the name of the health facility submitting the case-based reporting form. Record the name of the district and region that is receiving the report.

3. Tick the box at the top of the form to indicate which disease is being reported. If the disease or condition is not stated, or its cause is unknown, write the name of the disease or condition (or "unknown") in the blank marked "Other".

4. Record the name of the patient.

5. Record the patient's date of birth; if exact date of birth is not known, record the patient's age.

6. Record "M" for Male, and "F" for Female.

7. Record information about the patient's residence. Include the name of the community or neighborhood where the patient lives. Also include the name of the sub-district and district where the patient lives.

8. Record information about how to contact the patient or the patient's parents for use at a later time when additional information about the patient's illness may be needed.

9. Record the date the patient was seen at the health facility.

10. Record the date the health facility reported the disease or condition to the district.

11. Record the date of onset of the disease, if known.

12. For vaccine-preventable diseases such as measles, meningitis and yellow fever, obtain the patient's immunization history for the reported illness. Record the number of vaccine doses received by the patient for that illness and the date of the last immunization dose. Do not count doses that were received within the last 15 days. If the immunization was received within the last 15 days, there may not have been an immunization response.

For meningitis, record if there is a history of vaccination during a mass campaign.

13. Report whether the patient was an outpatient or inpatient at the time the case was reported.

14. Record whether the patient was living or deceased at the time the report was made. If the patient's illness is reported and the patient later dies, inform the district. The district can change the status on the form.

15. The health facility staff member who completes the form should sign his or her name, the date the form was filled and also the date the form was sent to the district.

16. When the investigation of the case is complete, the district should record the "Final Classification".

    - "Confirmed" means lab result was positive for the disease agent being investigated.
    - "Discarded" means lab results were negative.
    - "Suspected" means the diagnosis was based solely on clinical signs and symptoms and lab investigations were not carried out.

If no laboratory specimen is collected, the form is complete.

If a laboratory specimen is taken, complete items 17-18 in the second section of the form and send a copy of the entire form to the laboratory with each specimen.

17. Record the date the specimen was collected and the date and time the specimen was sent to the laboratory.

18. Circle what type of specimen was collected (blood, CSF, stool).

To be completed by the laboratory (items 19-23) and by the district (item 24):

19. Record the date the laboratory received the specimen.

20. Record the condition of the specimen upon arrival at the laboratory. If the specimen arrives in poor condition, inform the health facility promptly to let them know a useful laboratory result will not be obtainable. They may decide to send another specimen. The laboratory should give guidance in ensuring the specimen arrives in adequate condition. (See Annex 5 for information about ensuring the quality of specimens.)

21. Record the results of the laboratory testing according to the prompts on the bottom part of the form by circling as appropriate (+ve - positive; - ve - negative; p- pending etc.).

22. Record the date the results were sent (verbally or in writing) to the district.

23. Record the name of the laboratory, the name and signature of the person sending the results.

24. Record the dates the results were received by the district and by the clinician at the health facility.

At the district:

Send a complete case-based reporting form (including laboratory results) to the regional level for data entry and analysis.

Line List for Reporting Case-based Information When Several Cases Occur During a Short Period

(For reporting from health facility to district and for use during outbreaks)

(1) Health facility: _____ Sub-district_____ District_____ Region_____
(2) Date form completed_____ **(4)** Date received at district: _____
(3) Disease/Condition: _____

(5) ID Number (assigned at the district level only) 001, 002, etc.	**(6)** **(O)**ut/ **(I)**n Patient	**(7)** **Patient name**	**(8)** **Place of residence**		**(9)** **Sex**	**(10)** Age (in years or in months if <12 months old)	**(11)** Date seen at health facility	**(12)** Date of onset of disease	**(13)** No. of doses of vaccines received	**(14)** Laboratory Tests		**(15)** Outcome **(A)**live **(D)**ead **(U)**nknown **(R)**eferred	**(16)** Comments
			Community/ Suburb/ Town	Sub-district						Date specimen taken (if specimen not taken then fill NA)	Results of lab tests (+ve or –ve, Ind or NA)		

(5) If district sends specimen to the lab, use district-assigned ID number (RRR-DDD-YY-oox format) as well as patient name to identify lab specimen. If health facility sends lab specimen to lab without passing through the district, then patient name (only) will be the lab specimen identifier
(13) Exclude any doses given within 15 days of onset of illness.
(14) NA = Not Applicable; Ind = Indeterminate
(16) Comments could include remarks such as "sister to case No. GAR-DAW-01-002. Live together", "update record". Other comments could include specimen condition, and serotype of pathogen.
NOTE: If previously reported cases die, update the status by completing a new row with "died" in the status column and "update record" in the Comments column.
(17) Name of person reporting: _____ Signature: _____ Date: ____/____/____

Instructions for completing line list form

To be completed by the health facility:

1. Complete the name of the health facility and sub-district by submitting the form. Record the name of the sub-district, district and region that is receiving the report.

2. Indicate the date the form is completed.

3. Record the disease or condition which is being reported. If the disease or condition is not stated, or its cause is unknown, write "unknown" in the field for "Disease/Condition".

To be completed by the district:

4. Record the date that the line list is received at the district level.

5. Assign and record the unique identification number (ID number) for the case. The ID number should have 11 fields as follows:

   - The first 3 **letters** should represent the unique regional code
   - The second 3 **letters** should represent the unique district code
   - The third 2 **numbers** should represent the year of reporting
   - The last 3 **numbers** should represent the numerical position of that particular case for a specific disease for the year of reporting.

   For example, if the last time a case of meningitis was reported in Dangme West District was December 2000, and it was the 30th case in that year, it would be have the number GAR-DAW-00-030. A first case of meningitis reported in the year 2001 will have the number GAR-DAW-01-001. On the other hand if the last time a case was reported was January 2001, and it was the 30th case since the first of the year, it would be reported in February 2001 as GAR-DAW-01-031. In other words, for every disease, numbering starts from 001 at each New Year.

6. Record whether the patient is an inpatient or outpatient at the time the case is reported by indicating "I" for inpatient and "O" for outpatient.

7. Record the name of the patient.

8. Record information about the patient's place of residence. Include the name of the sub-district and the community/town/suburb where the patient lives.

9. Record "M" for Male, and "F" for Female.

10. Record the patient's age in years, or in months if the patient is less than 12 months old.

11. Record the date the patient is seen at the health facility.

12. Record the date of onset of the disease.

13. For vaccine-preventable diseases such as measles, meningitis and yellow fever, obtain the patient's immunization history for the reported illness. Record the number of vaccine doses received by patient for that illness and the date of the last immunization dose. Do not count doses that were received within the last 15 days. If the immunization was received within the last 15 days, there may not have been an immunization response.

    For meningitis, record if there is a history of vaccination during a mass campaign.

14. Record information on laboratory tests. Record the date specimen was taken. If no specimen is taken "NA" for Not Applicable. Also record the results of the laboratory tests carried out by indicating "+ve" for positive results and "-ve" for negative, "Ind" for indeterminate results and "NA" for not applicable, if no specimen was taken.

15. Record the outcome of the case at the time of reporting. Indicate the status of the patient with "A" for alive, "D" for dead, "R" for referred and "U" for when status of patient is unknown.

16. Record any comments. This could include remarks such as "sister to case no. RRR-DDD-YY-002". Other comments could include specimen condition and the serotype of pathogen. Where the status of a case previously reported is being updated, the remark "updated record" should be noted.

17. The name and signature of the person completing the form should be recorded.

Weekly Notifiable Disease Report Form

Health facility: _____ **Sub-district:** _____ **District:** _____ **Region:** _____

Week beginning Sunday _____/_____/_____

Week ending Saturday _____/_____/_____ **Year:** _____

Reporting site (Health Facility/ District/Region)	CHOLERA		MEASLES		MENINGITIS	
	Cases*	Deaths	Cases*	Deaths	Cases*	Deaths
Total						

* Report zero (0) when no cases of disease are seen in reporting period.

Name of person reporting: _____

Signature: _____

Date: _____/_____/_____

Monthly Communicable Disease Surveillance Report Form

Record by patient's outpatient/inpatient status the total number of cases and total number of deaths for each disease/condition diagnosed during the reporting month. Record zero (0) when no cases of the disease/condition are seen during the month. Report these totals to the next level.

Year: _____ Month: _____

Health facility: _____ Sub-district: _____ District: _____ Region: _____

Total Number of Patients Seen			
Disease/Condition	**Outpatient Cases***	**Inpatient**	
		Cases*	**Deaths**
Uncomplicated malaria < 5yrs clinical			
Uncomplicated malaria 5yrs and above clinical			
Uncomplicated malaria < 5yrs lab-confirmed			
Uncomplicated malaria 5yrs and above, lab-confirmed			
Severe malaria < 5yrs			
Severe malaria 5 yrs and above			
Inpatient malaria with severe anaemia (<5 years) Hb < 5g/dl			
Malaria in pregnant women clinical			
Malaria in pregnant women lab-confirmed			
Pneumonia (<5 years)			
Severe pneumonia (< 5 years)			
Diarrhoea with some dehydration (<5 years)			
Diarrhoea with severe dehydration (<5 years)			
HIV/AIDS			
Male urethral discharge			
Male genital ulcer			
Female genital ulcer			
Diarrhoea with blood			
Viral hepatitis			
Trachoma < 10yrs			
Trachoma 10+yrs			
Urinary schistosomiasis			
Infectious yaws < 15yrs			
Infectious yaws 15+yrs			
Lymphatic filariasis-Lymphoedema (Elephantiasis)			
Lymphatic filariasis-Hydrocele			
Onchocerciasis			

* Report zero (0) when no cases of disease are seen in reporting period.

