1.0 Public Health Surveillance

1.1 Overview

Historically, disease surveillance in the Caribbean had been primarily focussed on morbidity reporting of communicable diseases. Reports of disease events were often made after epidemics had occurred and they were recognized as such. Surveillance to detect new cases and interventions to control and prevent further disease spread was only then actively pursued. In many instances, active surveillance was undertaken after the epidemic had peaked. Resulting morbidity and mortality may therefore have been avoided, had active surveillance systems been in place as part of a systematic routine.

Numerous positive changes have taken place within recent years. Although this manual focuses on communicable diseases, surveillance activities have been expanded to include non-communicable chronic diseases, injuries, such as, those due to motor vehicular accidents, nutrition and behavioural risk factors.

Public Health Surveillance has been defined as the ongoing, systematic collection, collation, analysis, interpretation and dissemination of health data essential to the planning, implementation and evaluation of public health practice.

The ultimate objective of surveillance activities is its application to disease prevention and control.

This definition of surveillance embraces a concept that is wider than the simple reporting of disease occurrence. Health information includes data such as the immunization status of populations, the identification of risk factors, as well as demographic and other data useful in disease prevention and control programmes. Surveillance can also include procedures to determine other baseline data such as disease incidence and prevalence; and vector distribution and densities, using data generated in day-to-day health programmes. The parameters of surveillance data can therefore be expanded and applied to a number of other areas of health care delivery. An appreciation and knowledge of risks can help to determine vulnerability/susceptibility factors, to which interventions can be applied. For example, in the case of zoonoses and arthropod borne diseases, appropriate strategies to control the vector can be implemented, while measures related to water quality, environmental, veterinary and other health factors may be pertinent to the prevention and control of food-borne illnesses.

Risk data appropriately presented can facilitate the planning process and the evaluation of preventive health care, as well as the optimization of scarce resources through planned intersectoral collaboration, including both the public and private sectors. Public health action would require prioritization on the basis of criteria such as urgency, the severity and extent of problems and adverse effects, identified within the context of available resources. In the case of vaccine-preventable diseases, where the population has been
protected by immunization, the problem may not be as great as in the case of non-immunizable diseases.

Special mention should also be made of the need to maintain active surveillance in situations where diseases may have been eliminated. Vigilance is often diminished when a disease has been eliminated, or its prevalence is significantly reduced. While economic and social considerations play a major role, reduced vigilance and increased complacency are factors contributing to the phenomenon of re-emerging diseases now being experienced in many countries.

Malaria, for example, can be re-introduced and remain unrecognized until secondary cases prompt further investigation. Re-activated cases of tuberculosis can lead to an insidious resurgence of a disease that may once have been under control. It is therefore important that surveillance systems should be designed to identify problems of re-emerging diseases early, in order to facilitate timely implementation of control and prevention measures.

Another area of growing concern is that of newly emerging diseases, sometimes referred to as “exotic diseases”. These diseases pose a special public health problem because of limited information on their aetiology, pathogenesis and mode of transmission, all of which are essential to implementation of effective prevention and control measures. A useful approach to monitoring both newly emerging and re-emerging disease situations would be to augment disease-specific surveillance with the monitoring of syndrome complexes.

This is important within the context of modern day travel, through which, for example, malaria can be re-introduced into a country from which it had been eradicated. The Plasmodium parasite can be imported either by visitors from countries where malaria is endemic, or by residents returning home after visits abroad. Similarly, one of the newly emerging diseases could be imported and remain unrecognized, until an epidemic of an unusual disease syndrome is identified because of associated morbidity or mortality. Surveillance of pyrexias of unknown origin [PUOs] as well as of unusual syndromic presentations should therefore include information on travel history. Sentinel surveillance could play a key role in this activity.

The main uses of surveillance data are to:

- Estimate the size of a health problem (Figure 2)
- Detect outbreaks of communicable diseases (Figures 3 and 5)
- Characterize disease trends (Figure 4, 6)
- Evaluate interventions and preventive programmes (Figure 1)
- Provide information for use in health planning
- Identify training needs in terms of categories and levels
- Identify and prioritize research needs

Some of these uses are illustrated in the accompanying figures.
Figure 1

REPORTED MEASLES CASES AND VACCINATION COVERAGE RATES BY YEAR
ENGLISH SPEAKING CARIBBEAN & SURINAME
1980-1998

Source: Ministries of Health reports to SI/EPICAREC

Figure 2

REPORTED TUBERCULOSIS INCIDENCE RATES PER 100,000 POPULATION
CAREC MEMBER COUNTRIES
1980-1997
FIGURE 3

REPORTED DENGUE FEVER
INCIDENCE RATES PER 100,000 POPULATION
CAREC MEMBER COUNTRIES
1980-1998

FIGURE 4

REPORTED LEPROSY
INCIDENCE RATES PER 100,000 POPULATION
CAREC MEMBER COUNTRIES
1989-1998
**Figure 5**

**REPORTED RUBELLA INCIDENCE RATES PER 100,000 POPULATION CAREC MEMBER COUNTRIES 1982-1998**

**Figure 6**

**REPORTED MENINGOCOCCAL INFECTION INCIDENCE RATES PER 100,000 POPULATION CAREC MEMBER COUNTRIES 1980-1998**
With particular reference to communicable diseases, surveillance is a key activity in national, regional and international control programmes, requiring the coordinated triad of epidemiological, clinical and laboratory inputs.

Since inadequate financing is a common problem, it is perhaps best to develop the surveillance system using cost-effective modification of existing infrastructure in terms of facilities and human resources. Improvements, modifications and extensions to these may be tailored to the needs of individual countries, provided the basic essentials of effective surveillance are not compromised.

Finally, it should be recognised that the availability of new information technologies can greatly enhance the efficiency and effectiveness of the very labour intensive surveillance process of collection, collation and analysis of data and the dissemination of information. Modern informatic technology can handle repetitive actions, store, process and disseminate data rapidly, complementing the core activities in public health surveillance. The computer’s critical role in the area of information management is undisputed. However, adequate attention must be given to the potential problems in the implementation of new technologies. Issues such as standardization, security of data, verification of the output of systems and the amendment of system or process-related policies to accommodate new procedures must be addressed to ensure the efficacy of technology.

1.2 Essential Components and Requirements of a General Communicable Disease Surveillance System

An efficient communicable disease surveillance system is based on three essential components and requirements which are:

1. AN ORGANISATIONAL STRUCTURE
2. A FUNCTIONAL FRAMEWORK
3. OPERATIONAL STEPS

The first component is an organisational structure (1.2.1) with clearly defined levels of responsibility and channels of communication.

Level 1 represents the first point of contact with the disease under surveillance. Health facilities ranging from district health centres to large hospitals are included in this category, the main function of which is case detection and reporting.

Level 2 is located at the district, parish or regional health facility and performs managerial and supportive functions within the system. It is the crucial link between the case detection and policy making levels of the system.

Level 3 represents the central level which coordinates activities on a national scale, formulates policy and is responsible for inter-Ministerial and international collaboration.
The laboratory serves as a supportive pillar in the entire structure for those diseases requiring laboratory confirmation for final case classification and definitive action. The laboratory may also serve as a primary generation of surveillance data in areas such as anti-microbial resistance, which is monitored as a guide to clinical management.

The second component is a **functional framework** (1.2.2) which outlines the primary foci of the surveillance elements, the personnel available and their activities in the routine and outbreak control situations. The smooth functioning of a surveillance system depends on many enabling activities such as training and the provision of the necessary tools.

The third requirement is an awareness of the **operational steps** (1.2.3) commencing with case detection through case investigation and case confirmation to the desired public health action. The detailed requirements of each step must be carefully considered and appropriate systems established which include planning, designation of responsibility, and monitoring of performance.

Central to the success of a disease surveillance system is the close interaction of three major elements - the clinical, the diagnostic and the analytical, represented by the clinician, the laboratory scientist and the epidemiologist, respectively. It is essential that each understands and appreciates the functions of the others.
Note: Although three generic levels are shown on this diagram, individual countries may expand or contract them depending on their specific needs.
### Communicable Disease Surveillance System: Functional Framework

<table>
<thead>
<tr>
<th>System Level</th>
<th>Surveillance Node</th>
<th>Primary Focus</th>
<th>Operating Personnel</th>
<th>Routine Activities</th>
<th>Tools Needed</th>
<th>Outbreak Control Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 1</td>
<td>Health Centre</td>
<td>Community health service</td>
<td>Nurses, Physicians, Public Health workers</td>
<td>Routine surveillance; Case detection and reporting; Health education; Immunisation</td>
<td>Case definitions; Disease fact sheets; Reporting, specimen referral and case investigation forms; Specimen collection kits and instructions</td>
<td>Specimen collection and referral; Case investigation; Case searches; Community mobilisation; Mass immunisation; Environmental monitoring.</td>
</tr>
<tr>
<td>Level 1</td>
<td>Hospital - General and Specialised</td>
<td>Curative medicine</td>
<td>Physicians, Nurses, Surveillance and infection control officers</td>
<td>Case detection and reporting; Case investigation; Specimen collection and referral; Clinical management</td>
<td>Case definitions and detailed clinical profiles; Reporting, specimen referral and case investigation forms; Specimen collection kits and instructions</td>
<td>Specimen collection and referral with necessary data; Case investigation, Case searches, Community mobilisation; Mass immunisation; Environmental monitoring.</td>
</tr>
<tr>
<td>Level 1</td>
<td>Sentinel Physician</td>
<td>Curative medicine</td>
<td>Physicians</td>
<td>Case detection and reporting; Clinical care and referral; Specimen collection</td>
<td>Case definitions and detailed clinical profiles; Reporting forms and specimen kits</td>
<td>Specimen collection and referral with necessary data</td>
</tr>
<tr>
<td>Level 1</td>
<td>University medical centre</td>
<td>Community health service for the university population</td>
<td>Nurses, Physicians</td>
<td>Clinical care and referral</td>
<td>Case definitions; Disease fact sheets; Reporting forms and specimen kits</td>
<td>Case investigation and case searches; Studies of case series; Specimen collection and referral; Community education; Immunisation.</td>
</tr>
</tbody>
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## 1.2.2 Communicable Disease Surveillance System: Functional Framework

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<tbody>
<tr>
<td>Level 2</td>
<td>District, Parish or Regional Health Authority</td>
<td>Community health management</td>
<td>Medical officers; Data clerks; Statisticians; Managers Public Health Nurses</td>
<td>Receipt of reports and tabulation of data; Management of case investigation and active case search; Forwarding of line-listed data and analysis to national level; Supply of disease information and specimen kits to Level 1</td>
<td>Case definitions; Disease fact sheets; Case investigation, specimen referral and line-listing forms; Population data; Epidemiological information; District maps; Epi-analysis software; Specimen collection supplies for distribution</td>
<td>Epidemiological investigation. Specific containment activities including immunisation and vector control; Management of specimen referral and laboratory results; Estimation of resources needed; Procurement and channelling of resources</td>
</tr>
<tr>
<td>Level 3</td>
<td>National Health Authority</td>
<td>National health management</td>
<td>Medical and Statistical officers; Epidemiologists</td>
<td>Receipt of data from district level; Monitoring and feedback of disease trends; Assessment of resource needs; Sourcing of funds and personnel; National policy</td>
<td>All above plus: Outbreak investigation guidelines; Epi-analysis software; National disease situation data; WHO reporting requirements</td>
<td>Dissemination of action plan and monitoring of implementation; Liaison with national and international funding sources; National community awareness; International and Regional reporting; Plan of further containment measures.</td>
</tr>
<tr>
<td>Laboratory</td>
<td>Laboratory, Public, private or University</td>
<td>Diagnostic testing on clinical material</td>
<td>Laboratory technologists; scientists</td>
<td>Provision of information on specimen collection and transport; Supply of transport media; Testing and Reporting Referral to Reference laboratory as appropriate</td>
<td>Technical information on specimen referral, latest laboratory techniques and kits; Results interpretation. Supply of Media, Reagents and suitable Equipment</td>
<td>Receipt of specimens and testing by appropriate methods; Prioritisation of tests; Rapid feedback of results with interpretation; Assessment of needs</td>
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1.2.3 **COMMUNICABLE DISEASE SURVEILLANCE SYSTEM: OPERATIONAL STEPS**

1. **CASE DETECTION**
2. **CASE INVESTIGATION**
3. **CASE CONFIRMATION (CLINICAL, EPIDEMIOLOGICAL OR LABORATORY)**
4. **APPROPRIATE PUBLIC HEALTH ACTION**

There are specific requirements for the efficient operation of each of these steps.

1. **Case detection requires:**
   a) Facilities that interact closely with the community, providing both curative and preventive services. It is important to include different types of health facilities in order to obtain a broadly based system covering different sectors of the community. Bearing in mind that many of these are short-staffed, the number of diseases under routine surveillance should be kept to a minimum.

   b) Clear, simple case definitions that will ensure consistent standardised reporting and reliable information on disease occurrences and trends over time. These must be readily available at all Level 1 sites.

   c) A standardized reporting system that is manageable over the long term by those who will be using it. Existing communication links, even if unsophisticated, should be retained until newer systems have proven themselves.

   d) National feedback to stimulate routine reporting and to motivate staff.

2. **Case investigation requires:**
   a) Reporting within the agreed time frame. Class 1 diseases, (see 2.2), are immediately reportable and require prompt case investigation and rapid response.

   b) Trained investigators, who will obtain accurate responses and the essential items of information.

   c) Well-designed investigation data forms, arranged in a logical format and compatible with manual or computer data analysis.

   d) Coordination of the activities of Level 1 where the investigation begins and Level 2 where it is completed with the addition of epidemiological, clinical and laboratory data.

   e) Coordination with the laboratory to ensure that results are sent to the original referring location and accurately recorded on the appropriate case investigation form. Unique case identification numbers used on the case investigation, laboratory request and laboratory result forms are invaluable in the reconciliation of data.
3. Case confirmation requires:

Clinical case confirmation is based on the accurate use of the case definition and may suffice where the symptoms are highly specific, or where there are inadequate laboratory facilities, or during an outbreak, where the first few cases have been laboratory confirmed.

Laboratory case confirmation is based on:

a) Specimens that are appropriately collected, stored and transported. The validity of most test results requires that these conditions be satisfied. Results reported on the assumption that specimens were properly handled may be quite erroneous since organisms may have been destroyed and antibody degraded. Both general and specific guidelines are required.

b) Specimen referral forms with adequate data. The minimum data set should include - dates of onset of illness and specimen collection; main clinical findings; antimicrobial therapy; type of specimen; immunization history of the patient. These are all important in interpreting test results.

c) Technical proficiency of laboratory staff arrived at through constant training and proficiency testing, and adequate supervision.

d) Prompt reporting of results through agreed channels. Late reporting of results frustrates the purpose of surveillance since it causes delayed public health action which may then be ineffective.

Epidemiologically linked confirmation requires that a clinical case is linked in time, place or circumstances to a laboratory confirmed case. This classification requires careful investigation and recording of travel and exposure histories, and analysis of all epidemiological data.

Note: In an epidemic situation, public health action does not require laboratory confirmation of every case. Once the cause of the outbreak has been established by laboratory confirmation of the initial cases, it can be managed on the basis of clinical confirmation.

4. Public Health Action requires:

a) Disease control guidelines, that should be present at every decision-making node of the surveillance network.

b) Case confirmation by clinical criteria, positive laboratory tests or epidemiological linkage to a confirmed case.
c) Collation and analysis of epidemiological data to identify the populations affected or at risk, to define the mode of transmission, to decide on the strategies most likely to minimise the effect of disease on the community.

d) Formulation of a plan of action with specific activities and a time frame.

e) Identification of human and financial resources

f) Implementation of designated functions at all levels with supervision and monitoring according to performance criteria.

g) Completion and writing of surveillance reports.

h) Evaluation of each public health exercise and feedback to all levels of the system.

1.2.4 Sentinel Surveillance

Sentinel Surveillance is a sensitive method of obtaining early warning of, or prompt information on, a limited number of diseases through selection of sites which have a high probability of detecting cases and the ability to rapidly and accurately report through designated channels.