No. of health facilities supposed to report: ___ No. of sites that reported on time: ___ No. of sites that reported late: ___

Total immediately reportable cases previously reported this month on case-based forms or line lists

Disease	No. of cases*	No. of deaths	Disease	No. of cases*	No. of deaths	Disease	No. of cases*	No. of deaths
AFP			Measles			Yellow fever		
Cholera			Meningitis			Viral hemorrhagic fever		
Dracunculiasis (guinea worm)			Neonatal tetanus					
Other disease (specify			Other disease (specify)			Other disease (specify)		

* Report zero (0) when no cases of disease are seen in reporting period.

Analysis, interpretations, comments and recommendations on both outpatient and inpatient data

Other information:

Look at the trends in the District Analysis Book. Comments on observed trends? Abnormal increase in cases, deaths or case fatality ratios? Lack of decrease of previous increasing trends? Improving trends?

Conclusions, actions taken and recommendations:

Date sent: _____ Date received: _____

Person reporting: _____ Person receiving: _____

Some dehydration, severe dehydration, pneumonia and severe pneumonia are defined according to WHO Integrated Management of Childhood Infections (IMCI) definitions. TB, leprosy and Buruli ulcer data reported quarterly on separate forms.

Leprosy Quarterly Report Form

Year _____ Quarter _____

Health facility: _____ Sub-district: _____ District: _____ Region: _____

Category	Indicators	Clinical form of leprosy		Total
		Multibacillary	Paucibacillary	
Total cases under treatment during the quarter	Total cases being treated during the quarter			
Incoming cases seen during the quarter	Total new cases never treated (=detection)			
	0-14 years			
	15+ years			
	New cases with < 2nd degree disability			
	Relapse, defaulter, or transferred			
Cases that left program during this quarter	Died			
	Treatment finished			
	Transferred			
	Lost to follow-up (at least 1 year without treatment			
	Total			
Cases in program at the last day of the quarter	Total (=cases at the beginning plus new cases during the quarter minus cases that left the programme)			

Analysis, interpretations, comments and recommendations

Other information:

Comments on observed trends? Abnormal increase in cases? Lack of decrease of previous increasing trends? Improving trends?

Conclusions, actions taken and recommendations:

Sent Report Date: _____ Person: _____

Received Report Date: _____ Person: _____

Tuberculosis Quarterly Report Form

Year _____ Quarter _____

Health facility: _____ Sub-district: _____ District: _____ Region: _____

Case notifications	Number
Pulmonary- Smear + New case	
Pulmonary- Smear + Relapse	
Pulmonary- Smear Negative	
Pulmonary- Smear not done/unknown	
Extra-pulmonary	
Total	

Category of re-treatment cases	Number
Relapses	
Failures	
Re-treatment after interruption	
Total	

Age of new pulmonary smear+ cases			
	M	F	Total
0-14			
15-24			
25-34			
35-44			
45-54			
55-64			
65+			
Total			

Cohort analysis done on patients registered in same quarter in the previous year

Smear conversion	***New pulm. smear+* (at 2 months)**	*Re-rx smear+ (at 3 months)*
New sputum + converted by 2-3 months		
New sputum + evaluated with sputum by end of 3rd month		

Treatment results	***New pulm. smear+***	*Re-rx smear+*
Total registered		
Total evaluated		
Smear negative a tend of treatment (cured)		
Completed treatment, but smear not done at end of treatment		
Died		
Failure		
Interrupted treatment		
Transferred out		

Analysis, interpretations, comments and recommendations

Other information:

Comments on observed trends? Abnormal increase in cases? Lack of decrease of previous increasing trends? Improving trends?

Conclusions, actions taken and recommendations:

Sent Report	Date: _____	Received Report	Date: _____
	Person: _____		Person: _____

Cased-based Surveillance Report Form for Buruli Ulcer (BU01)

A copy of this form should be kept in the patient's record at the health facility where treatment is provided.

A. Institutional Information

1. *Name of institution, address:* _____

2. *Sub-district:* _____ *District:* _____ *Region:* _____ *Country:* _____

3. *Name of officer completing this form (Last/ First):* _____

4. *Title:* _____ *Specialization:* _____

B. Patient Information

5. *Health facility ID #:* _____ *Date of admission(dd/mm/yy):* ___/___/___

6. *Name (Last/First):* _____ **7.** *Age:* |__|__|years **8.** *Sex:* ☐ M ☐ F

9. *Address/Village*: _____

10. *Sub-district:* _____ *District:* _____ *Region:* _____ *Country:* _____

11. *Occupation of patient:* ☐ Student ☐ Farmer ☐ Other, specify: _____

12. *Source of drinking water:* ☐ Pipe-borne ☐ Borehole/well ☐ River/stream ☐ Pond/stagnant

13. *Patient classification:*
☐ *New case*
Recurrence: ☐ *same site* ☐ *different site* Date of last treatment(dd/mm/yy) __/__/__

14. *Duration of illness before seeking care:* |__|__| weeks |__|__| months

15. *Use of traditional treatment* ☐ N ☐ Y

16. *History of cases in family/among relatives:* ☐ N ☐ Y

17. *History of trauma at site of lesion:* ☐ N ☐ Y

18. *BCG vaccination or scar:* ☐ N ☐ Y

C. Location of Lesion(s)

19.	*Upper limbs:* ☐ Right ☐ Left *Lower limbs:* ☐ Right ☐ Left ☐ *Abdomen* ☐ *Back* ☐ *Buttocks and perineum* ☐ *Thorax* ☐ *Head and neck*

D. Clinical Forms

20.	*Active*: ☐ Nodule ☐ Papule ☐ Plaque ☐ Oedema ☐ Ulcer ☐ Osteomyelitis *Inactive:* ☐ Scar due to Buruli ulcer ☐ Amputation due to Buruli ulcer ☐ Others, specify_____
21.	*Disability present upon presentation:* ☐ N ☐ Y
22.	*Date of clinical diagnosis(dd/mm/yy):*___/___/___

E. Confirmation of Clinical Diagnosis

23.	ZN staining			Culture			Histopathology			PCR		
	Pos ☐	*Neg* ☐	*ND* ☐	*Pos* ☐	*Neg* ☐	*ND* ☐	*Pos* ☐	*Neg* ☐	*ND* ☐	*Pos* ☐	*Neg* ☐	*ND* ☐
	If positive, date: (dd/mm/yy) ___/___/___			*If positive, date:* (dd/mm/yy) ___/___/___			*If positive, date:* (dd/mm/yy) ___/___/___			*If positive, date:* (dd/mm/yy) ___/___/___		

Pos = Positive Neg = Negative ND = Not done

F. Principal Treatment (s)

24.	☐ *Wound dressing only* ☐ *Excision only* ☐ *Excision + primary closure* ☐ *Excision + split skin graft* ☐ *Amputation* ☐ *Heat* *Antimycobacterial agents, specify:*_____ *Antibiotics and other drugs:*_____ *Others:*_____

G. Treatment Outcomes

25.	*Healed without sequelae* ☐ *Healed with sequelae, specify:*_____ ☐ *Referral for treatment of active lesions: where*_____*Date:* (dd/mm/yy)___/___/___ ☐ *Absconded/discharged against medical advice* ☐ *Died, Buruli ulcer related, specify:*_____ ☐ *Died, not related to Buruli ulcer, specify*:_____

H. Referral of Sequelae

26.	☐ *No*: why not_____ ☐ *Yes*: where_____when (dd/mm/yy)___/___/____
27.	Date of Discharge (dd/mm/yy):___/___/___

Monthly Registration of Buruli Ulcer Cases (BU 02)

Year: _____ *Month:* _____

Name of Institution: _____

Sub-district: _____ *District:* _____*Region:* _____

No.	**Name** (Last/First) (6)	Age (7)	**Sex** (8)	Address (Village/Town) (9)	Patient classification[a] (13)		**Location(s) of lesion**[b] (19)	Clinical form(s)[c] (20)	**Disability present upon presentation** (21)		Date of clinical diagnosis (22)	**Confirmation of diagnosis**[d] (23)	
					New	Rec			Yes	No		Yes (which)	No

Classification [a]	Location of Lesions[b]	Clinical Forms[c]	Confirmation of Diagnosis[d]
New	Upper limbs (UL)	Nodule (N)	AFB smear (AFB)
Recurrent (Rec)	Lower limbs (LL)	Papule (P)	Culture (CUL)
	Abdomen (AB)	Plaque (Q)	Histopathology (HIS)
	Back (BK)	Oedema (E)	Polymerase chain reaction
	Buttocks and perineum (BP)	Ulcer (U)	(PCR)
	Thorax (TH)	Osteomyelitis (O)	
	Head and neck (HN)		