1. Why do we need Sentinel Surveillance?

a) As a parallel system to estimate the completeness of reporting of the routine system and to validate its sensitivity and specificity. The accuracy and consistency of reporting in the routine system may lapse with time and this may be undetected without a sentinel standard of comparison.

b) To expand the detection network in the early stages of an outbreak. One example of this is dengue fever, which occurs in many Caribbean countries, causing considerable morbidity and requiring prompt public health action for its control. A widespread alert prior to the season of high incidence will provide early warning of its emergence and allow effective control.

c) To detect the introduction of a disease occurring in other countries, e.g. cholera, hepatitis E. Current global information on the occurrence of communicable diseases is now easily available. Public health authorities are therefore aware of potential threats to their populations and are in a position to assess their relative importance and select those which warrant special surveillance.

d) To obtain information on diseases not included in the routine surveillance system, e.g. varicella and conjunctivitis. Conducting a status assessment on certain diseases is a necessary first step in defining the need for control activities such as
vaccination, for modifying existing strategies or for determining the impact of an intervention.

e) **To detect the re-emergence of diseases which have been eradicated or eliminated, e.g. poliomyelitis.** Diseases no longer occurring in the region may be subject to Sentinel Surveillance to detect any recrudescence in particular areas or high-risk populations.

f) **To detect the emergence of diseases which may appear due to a change in risk factors, e.g. Arboviral diseases following dam construction.** The possible adverse health consequences of any planned land development or population movement should be assessed before changes are made, and efforts should be made to minimise these. However, it is desirable to monitor the population during and after the change to detect expected or unexpected health problems, and to seek early solutions.

2. **Who are the potential participants and how are they selected?**

   a) **Health Centres**, serving a specific catchment area, may be asked to conduct sentinel surveillance for a disease which may appear in that area. An example of this is yellow fever surveillance in villages on the periphery of a forested area known to be enzootic for the virus.

   b) **Private medical practitioners** may be recruited depending on location, scope and type of practice. Examples would include paediatric practices for surveillance of respiratory or diarrhoeal disease in infants, or family practices for dengue.

   c) **Public and private laboratories** which perform the required tests in sufficient volume and to an adequate standard may be asked to participate in, for example, a programme to collect information on the different types of viral hepatitis.

   d) **Special institutions and population groups** provide information on a defined community which may be appropriate for certain types of surveillance. Examples of this category are *University facilities*, serving a young adult community drawn from different countries; *Medical facilities of the protective services*, serving an adult, predominantly male group distributed throughout the country; *Prison medical services*, serving a group of incarcerated adults with special health risks; *Hotel staff and guests*; a dual community exposed for varying periods to the same environment.

   e) **Hospitals**, both general and specialised, are a source of information on the more severe cases of any disease under sentinel surveillance. Specific departments may report directly to the system manager, but care should be taken to avoid duplicate reporting of cases detected at health centres or in private practice and referred to hospital.
3. How are sentinel sites linked to the public health system? With whom do they interact?

The operation of the routine surveillance system is well established and understood by all. In setting up a sentinel system additional reporting sites are recruited or staff of existing facilities are asked to carry out additional duties. Care must be taken to clarify reporting channels and points of contact with those responsible for data management and public health action.

Arrangements are needed for:

a) Reporting either to the district (level 2) or to a designated person in the epidemiology unit (level 3).

b) Supply of literature, reporting and case investigation forms.

c) Collection and referral of laboratory specimens. This may be the responsibility of the person reporting or may be handled by the routine system.

d) Feedback from the national Health Authority. This should be an active system with frequent status bulletins to maintain interest.

e) Educational activities. Clinical updates and seminars and patient management information will help to raise awareness and encourage cooperation.

4. Who switches the system on and off?

Sentinel surveillance systems are set up for a specific purpose on the authority of the National Level (e.g. the Chief Medical Officer or Epidemiologist). If a time-limited system is no longer needed, or is no longer serving its purpose, it should not be left to peter out but should be officially terminated. This can be done by a final summary report which should include action taken as a result of the activity, and a statement of the current status of the disease. This should be disseminated to all participants.

A letter of appreciation from the National Level will leave the door open for further collaboration.

1.2.5 Reporting of Disease Syndromes

Disease specific surveillance involves the following:

- Case detection based on a clinical case definition that is simple and sensitive
- Extensive case investigation that introduces some specificity
- Confirmation of a specific disease based on a combination of clinical, epidemiological and laboratory data
This procedure frequently results in delayed reporting since considerable decision making is required at the peripheral level before the Public Health system even becomes aware of a potential threat.

The effectiveness of public health action is sometimes compromised by the perceived need to await definitive confirmation of aetiology which can only be provided by laboratory tests not available in-country.

In an effort to overcome these difficulties a system of **syndromic disease reporting** has been proposed by the World Health Organization as a means of rapidly detecting syndromes/disease events that may cause a significant **international** public health problem. Syndromic notification will be followed by disease-specific information as soon as it becomes available.

A WHO sponsored pilot study of this international system is underway and, until it is assessed, the reporting of **cholera, plague and yellow fever remains an obligation under the present International Health regulations**. (For further information see Section 6 of this Manual).

In parallel with this international initiative it is considered advisable to introduce syndromic reporting as part of the national surveillance systems in the Caribbean.

The syndromes presented in Table 1 are easily recognised and can be promptly reported, alerting the public health system to the possibility of one or more diseases. In some cases action can be taken prior to a definitive diagnosis, but in any event expert assistance can be enlisted at an early stage.

Reporting of disease syndromes may be used in different ways depending upon the needs of each country:

a) **As a sensitive screening platform from which to focus attention on specific diseases.**

b) **As a rapid reporting supplement to existing disease-specific national surveillance activities**

c) **As an alternative system to be used where medically trained health workers and adequate laboratories are not available to support specific disease reporting.**

The following eight syndromes (*Table 1*) are proposed as covering all the important communicable diseases which may be a threat to public health and which are under surveillance in CAREC Member countries.

Receipt of a syndromic report should trigger a response from level 2 which starts with case investigation using the appropriate forms. This will serve to narrow the list of possibilities to one or two diseases, based on additional clinical and epidemiological information.
Requests for further laboratory, medical or epidemiological assistance can then be made through the national authorities who will decide on immediate control activities.

It is important to provide feedback on the final diagnosis to levels 1 and 2 and to inform them of long range plans for control and prevention of the disease.
### TABLE 1: SYNDROMIC CHARACTERISTICS AND SPECIFIC DISEASES ASSOCIATED

<table>
<thead>
<tr>
<th>SYNDROME</th>
<th>CHARACTERISTICS</th>
<th>SELECTED DISEASES WITHIN THESE SYNDROMES</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Febrile systemic disease</td>
<td>Sudden onset of fever, headache, muscle and joint pain; occasionally gastrointestinal symptoms; may be biphasic or recurrent</td>
<td>Brucellosis, Dengue fever, Leptospirosis, Malaria, Typhoid fever</td>
</tr>
<tr>
<td>2. Fever with rash</td>
<td>Onset with fever and systemic symptoms; generalised eruption (macular, papular, vesicular) or eruption localised to parts of the skin and/or mucous membranes</td>
<td>Dengue fever, Measles, Rubella</td>
</tr>
<tr>
<td>3. Fever with respiratory symptoms</td>
<td>Fever with laryngitis, pharyngitis, cough, thoracic pain, pulmonary edema, fatigue, purulent or blood-stained sputum</td>
<td>Diphtheria, Hantavirus pulmonary syndrome, Legionnaires’ disease, Pertussis, Pneumococcus infection, Plague (pneumonic), Tuberculosis</td>
</tr>
<tr>
<td>4. Gastrointestinal symptoms with or without fever</td>
<td>Nausea, vomiting, abdominal cramps, diarrhoea with or without mucus or blood</td>
<td>Cholera, Foodborne illness, Gastroenteritis, Salmonellosis, Shigellosis</td>
</tr>
<tr>
<td>5. Fever with jaundice</td>
<td>Acute or insidious onset of fever, headache, backache, anorexia, malaise, fatigue, nausea, abdominal pain or discomfort, vomiting, jaundice</td>
<td>Leptospirosis, Viral hepatitis, Yellow Fever</td>
</tr>
<tr>
<td>6. Fever with haemorrhagic symptoms</td>
<td>Onset of fever with systemic symptoms; second phase after 3-5 days with cutaneous bleeding (petechiae, ecchymoses); internal bleeding (haematemesis, melena, haematuria); sometimes jaundice, shock</td>
<td>Dengue Haemorrhagic fever, Leptospirosis, Yellow Fever</td>
</tr>
<tr>
<td>7. Fever with neurological symptoms</td>
<td>Fever with systemic symptoms, headache, vomiting, neck stiffness and/or pain; confusion, disorientation, anxiety, hyperactivity, tremors, spasticity, convulsions, coma</td>
<td>Meningitis/Encephalitis, bacterial or viral, Poliomyelitis, Rabies, Tetanus,</td>
</tr>
<tr>
<td>8. Genital discharge or ulcer</td>
<td>Urethral or vaginal discharge, itching, burning, dysuria, genital or perianal ulcers in males or females, papule, bubo, skin rash</td>
<td>Sexually transmitted diseases including Chlamydia, Gonorrhoea, Syphilis, Herpes</td>
</tr>
</tbody>
</table>
1.2.6 Requirements of a Specialised Surveillance System

Measles is used as an example. This approach may be adapted for other diseases.

Specialised surveillance systems are established for diseases with clearly defined regional or global goals of disease reduction, elimination or eradication. The emphasis is on high quality surveillance which is assured through the establishment of performance standards for every procedure and maintained by constant monitoring of performance indicators. A high degree of standardization is needed for inter-country collation of data.

In 1991, Caribbean Health Ministers adopted a goal of measles elimination by the year 2000, and began implementation of the PAHO strategies of mass immunization to interrupt transmission followed by high routine coverage and sensitive, case-based surveillance to detect introduction or recrudescence of the disease.

Specialised surveillance systems should, as far as possible, be integrated into routine disease surveillance systems, and should serve to enhance the quality of case detection, reporting and investigation. Characteristics of specialised systems are:

1. Simple clinical criteria for case detection and reporting

The aim of this simplicity is high sensitivity of case detection, with the responsibility for case confirmation (specificity) resting on level 2 or 3.

Every case of measles must be identified, and classified as indigenous or imported in order to determine the circulation of measles virus in the community.

Measles is a febrile rash disease which is detected and reported on the basis of the following clinical case definition.

Measles Case Definition: Any person with fever and a maculopapular rash or any person in whom a clinician suspects measles infection.

Suspect measles is immediately reportable (within 24 hours) to the district level, and every effort is made to enlist the non-public health sector through paediatric and University associations.

2. Rapid and standardised case investigation

Suspect cases are investigated within 48 hours of notification using a standard case investigation form. (See 3.15.4 for a sample form). A unique identifying number is assigned to each case (the EPID number). This is used along with demographic information to positively identify the case and to link clinical, epidemiological and laboratory data.
All items on the investigation form are needed for accurate interpretation of laboratory results and final case classification. Particularly important are dates of onset and specimen collection, immunization history and travel history.

3. **Laboratory confirmation**

Case investigation includes laboratory investigation of every case to exclude the many other causes of fever and rash. These include rubella, dengue fever, early chicken pox, enterovirus infections, scarlet fever and roseola.

Although many methods of laboratory confirmation are available, for a specialised surveillance system only one or two are selected based on a balance between sensitivity and practicability. Only designated laboratories should be used since these are required to adhere to stringent laboratory protocols of testing and interpretation of results. Training is given and specific reagents are recommended or provided. The recommended test for measles is the ELISA for Measles-specific IgM antibodies.

An adequate specimen is collected from every case of suspected measles. With reference to measles surveillance, an adequate specimen is a blood sample taken within 3 to 28 days of rash onset. (However, it is recommended that a blood sample be collected on first contact, to ensure that every case is tested). The accompanying laboratory request form should state the dates of onset and collection. The blood sample is transported rapidly to the laboratory where the Measles IgM test is done within 3 days, and results reported to the sender of the specimen and to the programme manager.

4. **Effective public health action**

A confirmed case, or a cluster of cases, indicates circulation of the measles virus in the community. The public health options include intensive house-to-house “mop-up” vaccination in the affected district or a country-wide “keep-up” campaign of all children born since the initial mass campaign, to reduce the number of accumulated susceptibles.

5. **Monitoring of performance indicators**

The quality of surveillance is assessed by performance indicators such as:

- Proportion of reporting sites that report each week (target 80%).
- Proportion of sites reporting at least one suspected measles case per year (80%)
- Proportion of cases investigated within 48 hours of notification (target 80%)
- Proportion of cases with adequate specimens or epidemiologic linkage to a laboratory confirmed measles case (target 80%)
- Proportion of total laboratory confirmed cases with source of infection identified (target 80%).
6. Data analysis and the production of status reports

The effectiveness of specialised surveillance is measured by on-going data analysis at the national level, the level which interacts with PAHO/WHO and funding agencies. Monthly status reports are produced to document progress or highlight areas of weakness. Such reports include:

- Measles immunization coverage by district
- Completeness of weekly reports by district
- Clinical and laboratory confirmed cases by district
- Immunization status of confirmed cases
- Confirmed cases by age at rash onset
- Cases with surveillance failure (late notification/investigation; no adequate specimen)

1.3 Essential Attributes of a Surveillance System

The ultimate objective of a surveillance system is its application to disease control and prevention. Within each system, there are elements which have specific objectives. The combination of these elements determines the overall strength or weakness of the system. In order to meet its specific objectives and maximize the effectiveness of the system, there are certain essential attributes which should characterize all stages of the process. These attributes may be qualitative or quantitative. Among the qualitative attributes that should be considered in the organisation of a surveillance system simplicity, flexibility and acceptability are of special importance.

1.3.1 Qualitative and Quantitative Attributes

Simplicity of a system refers to its structure and its ease of operation, both of which are interrelated. As a general principle, the structure design and size of the system should be as simple as the requirements for meeting its objective would allow. In small systems in which data handling and two-way flow of information are streamlined, high levels of compliance in reporting and other associated areas are usually achieved. Simple systems are also less costly to maintain than larger complex ones. On the other hand, the objectives of the system are the key considerations against which expected returns should be measured, and should be used as a guide in the final determination of its structure and size. Consideration should be given to the quantity and type of data required; the mechanisms for collecting, collating, analyzing, disseminating and using the data generated by the system; the infrastructure required to ensure cost-effective operation of the system.

Disease surveillance is a dynamic process. Trends change, new diseases appear, methods of diagnosing, reporting, controlling and preventing diseases change over time. To maintain effectiveness, flexibility should be a built-in attribute of any surveillance system. This would facilitate prompt responses to changing disease conditions, including corresponding demands for changes in appropriate public health action.
Surveillance requires the participation of contributors and users and the level of this participation is to a large degree a reflection of the acceptability of the system. Inputs by participants into practical aspects of the design/modification of the system are therefore important. One measure of acceptability is the level of compliance at the various points of interaction between the system and its participants.

Accuracy ensures that all the information is valid and correctly documented. Timeliness may be viewed from two aspects. One is the promptness of reporting in terms of meeting specific deadlines. The other aspect of timeliness, relates to the interval between any two or more steps in a surveillance system. e.g. time between disease occurrence, diagnosis and receipt of report and appropriate public health intervention. Delay in this case, is assessed by its relevancy to the urgency of the problem in relation to the required response. Completeness requires that all relevant information is collected, including negative reports.

Representativeness is important in that a surveillance system should provide reliable and unbiased information on the occurrence of a health event over time, and its distribution in the population by place and person. This can be assessed to some degree either by comparing the characteristics of reported events with those of all such events that occurred, or through the use of special studies conducted in a representative sample of a population.

Sensitivity of a surveillance system describes the ability of a system to detect the cases or other health events that it is intended to detect. Sensitivity also refers to the system’s ability to detect epidemics and other changes in disease occurrence. Many surveillance systems detect only a small proportion of the cases that actually occur, and while it may not be cost efficient to achieve 100% sensitivity as regards individual cases ascertainment, there is need to ensure nonetheless that the system is sufficiently sensitive to identify community-wide problems.

Predictive Value Positive is defined as the proportion of reported cases who actually have the condition being monitored or the proportion of reported epidemics which were actually epidemics. That is, it is a measure of the predictive value of a reported case or epidemic. We measure predictive value positive by investigating whether the reported cases and epidemics meet our definition for a true case or real epidemic. The more “false-positive” reports there are in a surveillance system, the lower the predictive value of the reports. These result in unnecessary investigations, wasteful allocation of resources, and especially for false reports of epidemics – unwarranted public anxiety.

1.3.2 Surveillance Process

Surveillance activities include a number of monitoring functions e.g. of contacts of cases of communicable diseases, of the environment and other factors affecting disease transmission. Perhaps the most important feature of the communicable disease surveillance process is data management which includes:
Data analysis, however, is the most prominent feature. Epidemiologists use surveillance data for monitoring the health status of populations. Thus, describing a health problem or event and defining its magnitude and trend in populations over time are two important ongoing surveillance functions. In order to understand the basic dimensions of a health problem or event, we usually analyse the data by time, place and person. Hence, for example, during the conduct of an outbreak investigation, we create a line listing of information including data on age, gender, time and date of onset of illness, place of residence or employment, etc of affected cases. Similarly, from our surveillance data, we must be able to document the incidence or prevalence rate of the health problem by month or year; to graph the number of reported cases of a health event occurring over time using histograms, epidemic curves, etc; and to group affected cases by their age, immunisation status, common exposure etc.