For Hospitals, Health Centres and Community levels

Quarterly Report on New and Recurrent Cases of Buruli Ulcer (BU 03)

Buruli ulcer **Patients registered during ___Qtr of _____**

Name of district: _____ Number of district: _____

Name of officer completing this form:_____

Title:_____Date of completion of this form (dd/mm/yy): ___/___/___

Address:_____

_____

Tel:_____Fax:_____

Email: _____

1. New and recurrent cases

	Laboratory confirmation						No laboratory confirmation						Sub-total		Total	
	<15 yrs		15-49 yrs		>49 yrs		<15 yrs		15-49 yrs		>49 yrs					
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
New																
Recurrent																

2. Clinical forms of new and recurrent cases

	Nodule	Papule	Plaque	Oedema	Ulcer	Osteomyelitis	Mixed	Total
New								
Recurrent								

3. Disabilities in new and recurrent cases

	Disability present		Total
	Yes	No	
New			
Recurrent			

Managing Public Health Surveillance Data

Effective public health activities, including public health surveillance, depend on a trusting relationship between the public health workers and the public they are trying to assist. This need for trust requires public health workers, including epidemiologists, to observe patient privacy issues and to secure patient consent before releasing information about that patient, all the while taking action to protect the overall public health. Public health workers are obliged to observe the principles of privacy and confidentiality and to conduct themselves with patients in a professional manner. Following are several priciples that public health workers must observe:

Privacy is the right of patients (or a patient's parent, guardian or other advocate) to choose what information they will release about themselves and to whom. Patients have the right to know why they are providing information and to refuse to provide information.

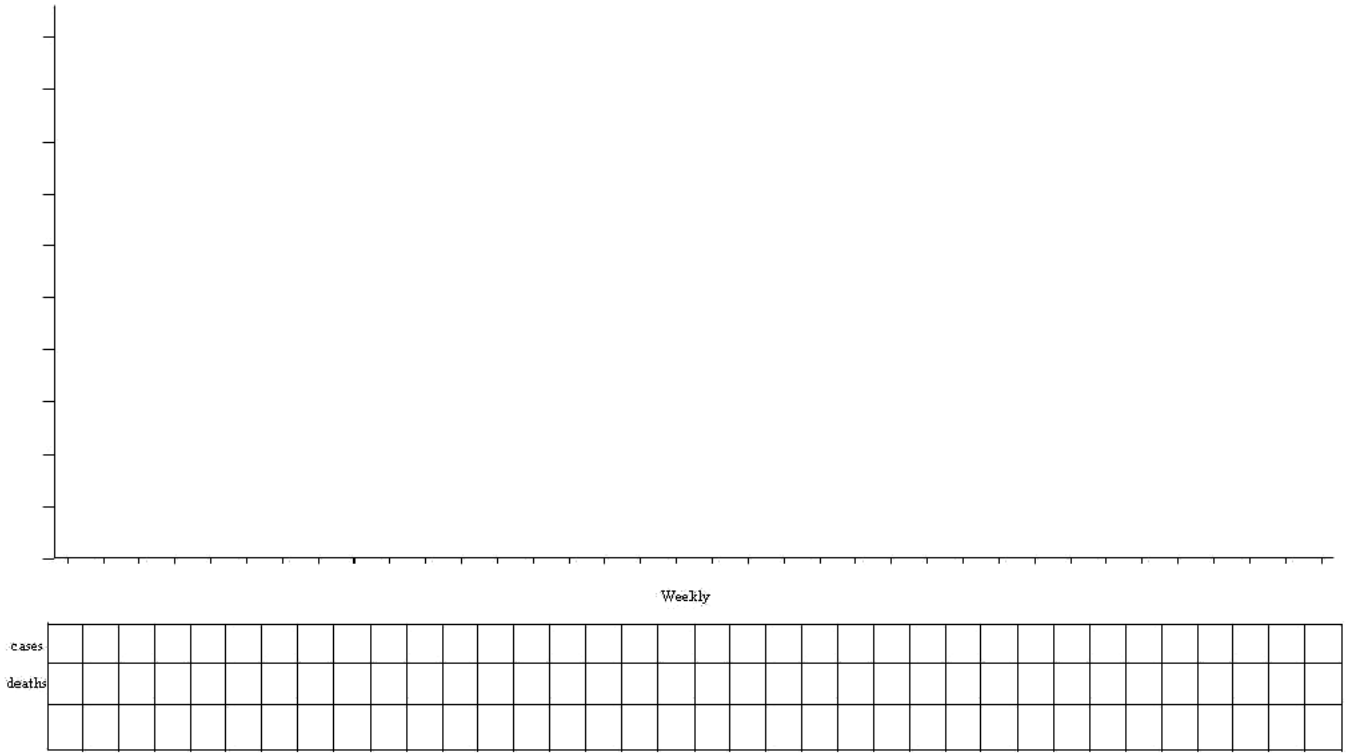
Informed consent is the need to gain patients' permission before using information about them in a broader public health effort. Consent may be written or verbal, depending on the rules of the individual country and health system. Patients (or other responsible party) must be informed of what information is being collected, to whom it is reported and how it will be used. In the case of a disease surveillance and response programme, patients should be informed of the benefits of the information-sharing to their own health and public health of their community.

Confidentiality is the obligation of public health workers to keep information about patients restricted to only those persons who absolutely need it to maintain or improve the health of the community and to make sure that information is used only for the purposes for which it was intended. Information for surveillance is not expected by the community to be used for research purposes. Patient information, even when it does not include names, can be used to intentionally or unintentionally identify persons and lead to discrimination or other consequences against those individuals. Therefore, such information must be protected, and patients have the right to expect that information will be handled as confidential.

Concomitantly, the public health system needs to trace contacts or outbreaks when required. A good information system will have thought carefully about what information is essential for public health action. National or institutional laws should specify what the uses of the information collected should be and when additional consent from the patient is needed. The public health worker respects these laws.

Public health workers observing the above principles and conducing themselves in a manner that is professional – fair, reliable, ethical and competent – will allow them to gain the public's trust, confidence and cooperation.

Sample Grid for Time Analysis



Sample Tables for Person Analysis

These are examples of person analyses that may be done for outbreak data or at the end of the year to analyse summary data for case-based surveillance reports.

Age distribution

Age group	Number of reported cases	% of reported cases
0 through 4 years		
5 years through 14 years		
15 years and above		
Sub-total		
Number with missing data		
Total		

Location: Urban versus rural

Location	Number of reported cases living in this area	% of reported cases
Urban		
Rural		
Sub-total		
Number with missing data		
Total		

Sex distribution

Sex	Number of reported cases	% of reported cases
Female		
Male		
Sub-total		
Number with missing data		
Total		

Comparing inpatient and outpatient status

Source of report	Number of reported cases	% of reported cases
Inpatient		
Outpatient		
Sub-total		
Number with missing data		
Total		

Comparing immunization status and outcome

Number of doses	Number survived	Number deceased
Zero dose		
1 dose		
2+ doses		
Sub-total		
Number (%) with missing data		
Total		

Log of Suspected Outbreaks and Rumours

The following table is used to record verbal or written information from health facilities or communities about suspected outbreaks, rumours or reports of unexplained events. Record the steps taken and any response activities carried out.

Disease or condition initially reported (Date of recording) (1)	Number of cases (2)	Location (Health center, community, etc.) (3)	Date district was notified (4)	Date suspected outbreak was investigated by the district (5)	Result of district investigation (Confirmed, ruled out, or unknown) (6)

No. of cases actually identified (7)	Date outbreak began (Date onset index case/ date crossed threshold or first cluster) (8)	Date a case was first seen at a health facility (9)	Date appropriate intervention began (10)	Type of appropriate intervention that was begun (11)	Date district notified regional level of the outbreak (12)	Date district received regional response (13)	Comments* (14)

* Include indication as to whether report is rumour or fact in the comments column.

Instructions for filling suspected outbreaj and rumours log book

1. Record the disease or condition which was initially reported and also the date on which this column is being filled. If the disease or condition is not stated, or its cause is unknown, write “unknown” in the field for disease or condition is initially reported.

2. Record the number of cases reported initially.

3. Record the location or place where the cases of the disease or condition were seen.

4. Record the date when district was first notified of the disease or condition.

5. Record the date the district investigated the reported outbreak.

6. Record the outcome of the investigation as “confirmed” if it is true, “ruled out” if it turned out not to be a true outbreak and “unknown” if the outbreak status is not known perhaps because laboratory results are not back yet.

7. Record the number of cases actually identified when the investigation was carried out.

8. Record the date outbreak actually began, i.e. the date the index/first case or first cluster was seen based on the investigation.

9. Record the date the first case was seen at the health facility.

10. Record the date an appropriate intervention to control the disease was begun.

11. Record exactly what intervention was carried out.

12. Record the date when the district notified the regional and/or national level.

13. Record the date when the district received a response from either the regional or national level.

14. Note any comments concerning the event. This could cover issues like how prepared district was, the promptness or otherwise of the response to the outbreak, whether the report was just a rumour etc.