The organisation and presentation of such data is very important for communicating effectively with policy makers, politicians, etc and other stakeholders.

1.3.3 SOURCES OF SURVEILLANCE DATA

There are at least ten major sources or kinds of data relevant to disease surveillance. They are:

- Mortality reports
- Morbidity reports
- Epidemic reports
- Reports of laboratory utilisation
- Reports of individual case investigations
- Reports of epidemic investigations
- Special surveys (e.g. of hospital admissions, disease registers, and serologic surveys)
- Information on animal reservoirs and vectors
- Demographic data
- Environmental data

**Mortality reports** – the usefulness of mortality data as a surveillance tool in disease control is limited by several characteristics. Data from death certification gives only a cause of death and is not always accurate in terms of reflecting underlying disease; there can be long delays (several months or longer) in accessing the data; some communicable diseases have a very low fatality rate, and in those with a high fatality rate the interval between onset and death may be prolonged.

**Morbidity reports** – despite the fact that certain diseases are notifiable by law, most countries share a common experience of under-reporting. Lists of notifiable disease may be too long; the system of data collection may be unsatisfactory; and very often there is
a breakdown in feedback to the contributors with a resulting loss in interest. Although the true extent of disease occurrence cannot be determined by reports from this source, Sentinel reporting is usually accurate and timely and can provide an indicator of increase or decrease in disease occurrence. If carefully selected, this source can also provide some indication of distribution.

**Epidemic reports** – these may be received from a variety of sources: Medical officers at region, parish or county levels; epidemiologists investigating outbreaks; hospitals or other health institutions at which a large number of persons are seen in a cluster e.g. presenting with gastro-intestinal disturbances; community sources. Reports often appear in the media, and while these may be inaccurate they should be subject to at least preliminary investigation.

**Laboratory reports** – laboratories should report to the surveillance system, to which they should be integrally linked.

**Reports of individual case investigations** – early diagnosis and control measures may prevent outbreaks. They may also be useful in detecting weaknesses in immunization programmes, especially in the EPI.

**Reports of epidemic investigations** – surveillance and investigation procedures may be improved upon by critical reviews of such reports. Reports of actual investigations are useful tools in training programmes.

**Special surveys** – these are used to provide information needed for special purposes which are not available from routine surveillance data.

**Information on animal reservoirs and vectors** – has practical application in the implementation of prevention and control measures against vector borne diseases.

**Demographic data** – obtained from official population census and used as baseline data in epidemiological analyses.

**Environmental data** – monitoring of these data provides information on levels of risk factors for certain communicable diseases and is of special importance in disaster situations.

After collation and analysis, data interpretation should be presented in a form upon which public health action can be based. Finally, to achieve the end point of the system, adequate mechanisms for the prompt feedback of processed data must be in place to facilitate implementation of the required public health response. Feedback should be at periodic intervals, determined to some extent by particular disease situations, and recipients should include both contributors to, as well as users of the system.

Co-ordination at Country level should be the responsibility of the Designated National Epidemiologist, and all personnel involved in the system should be familiar with all aspects of procedures to be followed. Particular roles/functions within the system should be clear, and ongoing relevant training should be an integral element of the system.
2.0 Diseases and Conditions Under Surveillance

The Communicable diseases which have been selected for surveillance in the Caribbean, and which will be discussed in detail in Section 3 of this manual, can be arranged into categories which justify their inclusion.

2.1 Categories of diseases under surveillance.

a) Diseases subject to the International Health Regulations
   Cholera, plague and yellow fever.

b) Diseases under international surveillance
   AIDS, malaria and influenza

c) Diseases of the Expanded Programme on Immunization
   Tuberculosis, diphtheria, pertussis, tetanus, poliomyelitis, measles, mumps, rubella and congenital rubella syndrome.

d) Diseases of interest in the Region of the Americas
   Meningococcal infection (*Neisseria meningitidis*), leprosy, dengue fever, dengue haemorrhagic fever/dengue shock syndrome.

e) Diseases of interest in the Caribbean
   Typhoid fever, food borne illness, viral hepatitis A and B, rabies in humans, leptospirosis, salmonellosis, shigellosis, gastroenteritis, sexually transmitted diseases and viral meningitis/encephalitis.

f) Diseases of national interest
   Meningitis due to *H. influenzae* and invasive pneumococcal disease.

g) Other diseases of potential concern
   Legionnaires’ disease, hantavirus pulmonary syndrome and brucellosis in humans.

2.2 Reporting classes of selected diseases

These are further classified for reporting purposes according to the practical benefit that can be derived from reporting.
a) Class 1

Case report universally required by International Health Regulations or as a disease under surveillance by WHO.

- An obligatory case report is made by level 1 to level 2 by telephone, Fax or other rapid means within 24 hours
- Level 2 forwards the initial report to the national level by the most expeditious means.
- On confirmation of a case the national authority reports to WHO according to the International Health Regulations or standard format.

b) Class 2

Case report regularly required wherever the disease occurs.

- A case report is made by level 1 to level 2 by phone, Fax or other rapid means within 24 hours
- The first recognised case will be reported within 48 hours by the most rapid means to the national level
- Subsequent cases will be reported weekly by level 2 to the national level. A line-listing format may be used and the data transmitted by Fax, messenger or mail.

c) Class 3

Selectively reportable in recognised endemic areas

- A case report is made by level 1 to level 2 within 48 hours by the most practicable means.
- Reports are forwarded by level 2 to the national level collectively by mail weekly or monthly. A line listing format may be used.

d) Class 4

Obligatory report of epidemics

- No case report is required.
- Outbreaks are promptly reported by level 1 to level 2 by the most rapid means.
- These are forwarded by level 2 to the national level by phone or Fax. Only numbers of cases are required, with relevant epidemiological data.

NOTE: Apart from the reporting requirements described above it is imperative that complete case investigations be carried out to identify the aetiologic agent and source of infection and to determine the appropriate public health action.
### 2.3 List of diseases and conditions under surveillance

<table>
<thead>
<tr>
<th>DISEASE</th>
<th>CLASS</th>
<th>CATEGORY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cholera</td>
<td>1</td>
<td>DISEASES SUBJECT TO THE INTERNATIONAL HEALTH REGULATIONS</td>
</tr>
<tr>
<td>Plague</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Yellow Fever</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Acquired Immunodeficiency Syndrome</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Malaria</td>
<td>1(3)*</td>
<td>DISEASES UNDER INTERNATIONAL SURVEILLANCE</td>
</tr>
<tr>
<td>Influenza</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Tuberculosis</td>
<td>2</td>
<td>DISEASES OF THE EXPANDED PROGRAMME ON IMMUNIZATION</td>
</tr>
<tr>
<td>Diphtheria</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Pertussis</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Tetanus And Neonatal Tetanus</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Poliomyelitis</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Measles</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Rubella And Congenital Rubella Syndrome</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Meningococcal Infection (Neisseria meningitidis)</td>
<td>2</td>
<td>DISEASES OF INTEREST IN THE REGION OF THE AMERICAS</td>
</tr>
<tr>
<td>Leprosy (Hansen’s Disease)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Dengue Fever (classical)</td>
<td>4</td>
<td>DISEASES OF INTEREST IN THE CARIBBEAN</td>
</tr>
<tr>
<td>Dengue Haemorrhagic Fever/Shock Syndrome</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Sexually Transmitted Diseases</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Typhoid</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Food Borne Illness</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Gastroenteritis (&lt;5 Years)</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Viral Hepatitis A</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Viral Hepatitis B</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Viral Meningitis/Encephalitis</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Rabies (In Humans)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Leptospirosis</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Salmonellosis</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Shigellosis</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Pneumococcal Disease (Invasive)</td>
<td>3</td>
<td>DISEASES OF NATIONAL INTEREST</td>
</tr>
<tr>
<td>Meningitis (due to H influenzae)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Brucellosis (In Humans)</td>
<td>3</td>
<td>OTHER DISEASES OF POTENTIAL CONCERN</td>
</tr>
<tr>
<td>Legionnaires Disease</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Hantavirus Pulmonary Syndrome</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

Malaria may be categorised as Class 3 in endemic countries

**Note:** Countries may choose to adjust the reporting class of a disease to suit national requirements.
3.0 Selected Diseases under Surveillance

Detection of cases is based upon clinical signs and symptoms that can be observed at the peripheral level by all alert health care workers. The first and most important responsibility is to report suspected cases, based on standard case definitions, to the appropriate level and to maintain a tally of reported cases based on clinical criteria. We have tried to make our case definitions consistent with those used by the WHO, CDC and LCDC (see References), but have taken cognisance of the realities in the Caribbean.