Case Investigation Form – Neonatal Tetanus

Official Use Only **Epid Number**: (completed by district team) _____-_____-_____-_____ Region District Year Onset Case Number

Received at National _____/_____/_____

IDENTIFICATION

District: _____ Region: _____

Nearest health facility to village: _____ Village/ Suburb: _____ Town/ City: _____

Address:

_____

Name of patient: _____ Mother: _____

Sex: ☐ 1 = Male, 2 = Female Father: _____

NOTIFICATION/INVESTIGATION

Notified by: _____ Date notified: _____/_____/_____ Date case investigated: _____/_____/_____

MOTHER'S VACCINATION HISTORY Please use the following key, 1=Y, 2=N, 9=U, where applicable.

Question	Answer
Mother vaccinated with TT?	
Have card?	
Number of doses:	
Vaccination status of mother prior to delivery? **	

1st ____/____/____ 4th ____/____/____

2nd ____/____/____ 5th ____/____/____

3rd ____/____/____ If >5, last dose_____/_____/____

**1= up-to-date, 2= not up-to-date, 9= unknown

BIRTH OF INFANT

Date of birth: _____/_____/_____ Please use the following key, 1=Y, 2=N, 9=U, where applicable.

Questions	Answer	Questions	Answer
Mother received antenatal care?		Location of birth: ***	
How many prenatal visits?		If birth in institution, name of institution:	
Attended by a trained TBA/ midwife?		Cut cord with a sterile blade?	
If attended by a trained TBA/ midwife, give name		Cord treated with anything? Describe treatment of cord:	
Attended by doctor/nurse?		Where?	

*** 1=Hospital, 2=Health center, 3=Home, trained attendant, 4=Home, untrained attendant, 5=Home, no attendant, 9=Unknown

INITIAL CLINICAL HISTORY

Please use the following key, 1=Y, 2=N, 9=U, where applicable.

Questions	Answer	Questions	Answer
Was baby normal at birth?		Spasms or convulsions?	
Normal cry and suck during first 2 days?		Complications?	
Stopped sucking after 2 days?		Did the baby die?	
Arched back?		Age at death:	Days
Stiffness?		Age of onset in days:	Days (99=Unknown)

Onset of symptoms: ____/_____/_____

TREATMENT

Date of admission: _____/_____/_____

Medical record number: _____

Facility Address:

Questions	Answer 1=Y, 2=N, 9=U
Seen in OPD?	
Admitted?	

COMMENTS:

RESPONSE

Please use the following key, 1=Y, 2=N, 9=U, where applicable.

Questions	Answer
Mother given protective dose of TT within 3 months of report?	
Supplemental immunization within same locality as the case?	

Date of response: _____/_____/_____

Details of response: _____

_____

FINAL CLASSIFICATION OF THE CASE: **Neonatal Tetanus:** ☐ 1=Yes, 2=No, 9=Unknown

INVESTIGATOR

Name: _____ Title: _____

Unit: _____Address: _____ Phone: _____

Case Investigation Form – Acute Flaccid Paralysis

Official Use Only **Epid Number**: _____-_____-_____-_____
(completed by district team) Region District Year Onset Case Number
Received : _____/_____/_____

IDENTIFICATION

District: _____ Region: _____
Nearest health facility to village: _____ Village/ Suburb: _____ Town/ City: _____

Address: _____
_____

Name of patient: _____ Mother/Father: _____
Sex: ☐ 1 = Male, 2 = Female Date of birth: _____/_____/_____ or Age: years _____ months _____
(If DOB is unknown)

NOTIFICATION/INVESTIGATION

Notified by: _____ Date Notified: ____/____/____ Date Investigated: ____/____/____

HOSPITALIZATION

Admitted to hospital? ☐ 1= Y, 2= No Date of admission: ____/____/____ Medical record number: _____
Facility address:

CLINICAL HISTORY

Please use the following key, 1=Yes, 2=No, 9=Unknown.

Question	Answer
Fever at onset of paralysis	
Paralysis progresses <= 3 days	
Flaccid and sudden paralysis	
Asymmetrical	

Site of paralysis

LA			RA
LL			RL

Onset of paralysis: ____/____/____

AFTER INVESTIGATION, WAS IT TRUE AFP?

☐ 1= Y, 2= N

If "No" then the rest of the form does not need to be completed.
Mark "6" for Final Classification.

VACCINATION HISTORY

Total doses of polio: ☐ 99=Unknown

Birth ____/____/____
1st ____/____/____
2nd ____/____/____
3rd ____/____/____
4th ____/____/____
If >4, last dose ____/____/____

SPECIMEN COLLECTION

Date 1st Stool: ____/____/_____ Date 2nd Stool: ____/____/_____ Date Sent to National lab: ____/____/_____

STOOL SPECIMEN RESULTS: Condition of Stool: ☐ 1=Adequate, 2= Not Adequate

_____/_____/_____ Date received by national Lab

_____/_____/_____ Date results sent by lab to district

_____/_____/_____ Date results receive by district

_____/_____/_____ Date isolate sent by national Lab to regional lab

_____/_____/_____ Date differentiation result sent by regional lab

_____/_____/_____ Date differentiation result received by district

Primary Isolation Results:

P1	P2	P3	NP-Ent	W1	W2	W3	V1	V2	V3	NP-Ent

FOLLOW UP EXAMINATION

Date of follow up examination: _____/_____/_____ Residual paralysis?

LA			RA
LL			RL

Findings at follow-up: ☐

1= Residual paralysis
2= No residual paralysis
3= Lost to follow-up
4= Death before follow-up

FINAL CLASSIFICATION OF THE CASE: ☐ 1=Confirmed, 2=Compatible, 3= Discarded 6=Not AFP

INVESTIGATOR

Name: _____ Title: _____

Unit: _____ Address: _____ Phone: _____

Case Investigation Form - Guinea Worm Disease

GHANA GUINEA WORM ERADICATION PROGRAM
SUPERVISOR'S REGISTER OF CASES AND SUMMARY OF STATUS OF INTERVENTION

Month: _____ Year:____ Region: District: Zone:

Village: Name of Village Volunteer:

	Number and Name of Patient	Age	Sex	Is this the first worm to emerge from this patient this year? Y/N	Date				Did patient enter a source of water while the worm emerged? Y/N	Date supervisor confirmed case	Was transmission of guinea worm disease from this patient contained? Y/N	* Was patient resident in another village during the last twelve months? Y/N	Remarks
					Worm first emerged	Volunteer first saw case	Bandaging began	Worm was completely pulled out					
1													
2													
3													
4													
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17													
18													
19													
20													

Zonal Coordinator's Signature: VV's Signature:

# of households:_____
# of filters distributed this month:_____
# of households with filters:_____
# of ponds used for drinking water:_____
# of health education sessions: _____
# of hand-pumps in disrepair:_____

Medical kit present?(Y/N) ____
treated with Abate ____
VV with flip chart?(Y/N) ____
# of safe source of drinking water ____

Replenished?(Y/N) _____
Abate used: _____
Posters displayed?(Y/N) _____

* If the patient has resided outside his/her village during the last 12 months, indicate in the Remarks column (for each patient) the names of the village district-region-country, and for how long the patinet lived in that village.

White=National level copy
Green=District level
Yellow=Regional level
Blue=Zonal level

GHANA GUINEA WORM ERADICATION PROGRAMME

Monthly Surveillance Summary by Sub-district and Zone: **District:** **Month:**

		VILLAGES								GUINEA WORM DISEASE					WATER	VECTOR CONTROL			FILTERS		EDUCATION	
						New Infected Vils this month																
Sub-district	Zone	Total CBS Vils 2001	Total EVs 2001	# of EV Reporting this month	EVs Reporting **1st time this year**	Re-infected	Entirely new	# Villages Rept. 1+ Cases this Year	# of Villages Infected this Month	# of Cases this Month	# Cases Contained	% Cases Contained	Cum. Cases this Year	# of Cases Imported *	# of Evs with 1+ Safe Sources	# Vil. trtd with Abate	# Treatable Sources in Evs	# Sources Treated in Evs	Total # of Households in Evs	Evs with 100% Filter Coverage	Educ. Activity during month **	# of End Vs receiving 1+ Hedu. Activity
1																						
	SUBD TOTAL																					
2																						
	SUBD TOTAL																					
3																						
	SUBD TOTAL																					
4																						
	SUBD TOTAL																					
5																						
	SUBD TOTAL																					
6																						
	SUBD TOTAL																					
	Grand Total																					

Note: All sub-districts & Zones, including non-endemic must be listed and reported on, for example whether or not community-based surveillance activities are taking place.