The syndromic reporting system should be used (see Section 1.2.5) if this has been accepted by the national authorities for use in certain areas or throughout the country. It may be used where the health care worker is uncertain of the specific disease indicated by the symptoms being observed.

Case confirmation usually involves laboratory investigation. The laboratory will initially focus on tests needed to confirm the reported provisional diagnosis. If these tests are negative, and especially if there is a cluster of suspected cases, the laboratory will consider the differential diagnoses and will perform additional tests. This may result in confirmation of a disease not originally reported. On receipt of these results the District or National epidemiologist should amend the records so that the correct disease is recorded and duplication is avoided.

If a positive laboratory result is obtained on an asymptomatic person he is regarded as a confirmed case.

The tests listed as necessary for laboratory confirmation may be available in country, at CAREC, or at another reference laboratory. CAREC laboratory staff will arrange referral to another institution if necessary, and will advise on collection of appropriate specimens and required transport conditions.

The importance of appropriate specimen storage and transport cannot be over-emphasised. Adherence to recommended temperature, time, medium, and shipping container requirements will ensure the preservation of any organisms or antibodies present in the specimen at the time of collection. Improper handling will result in erroneous laboratory results.

WHO has produced a booklet “Guidelines for the safe transport of Infectious substances and diagnostic specimens” which emphasises the safety aspects of specimen transport. This document is available on request from CAREC.
### 3.1 Acquired Immunodeficiency Syndrome (AIDS)  
**CLASS 3**

<table>
<thead>
<tr>
<th>Internationally notifiable:</th>
<th>Yes</th>
</tr>
</thead>
</table>
| Reporting interval:         | Monthly to National Authorities  
Quarterly to CAREC |
| Report to (country level):  | National Epidemiologist or National AIDS  
Programme Co-ordinator as is relevant |
| Report to (regional level): | CAREC’s Epidemiology Division |

#### 3.1.1 Introduction

AIDS is a constellation of symptoms, signs and illnesses resulting from a compromised immune system following infection with human immunodeficiency virus (HIV) in the absence of other known causes of immunosuppression.

Please refer to Appendices 1 and 2 for a list of the known causes of immune deficiency and the diagnostic methods for the indicator diseases of AIDS, respectively.

#### 3.1.2 Adults and Adolescents (Aged 13 Years and Older)

A **confirmed** case of AIDS is defined as an individual, aged 13 years or older, who in the absence of the other known causes of immunosuppression (see Appendix 1), has a repeatedly positive screening test for HIV by an enzyme linked assay (ELISA) **together** with

- at least 2 **major** signs AND at least 1 **minor** sign (see below)

  or

- at least one **indicator** disease (see below)

**Major signs**

- Involuntary weight loss of > 10 % of baseline body weight  
- Chronic diarrhoea with at least two loose stools per day for \( \geq 30 \) days  
- Intermittent or constant fever for \( \geq 30 \) days

**Minor signs**

- Persistent cough for \( \geq 30 \) days  
- Generalized pruritic dermatitis  
- Herpes zoster, multi-dermatomal  
- Oro-pharyngeal candidiasis  
- Generalized lymphadenopathy
Indicator Diseases

- Bacterial pneumonias, recurrent (≥2 per year)
- Candidiasis of bronchi, trachea, or lungs
- Candidiasis, oesophageal
- Cryptococcosis, extrapulmonary
- Cryptosporidiosis, chronic intestinal (≥30 days)
- Cytomegalovirus disease (other than liver, spleen, or nodes)
- Cytomegalovirus retinitis (with loss of vision)
- Encephalopathy with no other cause
- Herpes simplex: chronic ulcer(s) (≥30 days; or bronchitis, pneumonitis, or esophagitis
- Histoplasmosis, disseminated or extra pulmonary
- Kaposi’s sarcoma
- Lymphoma, Burkitt’s
- Lymphoma, immunoblastic
- Lymphoma, primary of brain
- *Mycobacterium avium* complex or *M. kansasii*, disseminated or extrapulmonary
- *Mycobacterium tuberculosis*, any site (pulmonary or extrapulmonary)
- *Pneumocystis carinii* pneumonia
- Toxoplasmosis of brain
- Non-typhoid *Salmonella* septicemia
- Wasting syndrome (defined as ALL of the major signs)
- Invasive cervical cancer

### 3.1.3 Infants and Children (less than 13 years of age)

A confirmed case of pediatric AIDS is defined as an individual less than 13 years of age, who in the absence of other known causes of immunosuppression (see Appendix 1), has a repeatedly positive screening test for HIV by an enzyme linked assay (ELISA) together with

- at least 2 major signs AND at least 2 minor signs (see below)

or

- at least one indicator disease (see below)

#### Major signs

- Weight loss > 10% of baseline or failure to thrive
- Chronic diarrhoea with at least 2 loose stools per day for > 30 days
- Intermittent or constant fever for > 30 days
- Failure to thrive
Minor signs

- Generalized lymphadenopathy
- Oro-pharyngeal candidiasis
- Repeated common infections (otitis, pharyngitis, etc.)
- Persistent cough
- Generalized dermatitis
- Confirmed maternal HIV infection

Indicator diseases

- Chronic (persisting over 2 months) lymphoid interstitial pneumonitis
- Bacterial infections, unexplained, serious, recurrent (≥2 in a two-year period), including sepsis, meningitis, pneumonia, abscess of an internal organ, and bone/joint infections
- Candidiasis of bronchi, trachea, or lungs
- Candidiasis, esophageal
- Cryptococcosis, extra pulmonary
- Cryptosporidiosis, chronic intestinal ≥30 days
- Cytomegalovirus infection with onset after 6 months of age
- Herpes simplex infection, disseminated, with onset after 1 month of age
- Histoplasmosis, disseminated or extrapulmonary
- Kaposi’s sarcoma
- Lymphoma, Burkitt’s
- Lymphoma, immunoblastic
- Lymphoma, primary of brain
- *Mycobacterium avium* complex or M. kansasii, disseminated or extrapulmonary
- *Mycobacterium tuberculosis*, any site (pulmonary or extrapulmonary)
- Pneumocystis carinii pneumonia
- Toxoplasmosis, disseminated, with onset after 1 month of age

3.1.4 TECHNICAL NOTES

In those cases where laboratory confirmation of HIV infection cannot be obtained, a case of AIDS may be reported on its clinical presentation.
HIV Post-Test /AIDS Reporting Form

1. Demographic Data

<table>
<thead>
<tr>
<th>Last Name</th>
<th>First Name</th>
<th>ID Number</th>
<th>Date of Birth</th>
<th>Street Address</th>
<th>District Address</th>
<th>Occupation</th>
<th>Sex</th>
<th>Education Level attained</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>None</td>
<td>Married</td>
</tr>
<tr>
<td></td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>Primary</td>
<td>Common-Law Union</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Secondary</td>
<td>Unmarried + regular visiting partner</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Tertiary</td>
<td>Unmarried, no regular partner</td>
</tr>
</tbody>
</table>

To create an ID number: Use the Last Name Initial, First Name Initial followed by Year, Month and Day of birth. e.g. John Doe dob 28 August 1952 is DJ520828

Please ensure that the sex, date of birth & the district address is recorded.

2. Reason for HIV Test [Tick as appropriate]

<table>
<thead>
<tr>
<th>Reason</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antenatal Management</td>
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<td></td>
</tr>
<tr>
<td>Blood Donor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diagnostic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Occupational Exposure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patient Request</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Visa/Insurance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Was patient known to be HIV positive prior to this report?

Was Patient informed of result?

3. Co-Factors for Exposure [Tick as appropriate]

<table>
<thead>
<tr>
<th>Co-Factor</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Received Blood/blood Products (Which year?__________)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accidental Exposure to Blood/Body Fluids</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IV Drug Use</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sexual contact with Males</td>
<td></td>
<td></td>
</tr>
<tr>
<td>with Females</td>
<td></td>
<td></td>
</tr>
<tr>
<td>with Males &amp; Females</td>
<td></td>
<td></td>
</tr>
<tr>
<td>with Partner who has multiple sex partners</td>
<td></td>
<td></td>
</tr>
<tr>
<td>with Partner known to be HIV+ ve</td>
<td></td>
<td></td>
</tr>
<tr>
<td>with Partner who has sex with males &amp; females</td>
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</tr>
<tr>
<td>No. of sexual Partners during lifetime</td>
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<tr>
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<tr>
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<td>&gt;20</td>
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<td>No response</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Condom use with casual non-regular partner(s) in last 12 months?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Always</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Usually</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sometimes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Never</td>
<td></td>
<td></td>
</tr>
<tr>
<td>History of STDS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crack/cocaine use</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Work as Commercial Sex Worker</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Child of HIV+ve mother[Mother’s Name/ ID #________________________]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age of First Intercourse</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10-15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15-19</td>
<td></td>
<td></td>
</tr>
<tr>
<td>19+</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
4. Symptom Profile [Tick as appropriate]

**Major Clinical Signs**
- No Information
- Weight Loss >10% of baseline Body Weight
- Diarrhoea for >30 days
- Intermittent or constant fever for >30 days
- Child <13 years with Failure to thrive

**Minor Clinical Signs**
- None of the Above
- Cough for more than one month
- Generalised itchy dermatitis
- Generalised Lymphadenopathy
- Multidermatomal Herpes Zoster
- Oro-pharyngeal Candidiasis
- Oral, Anal, Genital Ulcers >30 days
- Child<13 yrs with repeated common infections (otitis, pharyngitis) + confirmed maternal HIV infection

5. Indicator Diseases [Tick as appropriate]

**No Information**
- Atypical Mycobacteriosis
- Candidiasis: Oesophageal tracheal or Bronchial
- Cerebral Toxoplasmosis
- CMV Retinitis
- Cryptococcal Meningitis
- Kaposi’s Sarcoma
- Encephalopathy- no other cause
- Histoplasmosis: disseminated/extra-pulmonary
- Invasive Cervical Cancer
- Pneumocystis Carinii
- Pneumonia
- Oral, Anal, genital ulcers >30 days
- Recurrent bacterial pneumonia
- Salmonella septicaemia, non-typoid
- Tuberculosis
- Wasting syndrome: weight loss, diarrhoea, fever
- Other

Please complete this form in full when:
- receiving a positive HIV result (defined as positive by a screening test and confirmed by a second, different test)
- reporting a new case of AIDS (defined as a positive result with appropriate clinical profile/ or indicator disease)
- reporting an HIV/AIDS related death (defined as a case first diagnosed at the time of death should be reported both as a case and a death)

6. Diagnostic Milestones

| Date of First Positive HIV test | Month / Day / Year |
| Date of AIDS Diagnosis | Month / Day / Year |
| Date of AIDS Death | Month / Day / Year |

7. Laboratory Information

| Lab. Number | Test Result* |
| Test Date | Month / Day / Year |

*Indicate Positive/Negative/Inconclusive/Not Done

8. Case Assessment

| HIV Positive | No HIV result available |
| Symptomatic | Asymptomatic |
| Meets AIDS Clinical Criteria |

9. Final Classification

| Suspected AIDS Case | Confirmed AIDS Case |
| Suspected AIDS Death | Confirmed AIDS Death |

Return completed form to the National Surveillance Unit, Ministry of Health

Form completed by ... Position ... Tel No ... Date ...
APPENDIX 1

**KNOWN CAUSES OF REDUCED RESISTANCE OTHER THAN HIV DISEASE**

Known causes of reduced resistance to diseases indicative of immune deficiency are listed in the left column while diseases that may be attributable to these causes are listed on the right.

<table>
<thead>
<tr>
<th>KNOWN CAUSES OF REDUCED RESISTANCE</th>
<th>DISEASES POSSIBLY ATTRIBUTABLE TO KNOWN CAUSES OF REDUCED RESISTANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Systemic Corticosteroid therapy.</td>
<td>Any infection diagnosed during or within 1 month after discontinuation of the corticosteroid therapy, unless symptoms specific for an infected anatomic site (e.g. dyspnea for pneumonia, headache for encephalitis, diarrhoea for colitis) began before the corticosteroid therapy; or any cancer diagnosed during or within 1 month after discontinuation of more than 4 months of long-term corticosteroid therapy, unless symptoms specific for the anatomic sites of the cancer began before the long-term corticosteroid therapy.</td>
</tr>
<tr>
<td>Other immunosuppressive or cytotoxic therapy.</td>
<td>Any infection diagnosed during or within 1 year after discontinuation of the immunosuppressive therapy, unless symptoms specific for an infected anatomic site began before the therapy; or any cancer diagnosed during or within 1 year after discontinuation of more than 4 months of long-term immunosuppressive therapy, unless symptoms specific for the anatomic sites of the cancer began before the long-term therapy.</td>
</tr>
<tr>
<td>Cancer of lymphoreticular or histiocytic tissue such as lymphoma (except for lymphoma localized to the brain, Hodgkin’s disease, lymphocytic leukaemia, or multiple myeloma)</td>
<td>Any infection or cancer, if diagnosed after or within 3 months before the diagnosis of the cancer of lymphoreticular or histiocytic tissues.</td>
</tr>
<tr>
<td>Age, 60 years or older at diagnosis.</td>
<td>Kaposi’s sarcoma, but not if the patient has a positive test for HIV.</td>
</tr>
<tr>
<td>Age, less than 28 days (neo-natal) at diagnosis</td>
<td>Toxoplasmosis or herpes simplex virus infection.</td>
</tr>
<tr>
<td>Age, less than 3 months at diagnosis.</td>
<td>Cytomegalovirus infection.</td>
</tr>
<tr>
<td>An immunodeficiency atypical of AIDS, such as one involving hypogammaglobulinaemia or angioimmunoblastic lymphadenopathy; or an immunodeficiency of which the cause appears to be genetic or developmental defect rather than HIV infection.</td>
<td>Any infection or cancer diagnosed during such immunodeficiency.</td>
</tr>
<tr>
<td>Exogenous malnutrition (starvation due to food deprivation, not malnutrition due to malabsorption or illness).</td>
<td>Any infection or cancer diagnosed during or within 3 months after discontinuation of starvation.</td>
</tr>
</tbody>
</table>

Sources: WHO Weekly Epidemiological Record 1986; 61 (10): 69-76
### APPENDIX 2

#### DIAGNOSTIC METHODS FOR INDICATOR DISEASES OF AIDS

<table>
<thead>
<tr>
<th>DISEASES</th>
<th>DIAGNOSTIC METHODS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cryptosporidiosis, Isosporiasis, Kaposi’s sarcoma, Lymphoma, <em>Pneumocystis carinii</em>, Progressive multifocal leukoencephalopathy, Toxoplasmosis</td>
<td>Microscopy (histology or cytology)</td>
</tr>
<tr>
<td>Candidiasis</td>
<td>Gross inspection by endoscopy or autopsy or by microscopy (histology or cytology) on a specimen obtained directly from the tissues affected, not from a culture.</td>
</tr>
<tr>
<td>Coccidiodomycosis, Cryptococcosis, Cytomegalovirus, Herpes simplex virus</td>
<td>Microscopy (histology or cytology), culture, or detection of antigen in a specimen obtained directly from the tissues affected or a fluid from those tissues.</td>
</tr>
<tr>
<td>Mycobacterium avium. Recurrent bacterial infection</td>
<td>Culture</td>
</tr>
<tr>
<td>HIV encephalopathy</td>
<td>Clinical findings of disabling cognitive or motor dysfunction interfering with occupation or activities of daily living, progressing over weeks to months, in the absence of a concurrent illness or condition other than HIV infection that could explain the findings. Methods to rule out concurrent illness and conditions must include CSF examination and either brain imaging (CT scan, MRI) or autopsy.</td>
</tr>
</tbody>
</table>

Sources: WHO Weekly Epidemiological Record 1986; 61 (10): 69-76
### 3.2 Brucellosis (in humans) CLASS 3

<table>
<thead>
<tr>
<th>Internationally notifiable:</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reporting interval:</td>
<td>Immediately</td>
</tr>
<tr>
<td>Report to (country level):</td>
<td>National Epidemiologist</td>
</tr>
<tr>
<td>Report to (regional level):</td>
<td>CAREC’s Epidemiology Division</td>
</tr>
</tbody>
</table>

#### 3.2.1 INTRODUCTION

Brucellosis is an illness characterised by an acute or insidious onset of fever, night sweats, easy fatigability, anorexia, weight loss, headache and arthralgia. The fever is usually intermittent, especially at night, and may become chronic and undulant. It is predominantly an occupational disease in persons working with animals and may occur in persons who consume raw dairy products from infected animals. The disorder may become chronic.