*** Imported Cases: Please attach details**

** Educational Activity during month: Rec 1 for village education with use of **flip charts**
2 for **Durbars** involving chiefs, opinion leaders, etc
3 for distribution and use of **posters**
4 for Mass education using **Radio/TV/Video shows/Cinema Vans**
5 for Sessions in **schools/churches/mosques**
6 for **Market strategies**, eg, use of megaphones, pajivolts, banners
7 for **Theatre/Drama**

Monthly Surveillance Summary by Sub-district and Zone: **District:** **Month:**

		VILLAGES								GUINEA WORM DISEASE					WATER	VECTOR CONTROL			FILTERS		EDUCATION	
						New Infected Vils this month																
Sub-district	Zone	Total CBS Vils 2001	Total EVs 2001	# of EV Reporting this month	EVs Reporting **1st time this year**	Re-infected	Entirely new	# Villages Rept. 1+ Cases this Year	# of Villages Infected this Month	# of Cases this Month	# Cases Contained	% Cases Contained	Cum. Cases this Year	# of Cases Imported *	# of Evs with 1+ Safe Sources	# Vill. trtd with Abate	# Treatable Sources in Evs	# Sources Treated in Evs	Total # of Households in Evs	Evs with 100% Filter Covrage	Educ. Activity during month **	# of End Vs receiving 1+ Hedu. Activity
SUBD 1		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
SUBD 2		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
SUBD 3		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
SUBD 4		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
SUBD 5		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
SUBD 6		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
TOTAL	0	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	

Checklist of Laboratory Supplies for Use in an Outbreak Investigation

For using standard safety precautions when collecting and handling all specimens:

_____ Pieces of bar soap and bleach for setting up handwashing stations
_____ Supply of gloves
_____ Safety boxes for collecting and disposing of contaminated supplies and equipment

For collecting laboratory specimens:

Blood
_____ Sterile needles, different sizes
_____ Sterile syringes
_____ Vacutainers
_____ Test tube for serum
_____ Antiseptic skin disinfectant
_____ Tourniquet
_____ Transport tubes with screw-on tops
_____ Transport media - Cary-Blair, Trans-Isolate

Cerebral spinal fluid (CSF)
_____ Local anaesthetic
_____ Needle and syringe for anaesthetic
_____ Antiseptic skin disinfectant
_____ Screw-top tubes and tube rack
_____ Microscopic slides in a box
_____ Trans-Isolate media

Blood films (malaria)
_____ Sterile or disposable lancet
_____ Glass slides and cover slips
_____ Slide box

Stool
_____ Rectal swabs
_____ Cary-Blair transport media

If health facility has a centrifuge:

_____ Sterile pipette and bulb
_____ Sterile glass or plastic tube, or bottle with a screw-on top

For packaging and transporting samples:

_____ Cold box with frozen ice packs or vacuum flask
_____ Cotton wool for cushioning sample to avoid breakage
_____ Labels for addressing packaged samples to lab
_____ Labels for providing instructions on storage conditions e.g. “store in a refrigerator”.
_____ Case forms and line lists to act as specimen transmittal form
_____ Marking pen to mark tubes with name of patient and ID number (if assigned by the district)

Treat Cases During an Outbreak

Use appropriate drugs and treatments for managing cases during an outbreak. Following are treatment recommendations for use in an outbreak situation for cholera, dysentery, measles and bacterial meningitis.

1. Treat cholera in an outbreak situation

Source: *WHO guidelines for management of the patient with cholera, WHO/CDD/SER/91.15*

1. Assess the patient's level of dehydration. (See assessment guide below.)
2. Give fluids according to the appropriate treatment plan. (See below.)
3. Collect a stool specimen from the first five suspected cholera patients that are seen in the health facility.
4. Give an oral antibiotic to patients with severe dehydration.

Assess the patient for signs of dehydration		
▪ Look at patient's general condition. Is the patient:		lethargic or unconscious? restless and irritable?
▪ Look for sunken eyes.		
▪ Offer the patient fluid. Is the patient:		not able to drink, or drinking poorly? drinking eagerly, thirsty?
▪ Pinch the skin of the abdomen. Does it go back:		very slowly (longer than 2 seconds)? slowly?
Decide if the patient has severe, some or no signs of dehydration and give extra fluid according to the treatment plan.		
If two of the following signs are present: ▪ lethargic or unconscious ▪ sunken eyes ▪ not able to drink or drinking poorly ▪ skin pinch goes back very slowly	➔	**SEVERE DEHYDRATION*** Give fluid for severe dehydration (Plan C).
*In adults and children older than 5 years, other signs for severe dehydration are "absent radial pulse" and "low blood pressure".		
If two of the following signs are present: ▪ restless, irritable ▪ sunken eyes ▪ drinks eagerly, thirsty ▪ skin pinch goes back slowly	➔	**SOME DEHYDRATION** Give fluid according to for some dehydration (Plan B).
If there are not enough signs to classify as some or severe dehydration	➔	**NO DEHYDRATION** Give fluid and food to treat diarrhoea at home (Plan A).

▸Antibiotics recommended for treatment of severely dehydrated cholera patients		
Antibiotic	**Children**	**Adults**
Doxycycline* *one single dose*	–	300 mg
Tetracycline (First line) *4 times per day for 3 days*	12.5 mg per kg	500 mg
Trimethoprim-sulfamethoxazole* **(Second Line)** (TMP-SMX) *2 times a day for 3 days*	TMP 5 mg per kg and SMX 25 mg per kg	TMP 160 mg and SMX 800 mg
Furazolidone** *4 times per day for 3 days*	1.25 mg per kg	100 mg
***Erythromycin**†* *adults: 4 times per day for 3 days* *children: 3 times per day for 3 days*	10 mg per kg	250 mg

* 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. However, in some countries, it is not available for pediatric use.
*** Furazolidone is WHO's antibiotic of choice for pregnant women.
† Erythromycin or chloramphenicol may be used when the other recommended antibiotics are not available, or where *V. cholerae* is resistant to them.

- If the patient vomits while taking fluid, wait 10 minutes. Then allow the patient to resume feeding, but more slowly.
- Continue monitoring the patient and replacing fluid until the diarrhoea stops.
- When the patient is ready to leave the facility, counsel the patient on treating diarrhoea at home.
- Refer to IMCI guidelines for treating children less than 5 years of age and to national guidelines for further information on treating acute watery diarrhoea and confirmed cholera.

Plan A: Treat diarrhoea at home

If patient showed no signs of dehydration when first assessed, the patient may be treated at home. Give a two-day supply of oral rehydration salts (ORS) and explain how to take the ORS according to the following schedule:

Age	**Amount of solution after each loose stool**	**Provide enough ORS packets for preparing:**
Up to 2 years	50 to 100 ml after each loose stool	500 ml per day
2 years up to 10 years	100 to 200 ml after each loose stool	1000 ml per day
10 years or more	As much as the patient wants	2000 ml per day

Also give home-based fluids as follows: rice-water, mashed kenkey, mashed tuo-zafi, light soup without pepper, akasa, coconut juice and fruit juice.

Plan B: Treat some (moderate) dehydration with ORS

In the clinic, give the recommended amount of ORS over a four-hour period. Determine the amount according to the patient's weight. Use the patient's age only when the weight is not known.

To determine the amount of ORS to give during the first 4 hours						
Age or Weight	**Up to 4 months**	**4 months up to 12 months**	**12 months up to 2 years**	**2 years up to 5 years**	**5 years up to 14 years**	**15 years and more**
Weight in kg	< 6 kg	6 - < 10 kg	10 - < 12 kg	12 - < 19 kg	19 - 30 kg	30 kg and more
Give this amount of ORS	200 - 400 ml	400 - 700 ml	700- 900 ml	900 -400 ml	1400-2200 ml	2200-4000 ml

- If the patient wants more ORS than shown, give more.
- For infants less than six months who are not breastfed, also give 100-200 ml of clean water during this period.
- Give frequent small sips from a cup.
- If the patient vomits, wait 10 minutes. Then continue giving fluids, but more slowly.
- For infants who are breastfeeding, continue breastfeeding whenever the infant wants.
- May give, in addition, home-based fluids as follows: rice-water, mashed kenkey, mashed tuo-zafi, light soup without pepper, akasa, coconut juice and fruit juice.
- Assess patients every 1-2 hours to make sure they are taking ORS adequately and to monitor fluid loss. Completely reassess the patient's dehydration status after four hours, and follow the appropriate treatment plan for the patient's dehydration classification.

Plan C: Treat severe dehydration quickly

- Start intravenous fluids immediately. If the patient is a child and can drink, give ORS by mouth while the drip is set up. Give 100 ml per kg of Ringer's Lactate Solution, normal saline or cholera replacement fluid (5:4:1) divided as follows:

For giving IV fluids:		
For **adults** (and patients 1 year and older), give 100 ml per kg IV within 3 hours as follows:	First, give 30 ml/kg as rapidly as possible within 30 minutes	Then, give 70 ml per kg during the next 2½ hours
For **patients less than 1 year**, give 100 ml per kg IV in 6 hours as follows:	First, give 30 ml per kg in the first hour*	Then, give 70 ml per kg in the next 5 hours

* Repeat once if radial pulse is still very weak or not detectable after the first 30 ml per kg is given.

- Reassess the patient after the first 30 ml per kg, and then every 1 to 2 hours. If hydration status is not improving, give the IV drip more rapidly.
- Also give ORS (about 5 ml per kg per hour) as soon as the patient can drink. This is usually after 3–4 hours for infants and after 1–2 hours for patients older than one year.
- Reassess the patient after six hours (for infants) or three hours (for one year and older). Classify dehydration. Then choose the appropriate plan (Plan A, Plan B, Plan C) to continue treatment.
- Give antibiotics recommended for treatment of severely dehydrated cholera patients. (See the schedule above.)
- Give patients information about home care before they leave the health facility.
  - If the patient vomits while taking ORS, wait 10 minutes and then continue giving fluids more slowly.
  - Continue breastfeeding of infants and young children.
  - Also give home-based fluids as follows: rice-water, mashed kenkey,
  - mashed tuo-zafi, light soup without pepper, akasa, coconut juice and fruit juice.
  - Return for treatment if the patient develops any of the following:
    - increased number of watery stools
    - eating or drinking poorly
    - marked thirst
    - repeated vomiting
    - fever
    - blood in the stool.

2. Give an appropriate oral antibiotic for outbreaks of bloody diarrhoea due to *Shigella dysentariae* type 1.

Source: Adapted *WHO Guidelines for the control of epidemics due to S. dysentariae type 1. WHO Geneva. 1995*

	COTRIMOXAZOLE {First Line} (trimethoprim + sulphamethoxazole) Give two times daily for 5 days			**NALIDIXIC ACID {Second Line}** Give four times daily for 5 days	**CIPROFLOXACIN** Give two times daily for 5 days
WEIGHT	**ADULT TABLET** 80 mg trimethoprim + 400 mg sulphamethoxazole	**PEDIATRIC TABLET** 20 mg trimethoprim + 100 mg sulphamethoxazole	**SYRUP** 40 mg trimethoprim + 200 mg sulphamethoxazole per 5 ml	**TABLET** 250 mg	**TABLET** 250 mg
Children's dose					
3 - 5 kg	1/4	2	5.0 ml	1/4	1/4
6 - 9 kg	1/2			1/2	1/2
10 - 14 kg	1	3	7.5 ml	1	1
15 - 19 kg	1	3	7.5 ml	1	1
20 - 29 kg	1	6	15 ml	2	2
Adult dose	**TABLET** 160 mg TMP + 800 mg SMX			**TABLET** 250 mg	**TABLET** 250 mg
	2 tablets			4 tablets	4 tablets

3. Give vitamin A to children with measles

Source: *WHO guidelines for epidemic preparedness and response to measles outbreaks, WHO/CDS/CSR/ISR/99.1*

- Give the first dose in the health facility or clinic.
- Give the mother one dose to give at home the next day.

AGE	Vitamin A Capsules		
	200 000 IU	100 000 IU	50 000 IU
Up to 6 months		½ capsule	1 capsule
6 months up to 12 months	½ capsule	1 capsule	2 capsule
12 months up to 5 years	1 capsule	2 capsules	4 capsules

4. Give appropriate antibiotic for bacterial meningitis cases during an outbreak

Source: Control of epidemic-prone meningococcal disease, WHO practical guidelines, 2nd edition 1998, WHO/EMC/BAC/98.3

- Admit patient to a health facility for diagnosis and treatment.
- Start an antibiotic immediately. Intra-muscular injectable oily chloramphenicol is best choice during an epidemic. It is very effective and a single dose is usually effective. (See below for dosage amounts.) If injectable treatment is not possible, give oral amoxycillin or cotrimoxazole or treat with an antimicrobial recommended by national treatment guidelines for meningitis. (See below for information about other antibiotics.)
- Patient isolation is not necessary. Provide good supportive care and simplify case management.

Age	INTRAMUSCULAR OILY CHLORAMPHENICOL 100 mg per kg in a single dose If the patient has not improved, give a second dose 24–48 hours later.	
	Dose in grams	Dose in milimeters
Adult: Age 15 years and older	3.0 g	12 ml
Child: 10 to 14 years	2.5 g	10 ml
6 to 9 years	2.0 g	8 ml
3 to 5 years	1.5 g	6 ml
1 to 2 years	1.0 g	4 ml
2 to 11 months	0.5 g	2 ml
1 to 8 weeks	0.25 g	1 ml

See next table for other recommended antibiotics.

Other recommended antibiotics to treat meningitis

Agent	Route	Dose for adults	Dose for children	Duration of treatment
Penicillin G	IV	3-4 MU daily every 4-6 hours	400 000 Units per kg	4 days
Ampicillin or Amoxicillin	IV	2-3 g daily every 6 hours	250 mg per kg	4 days
Amoxicillin	Oral	2-3 g every 6 hours	250 mg per kg	4 days
Chloram-phenicol	IV	1 g every 8-12 hours	100 mg per kg	4 days
Chloram-phenicol (oily)	IM	Single dose 3 g	single dose - 100 mg per kg	1-2 days
Cefotaxime	IV	2 g every 6 hours	250 mg per kg	4 days
Ceftriaxone	IV	1-2 g over 12-24 hours	50-80 mg per kg	4 days
Ceftriaxone	IM	1-2 g single dose	50-80 mg per kg	1-2 days

Preparing Disinfectant Solutions by Using Chlorine Products

During a response to an outbreak of any disease transmitted through direct contact with infectious body fluids (blood, urine, stool, semen and sputum, for example), an inexpensive system to disinfect surroundings can be set up using ordinary household bleach.

The following table describes how to make 1:10 and 1:100 chlorine solutions from household bleach and other chlorine products.

Use this chlorine product	**To make a 1:10 solution** **for disinfecting**: — *Excreta* — *Cadavers* — *Spills of infectious body fluids*	To make a 1:100 solution for disinfecting: — *Gloved hands* — *Bare hands and skin* — *Floors* — *Clothing* — *Equipment* — *Bedding*
Household bleach 5% active chlorine	1 liter bleach per 10 liters of water	100 ml per 10 liters of water, OR 1 liter of 1:10 bleach solution per 9 liters of water
Calcium hypochlorite powder or granules 70% (HTH)	7 grams or ½ tablespoon per l liter of water	7 grams or ½ tablespoon per 10 liters of water
Household bleach 30% active chlorine	16 grams or 1 tablespoon per l liter of water	16 grams or 1 tablespoon per 10 liters of water

To disinfect clothing:

- Promptly and thoroughly disinfect patient's personal articles and immediate environment using one of the following disinfectants:
  - Chlorinated lime powder
  - 1% chlorine solution
  - 1% to 2% phenol solution

- Promptly and thoroughly disinfect patient's clothing:
  - Wash clothes with soap and water
  - Boil or soak in disinfectant solution
  - Sun dry
  - Wash utensils with boiling water or disinfectant solution
  - Do not wash contaminated articles in rivers or ponds that might be sources of drinking water, or near wells.

Conducting a Register Review

The purpose of a register review is to collect information on cases admitted to the health facility during a specific period. The investigation team should explain to the health facility that the information will be used to determine what caused the outbreak or increase in number of cases.

1. Select facilities for review.

Depending on the local conditions and the priority disease or condition being investigated, select:

- Any inpatient facility with more than 10 hospital beds. Give priority to government health facilities where necessary.
- Large referral or teaching hospitals with pediatric wards, because they receive referrals from other health facilities.
- Small hospitals or health facilities that serve remote areas and high-risk populations, for example, nomadic groups, refugees, or areas without regularly scheduled health services.

2. Meet with the health facility staff and explain the purpose of the review.

Explain to the health facility's senior staff the purpose of the review, that is, that the information will assist the district and health facility in determining the most appropriate action for limiting the outbreak and preventing future cases from occurring. Emphasize that the activity is an information-gathering exercise and is not a review of health worker performance.

3. Arrange a time to conduct the review.

Arrange to conduct the review when staff who will assist with the review are present and available to help or to answer questions.

4. Identify all sources of information.

Depending on the priority disease or condition being investigated, check inpatient registers for the pediatric and infectious disease wards during the review visit. The inpatient register for the pediatric ward is a good source of information because it lists all children admitted to the ward. Annual summary reports are not always accurate, and outpatient registers often include only a provisional diagnosis.

Review the system and procedures health workers use to record information about diagnoses in the registers. Make sure that the information needed for investigating any suspect case is available. At a minimum, the register should include:

- Patient's name, age and place of residence
- Patient's signs and symptoms
- Date of onset of symptoms and outcome (for example, date of death, if relevant)
- Patient's immunization status, if appropriate to this disease

If the health facility does not keep at least the minimum information, talk with senior staff about how to strengthen the record keeping so that the minimum information is collected.

5. Do the record review at the scheduled day and time.

Go to the selected wards as scheduled. During the visit, look in the health facility registers for cases and deaths that may be suspected cases of the disease. These should be cases or deaths that meet the standard case definition for suspected cases. Find out whether the suspected case was investigated and reported according to national guidelines.

6. Line list the suspected cases that are found.

Record information about the suspected cases. This information will be used during case investigation activities.

7. Provide feedback to the health facility staff.

Meet with the health facility supervisor and discuss the findings of the activity. Use the opportunity to review any features of case management for the illness that may help health workers in the facility. Reinforce the importance of immediate reporting and case investigation as tools for prevention of priority diseases and conditions.

8. Report any suspected cases to the next level.

Report the suspected cases according to local procedures. Investigate the case further to determine the factors that placed the patient at risk for the disease or condition. Develop an appropriate case response.

Sample Messages for Community Education

Improve hand washing:

Hand washing with soap may be the most effective way to prevent transmission of some organisms that cause infectious diseases. For that reason, promote hand washing in every family. Hand washing is particularly important after defecation, after cleaning a child who has defecated, after disposing of a child's stool, before preparing or handling food and before eating.

Hand washing is practiced more frequently where water is plentiful and within easy reach. If possible, water for washing should be stored separately from drinking water. During an epidemic, soap should be provided to those without it. If soap is not available, ash or earth can be used to scrub the hands. Do not dry washed hands with dirty cloths. Air-dry wet hands.

Messages:

ARE YOU PROTECTED FROM DYSENTERY (bloody diarrhoea)?

Washing your hands protects yourself and others from disease.

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

ARE YOU READY FOR HAND WASHING?

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

Safe handling of food

Encourage the following food safety practices:

- Do not eat raw food, except undamaged fruits and vegetables that are peeled and eaten immediately.
- Cook food until it is hot throughout.
- Eat food while it is still hot, or reheat it thoroughly before eating.
- Wash and thoroughly dry all cooking and serving utensils after use.
- Keep cooked food and clean utensils separate from uncooked foods and potentially contaminated utensils.
- Wash hands thoroughly with soap before preparing food.
- Protect food from flies by means of fly screens.

Message:

DO YOU PREPARE FOOD SAFELY?

Cooking kills germs.

- Thoroughly cook all meats, fish and vegetables.
- Eat cooked meats, fish and vegetables while they are hot.

Washing protects from disease.

- Wash your *hands* before preparing or serving food.
- Wash your *dishes and utensils* with soap and water.
- Wash your *cutting board* especially well with soap.

Peeling protects from disease.

- Only eat fruits that have been freshly peeled (such as bananas and oranges).

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

Safe disposal of human waste

High priority should be given to ensuring the safe disposal of human waste at all times, and especially during epidemics of diarrhea. Sanitary systems appropriate for local conditions should be constructed with the cooperation of the community.

Community messages should emphasize the following:

- Everyone should use latrines properly, including children.
- Transfer children's excreta with a scoop or shovel to the latrine or bury in a hole.
- Avoid defecating on the ground, or in or near the water supply.

When large groups of people congregate for activities such as fairs, funerals or religious festivals, ensure the safe disposal of human waste. If there is no latrine, designate areas for defecation and provide a shovel to bury the excreta.

Message:

ARE YOU PROTECTED FROM DYSENTERY (bloody diarrhoea)?
DO YOU USE A TOILET OR LATRINE?

Germs that cause dysentery live in feces. Even a person who is healthy might have dysentery germs.

- *Always use* a toilet or latrine. It you don't have one – build one!
- Keep the toilet or latrine *clean.*
- *Wash your hands* with soap (or ash) and clean water after using the toilet or latrine.

KEEP IT CLEAN: USE A TOILET OR LATRINE

Clean drinking water and storage

Community drinking water supply and storage

- *Piped water.* To maintain safety, properly chlorinate piped water. To prevent entry of contaminated groundwater into pipes, repair leaking joints and maintain constant pressure in the system.

- *Exposed water source* (river, pond or open well). If these sources are used for drinking water, fence around them to protect from contamination by people and animals. Dig drainage ditches to prevent storm water and other surface water from flowing into the drinking water source. Do not allow defecation within 10 meters of the water source; also, defecation should be downhill, or downstream, from the drinking water source.

- *Closed wells*. Equip with a wellhead drainage apron, and with a pulley, windlass or pump.

- *Trucked-in water*. If locally available water is likely to be contaminated, drinking water should be supplied by tankers or transported in drums, if it is adequately chlorinated and a regular supply can be ensured. The trucking of water, however, is expensive and difficult to sustain; it is usually considered a short-term measure until a local supply can be established.

Home drinking water storage and treatment

When the safety of the drinking water is uncertain, it should be chlorinated in the home or boiled.

To prevent contamination of drinking water, families should store drinking water using one of the following types of containers:

- *Covered containers* that are cleaned daily and kept away from children and animals. Water should be removed from the containers using a long-handled dipper kept specially for this purpose.

- *Narrow-mouthed containers* with an opening too small to allow the insertion of a hand. Water should be removed by pouring from the opening or through a spigot.

Water used for bathing, washing and purposes other than drinking need not be treated and should be stored separate from drinking water.

Safe disposal of bodies

The body fluids of persons who die due to diarrhoea or a viral hemorrhagic fever are still infectious. Use extreme caution when preparing the bodies of suspected cholera or viral hemorrhagic fever patients.

- Hold funerals of persons quickly and close to the place of death.
- Discourage washing of dead bodies.
- Discourage distribution of food during funerals.

Reducing exposure to mosquitoes

PERSONAL PROTECTION:

- Use insect repellents.
- Use bednets, treated with insecticide.
- Tuck the lower edge of the bednet under the bedding.

Planning an Emergency Immunization Activity

1. Specify the target population for the immunization activity.

2. Estimate the necessary amounts of vaccine, diluent and immunization supplies such as sterile syringes, sterile needles and safety boxes. (See the worksheet in Annex 30.)

3. Choose the immunization sites and inform the community.
   - Coordinate with the EPI or disease control programme in the district to identify sites for conducting the immunization activity.
   - Identify the facilities that can participate in the activity.
   - Identify a mobile vaccination team, if needed.
   - Determine if there are any hard-to-reach areas, e.g. a transient workers' camp. Identify a mobile vaccination team to reach these areas.
   - Contact the facilities and schedule the immunization sites.
   - Contact the national level for vaccine. If a national reserve stock is not available, the national EPI programme manager will request an emergency supply from WHO.
   - Make sure there is enough capacity to store extra amounts of the vaccine during storage and transportation to the immunization site.

4. Select vaccinator teams. For every 100 to 150 people expected at the immunization site, the following staff is required:
   - 1–2 vaccinators to give immunizations
   - 1 recorder to record on immunization cards
   - Volunteers to verify age and vaccination status

5. Work with the EPI representative to conduct refresher training for vaccinators on recommended immunization practices. (See Annex 31 for recommended immunization practices.)

6. Mobilize the community. Inform the public about the emergency immunization activity.

7. Arrange transportation to the immunization site.
   - Plan workers' transportation to and from the site.
   - Schedule vehicles and plan for fuel and other costs.
   - Estimate per diem costs and make necessary arrangements for lodging if the site is away from the health worker's usual station.

8. Monitor the number of immunizations given.

Estimating Vaccine Supplies for Immunization Activities

Outbreak: _____ ***Date confirmed***: _____

Target population:

___ children age 0 up to 5 years
___ children age 9 months up to 14 years
___ children and adults age 0 up to 30 years
___ women of childbearing age: 15 years up to 45 years
___ all adults and children in the general population

1. Calculate the size of the target population. If the activity only targets a proportion of the general population, estimate the size of the target population. Multiply the general population times the percentage of children or adults in the target population. If you do not know the exact age distribution rates in the area, use recommended estimates such as the following:

—	children age 0 up to 5 years	20%
—	children age 9 months up to 14 years	45%
—	children and adults age 1 up to 30 years	70%
—	women of childbearing age 15-45 years	20%

2. Find out how many doses each person should receive. Record the number below as "number of doses recommended".

3. Allow for wastage. Use a wastage factor of 20%. Multiply the size of the target population (see step 1) times the number of doses times 1.20.

_____	x	_____	x	1.20	=	_____
Size of target population		*Number of recommended doses*		*wastage*		*Number of doses to order including wastage*

4. Allow for a reserve stock. Use a reserve factor of 25%. Multiply the estimated number of doses including wastage times 1.25 to obtain the total estimated number of doses.

_____	x	1.25	=	_____
Number of doses including wastage		*Reserve factor*		*Total number of estimated doses*

5. To obtain the total number of vials of vaccine to order, divide the total number of estimated doses by the number of doses that are contained in a vial. (This is usually printed on the label.)

_____	÷	_____	=	_____
Total number of estimated doses		*Doses per vial*		*Total number of vials required*

6. If the vaccine requires a diluent, multiply the number of millimeters of diluent per vial times the total number of vials required.

_____	x	_____	=	_____
Diluent required per vial		*Total number of vials*		*Total diluent to order*

1. Estimate the number of sterile needles and syringes that will be needed to carry out the activity. If single-use needle and syringes are used, order the same amount as for the estimated number of doses in Step 4.

2. Estimate the number of dilution syringes necessary for preparing the vaccine.

Source: *Field Guide for Supplementary Activities Aimed At Achieving Polio Eradication,* World Health Organization, Geneva 1997
District guidelines for yellow fever surveillance, Division of Emerging and Other Communicable Disease Surveillance and Control, World Health Organization, Geneva 1998

Recommended Immunization Practices

Work with the local EPI representative to give refresher training to the vaccinator teams that will conduct the emergency immunization activity. At a minimum, make sure vaccinator teams know how to:

1. Reconstitute the vaccine correctly:
— Determine the appropriate quantity of diluent to reconstitute the freeze-dried vaccine.
— Use a sterile syringe and sterile needle.
— Draw up and expel the diluent several times in the vial that contains the vaccine.

2. Wrap the vial in silver foil or cover it with a dark cloth. This will protect the vial from sunlight.

3. In a field situation, protect the vaccine and diluent from contamination. Cover the open top of the vial with foil to keep out dirt and flies.

4. Place the vaccine immediately into a cup of ice, or stand it on an ice pack. Keep the ice and vaccines in the shade.

5. Give instructions for use of injection techniques. Review with health staff the need to plan vaccination campaigns.

6. Do not discard the reconstituted vaccine at the end of the session. Follow national policy for using opened vials.

7. Record the dose on an immunization card for each person immunized, if it is national policy to require vaccinated persons to have a card.

8. Collect data for monitoring the activity. For example, record the number of doses given on a tally sheet so that coverage from the campaign can be calculated.

9. Remind health workers about the risk of getting blood-borne diseases from an accidental needle stick. Review safe practices for handling and disposing of sharp instruments and needles.

10. Arrange for safe disposal of used injection materials at the end of the activity. They can be burned or buried in a pit.

District Outbreak Report Format

_____

Title/Description (include disease/condition investigated)

_____ _____

Period Place (Villages/towns, sub-district, district, region)

Executive summary: _____

_____

Introduction:

Background:

Reasons for investigation (public health significance, threshold met, etc.):

Investigation and outbreak preparedness:

Methods:

Dates of investigation:

Site(s) of investigation (health care facilities, villages, other):

Case finding (indicate what was done regarding case finding, e.g. register review, contact investigation, alert other health facilities, other):

Lab specimens collected:

Describe response and intervention (include dates):

Results:

Date and location of first known (index) case:

Date and health facility of first case seen by the health care system:

Results of additional case finding:

Lab analysis and results:

With text, describe key features of results of time, place and person analysis: For detailed results by time (epi curve), place (map) and person characteristics (table), and line lists. Attach line lists, maps, etc as appropriate.

Results of response and evidence of impact:

Interpretations, discussion and conclusions:

Recommended public health actions: Comment on following levels: community, health facility, district, partners, regional and national

Self-evaluation of the Timeliness and Quality of Outbreak Detection, Investigation and Response

Outbreak detection:

Interval between onset of index case (or occurrence of an unusual cluster at the community level) [date 1] to arrival of first outbreak case at the health facility [date 2] (Target: <3 days): _____ Date 1 _____ Date 2 _____ Interval

Interval between initial outbreak case seen at the health facility (or date of outbreak threshold crossing at the health facility) [date 1] and reporting to the district health team [date 2] (Target: within 24 hours): _____ Date 1 _____ Date 2 _____ Interval

Cumulative interval between onset of index case (or occurrence of an usual cluster at the community or health facility) [date 1] to notification to the district [date 2] (Target: <7 days): _____ Date 1 _____ Date 2 _____ Interval

Outbreak investigation:

Case forms/line listed completed? ____ Yes _____No - Laboratory specimens taken (if required)? ____Yes____No

Interval between notification of district [date 1] and district field investigation conducted [date 2] (Target: within 48 hours) _____ Date 1 _____ Date 2 _____ Interval

Interval between sending specimens to the lab [date 1] and receipt of results by the district [date 2] (Target: 3-7 days, depending on type of test) _____ Date 1 _____ Date 2 _____ Interval

Outbreak response:

Interval between notification of outbreak to district [date 1] and concrete response by the district [date 2] (Target: within 48 hours of notification) _____ Date 1 _____ Date 2 _____ Interval

Epidemic Preparedness:

Adequate drugs and medical supplies available at the onset of the outbreak? _____ Yes _____ No

Treatment protocols available to health staff? _____ Yes _____ No

District Epidemic Management Committee regularly meet as part of epidemic preparedness? _____ Yes _____ No

Evaluation and Feedback:

Interval between end of the outbreak [date 1] and finalization of outbreak report with case forms/line list sent to national level [date 2] (Target: 2 weeks) _____ Date 1 _____ Date 2 _____ Interval

District Epidemic Management Committee met? _____Yes _____No

District Epidemic Management Committee's involvement was satisfactory _____ Yes _____No

Feedback given to health facilities? ____Yes ____No _____
Method of feedback used

Feedback given to community? ____Yes ____No _____
Method of feedback used

Other aspects of evaluation:

District Epidemic Management Committee Chairperson: _____ _____
Name Signature

District Director of Health Services: _____ _____
Name Signature

Date report completed: _____

Record of Reports Received

District surveillance personnel should use this form to record the timeliness and completeness of the monthly reporting that it receives from health facilities. The form allows the surveillance personnel to monitor the reporting performance of each health facility in the district so that action can be taken to improve unsatisfactory performance. The form can be adapted for monitoring weekly and quarterly reporting.

Please note that timeliness and completeness are expressed as percents (%). When the surveillance system is good, the rates for timeliness and completeness should approach 100%.

Legend

T = arrived on time
L = arrived late
W = report not received

Region _____ District _____ Year _____

Name of health facility	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Total number of reports expected (N)												
Total reports sent on time (T)												
Total reports sent late (L)												
Total number of reports not received (W)												
Timeliness of the reports = 100 * T / N												
Completeness of reporting = 100 * (N-W) / N												

Checklist for Supervising Surveillance and Response Activities at the Health Facility

*Health facility:*_____ *Date of supervisory visit:*_____

Activity	Supervisory Question	Answer	Comment (What caused problem)
Identify suspected cases	1. How often do you collect information from the community about reports of suspected cases or deaths due to a priority disease or condition?	_____	
Register cases	1. Are diagnoses of cases of priority diseases recorded in the clinic register according to the standard case definition?	Yes No	
Report	1. Do health staff use a standard case definition to report the suspected cases and outbreaks? 2. Do you record information about immediately notifiable diseases in a case form or line list?	Yes No Yes No	
Analyse and interpret	1. Do you plot the numbers of cases and deaths for each priority disease on a graph? (Ask to see the health facility's analysis book. Look to see if the trend lines are up-to-date.) 2. Do you plot the distribution of cases on a map?	Yes No Yes No	
Investigate and confirm reported cases and outbreaks	1. If an epidemic-prone disease was suspected, was it reported immediately to the district office? 2. For the cases of priority diseases needing laboratory tests seen since the last supervisory visit, how many had laboratory results? 3. Are appropriate supplies available or set aside for collecting laboratory specimens during an urgent situation? Show me the supply?	Yes No Yes No Yes No	

Activity	Supervisory Question	Answer	Comment (What caused problem)
Respond	1. Are appropriate supplies available for responding to a confirmed case or outbreak (for example, immunization supplies and vaccine, ORS, antibiotics)? 2. Please show me the supplies for carrying out a recommended response. 3. Who is the surveillance focal person for this facility? 4. How often do you provide information and training in outbreak response to the staff of this facility?	Yes No Yes No Name:_____ Designation: _____ Training is done _____	
Provide feedback	1. How often do you report information to the community? 2. Did you receive the latest bulletin from the (national, regional) level?	Report it:_____ Yes No	
Evaluate and improve the system	1.Were the last 3 routine monthly reports sent to the district office? 2. Were the last 3 routine monthly reports sent on time?	Yes No Yes No	
Epidemic preparedness	1.What precautions do health staff (including laboratory staff) take routinely with all patients regardless of the patients' infection status? 2. How do you estimate the number of supplies to set aside for use during an emergency situation?	Minimum level of standard precautions:_____ How supplies are estimated: _____	

Indicators for Monitoring the Quality of District-level Surveillance Activities

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

For this surveillance function:	*Regularly monitor the number of districts that:*
Maintain readiness for epidemic response	▪ Have a plan for outbreak response ▪ Have had access to emergency stocks of drugs and supplies at all times during the last 12 months ▪ Have access to adequate funds for outbreak response ▪ Have a team trained to conduct an outbreak investigation
Identify suspected cases	▪ Have a surveillance coordinating focal person at the district level ▪ Review case registers and logs
Investigate and confirm reported outbreaks	▪ Investigated at least one reported outbreak during the last 12 months ▪ Have laboratory capacity within the district that can confirm suspected cases of priority diseases ▪ Confirm priority diseases in a timely way ▪ Are able to demonstrate safe handling, packaging, storing and transport of specimens to higher level laboratory
Report data	▪ Have had an adequate and reliable supply of recommended forms at all times over the last 6 months ▪ Submitted all required reports to the next highest level on time during the last 6 months
Analyse data	▪ Describe outbreak data by time, place and person ▪ Perform trend analysis by health facility ▪ Have an epidemic threshold for each priority disease and appropriate denominators and a defined response action ▪ Compare quarterly data
Response	▪ Responded within 48 hours of reaching the threshold for action ▪ Meet with community about a health problem at least once every 6 months ▪ Achieved acceptable case fatality rates during the most recent outbreak (for example, no more than 10% for meningitis, no more than 1% for cholera) ▪ Have management committees that evaluated their preparedness and response activities during the last 12 months
Provide feedback	▪ Prepare and disseminate a written report of surveillance information at least quarterly during the last year ▪ Received from a higher level during the last year a written report or bulletin containing information that the district reported ▪ Provide feedback to the community

Supervision	▪ Number of health facilities that received a supervisory visit from the district surveillance focal point during the last 6 months
Training	▪ Number of health personnel in the district that received training for a surveillance function or topic such as investigation during the last 12 months
Resources and personnel	Number of districts with: ▪ transportation or logistical supports (vehicles with fuel, motorcycles) ▪ supplies for carrying out data management (computers, statistical program package) ▪ communication methods (reliable telephone service, facsimile, radiophone, E-mail) ▪ information and education materials (VCR and monitor, portable generator, screen, projector for slides or film) ▪ human resources (trained epidemiologist, laboratory technologists, data managers

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Centers for Disease Control and Prevention