#### 3.2.2 CASE DEFINITION

**a) Probable case**

A clinically compatible case that is

- Epidemiologically linked to a confirmed case
- Epidemiologically linked to a confirmed infected source

and/or

- Has supportive serology (rising serologic titres, or an absolute agglutination titre of $\geq 160$ in one or more serum specimens collected after the onset of symptoms).

**b) Confirmed case**

A clinically compatible case that is laboratory confirmed using the following criteria:

- Isolation of *Brucella sp.* from a clinical specimen, or

- Fourfold or greater rise in *Brucella* agglutination titre between acute and convalescent serum specimens obtained $\geq 2$ weeks apart and studied at the same laboratory, or

- Demonstration of *Brucella sp.* in a clinical specimen by immunofluorescence
3.2.3 REPORTING AND INVESTIGATIVE PROCEDURES

a) Level 1 (probably a hospital)
   - Reports a probable case to level 2 within 24 hours.
   - Collects a blood specimen and refers to the laboratory.
   - Initiates case investigation.

b) Level 2
   - Completes case investigation and confirms specimen referral
   - Collects case reports from level 1 and laboratory results
   - Determines the need for further blood specimens and arranges for these to be collected and sent to the laboratory as necessary.
   - Undertakes epidemiologic investigations to determine occurrence of other cases and arranges for laboratory investigation and clinical management as indicated.
   - Establishes liaison with appropriate veterinary personnel.
   - Sends a collective weekly report to the national level.

Note: This disease would have been reported as Syndrome 1 (See Section 1:2:5)
3.2.4 **Brucellosis (in humans) Case Investigation Form**

<table>
<thead>
<tr>
<th>Reporting Centre:</th>
<th>Date of report / /</th>
</tr>
</thead>
</table>

### 1. Patient information

<table>
<thead>
<tr>
<th>Name</th>
<th>Age (yrs)</th>
<th>Sex</th>
<th>M</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Address</td>
<td>Phone</td>
<td>Occupation</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 2. Clinical data

<table>
<thead>
<tr>
<th>Date of onset / /</th>
<th>Immunization history</th>
</tr>
</thead>
<tbody>
<tr>
<td>Symptom</td>
<td>Y N</td>
</tr>
<tr>
<td>Intermittent fever</td>
<td>Sweating</td>
</tr>
<tr>
<td>Fatigue</td>
<td>Irritability</td>
</tr>
<tr>
<td>Headache</td>
<td>Weight loss</td>
</tr>
<tr>
<td>Anorexia</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Is/was this patient hospitalised?</th>
<th>Y N</th>
<th>Date(s)</th>
<th>Outcome of illness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Survived</td>
<td>Died</td>
<td>Date:</td>
<td></td>
</tr>
</tbody>
</table>

### 3. Exposure history

<table>
<thead>
<tr>
<th>Contact with animal tissues/discharges</th>
<th>Y N</th>
<th>Date</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ingestion of raw milk/unpasteurized dairy products</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Airborne infection from animals in Pens/stables</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 4. Laboratory data

<table>
<thead>
<tr>
<th>Specimen</th>
<th>Date collected</th>
<th>Date rec’d</th>
<th>Condition</th>
<th>Test</th>
<th>Result</th>
<th>Date sent</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blood</td>
<td></td>
<td></td>
<td></td>
<td>Brucella agglutination</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blood</td>
<td></td>
<td></td>
<td></td>
<td>Brucella agglutination</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blood</td>
<td></td>
<td></td>
<td></td>
<td>Brucella isolation</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 5. Final case classification

<table>
<thead>
<tr>
<th>Laboratory confirmed</th>
<th>Discarded</th>
<th>Date reported:</th>
<th>To whom:</th>
<th>Route:</th>
<th>Signature:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
3.2.5 Specimen Collection and Transport

a) Acute blood sample

The first blood sample should be collected as early as possible after the onset of illness. If laboratory capability exists for isolation of *Brucella* sp., this sample must be transported at room temperature to reach the laboratory within one hour.

b) Convalescent blood sample

A second blood sample should be collected two weeks after the first. The paired sera will be used in the Brucella agglutinatum test. These must be transported to the laboratory within 24 hours at 4°C.

3.2.6 Laboratory Diagnosis

Criteria for laboratory diagnosis are:

- Isolation of *Brucella* sp. from a clinical specimen

or

- A four-fold or greater rise in *Brucella* agglutination test on paired sera.

3.2.7 Control and Prevention

- Treat relapsed cases promptly and adequately.

- Administer appropriate multiple-drug regime to patient. Relapses with single drug regime may be as high as 50%.

- Implement concurrent disinfection of purulent discharges in cases where such complications exist.

- Carry out epidemiologic investigation to identify other cases.

- Liaise with veterinary public health or other suitable personnel from animal health discipline to trace infection to common or individual source.

- Veterinary personnel to implement appropriate control measures in respect of animals.

- In the case of an outbreak, search for a common vehicle of infection, e.g., milk or milk products from an infected herd; recall incriminated products and ensure the institution of corrective measures (e.g. pasteurization) before production and release to the public are restarted.
Long term measures:

- Educate the public to use only pasteurized milk and milk products
- Educate workers in farms, abattoirs, butchers’ shops, meat processing plants etc, as to the nature of the disease and precautions to be taken in day to day activities.
- Maintain surveillance of livestock through relevant persons to discover early possible warnings such as abortion in animals.
- Ultimate control of human brucellosis depends upon the elimination of the disease in the animal reservoir provided primarily by domestic animals.
3.3 Cholera

<table>
<thead>
<tr>
<th>Internationally notifiable:</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reporting interval:</td>
<td>Immediately</td>
</tr>
<tr>
<td>Report to (country level):</td>
<td>National Epidemiologist</td>
</tr>
<tr>
<td>Report to (regional level):</td>
<td>CAREC’s Epidemiology Division</td>
</tr>
</tbody>
</table>

Report to the World Health Organization/Pan American Health Organization in accordance with the International Health Regulations.

### 3.3.1 Introduction

An acute bacterial enteric disease resulting from infection with *Vibrio cholerae* of the serogroups O1 or O139. These pathogens are transmitted through the ingestion of water or food contaminated directly or indirectly with faeces or vomitus of infected persons.

In its severe form the illness is characterised by the acute onset of profuse watery, non-bloody diarrhoea with or without vomiting. Untreated, it results in rapid dehydration, metabolic and circulatory disturbances leading to death. However, mild cases and asymptomatic infections are more common than the classical clinical illness, and this is an important consideration in the surveillance of travellers from infected areas.

The El Tor biotype of *Vibrio cholerae* causes a high infection to case ratio, and can survive for long periods as a free living organism in the environment e.g., in fresh water, salt water, human waste and sewage. This ability to survive in the ecosystem after clinical cases have ceased occurring, constitute a potential for causing future outbreaks and has implications for surveillance activities.

### 3.3.2 Case Definition

a) Suspected case

Any case of acute, profuse, watery diarrhoea and vomiting resulting in dehydration or death in a person over the age of 5 years

or

Any case of acute watery diarrhoea and vomiting in a person with history of recent travel in an infected area within 5 days of the onset of illness.
b) Confirmed case

(i) Laboratory confirmed case

A suspected case with isolation of toxigenic *Vibrio cholerae* O1 or O139 from stool or vomitus

(ii) Epidemiologically confirmed case

In epidemic situations, a case may be considered epidemiologically linked if the patient has had contact with one or more persons who have or had the disease, and at least one case in a chain of transmission has already been laboratory confirmed. Under these circumstances a suspected case may be considered to be “confirmed” for reporting purposes.

3.3.3 Reporting and Investigative Procedures

All cases of diarrhoea which satisfy the case definition of cholera must be investigated immediately.

a) Level 1

- Identifies a clinical or suspected case using the standard case definition

**Note:** In outbreak situations or in situations where imported cases have been identified, the working diagnosis of cholera should be made on the basis of the clinical picture for the purposes of applying intervention measures for control.

- Reports immediately (within 24 hours) to Level 2
- Conducts preliminary case investigation
- Intensifies ongoing diarrhoeal surveillance and reports all cases of watery diarrhoea weekly.
- Reports zero cases if no confirmed cases are identified after one week from the date of onset of the last reported case.

b) Level 2

- Dispatches an investigator who confirms the diagnosis
- Alerts the laboratory
- Completes the case investigation, initiates line listing procedure and forwards same to level 3 at weekly intervals.
c) **Level 3**

- Reports to WHO/PAHO in accordance with the International Health Regulations.

**Note: This disease would have been reported as Syndrome 4 (See Section 1.2.5)**
### 3.3.4 Cholera Case Investigation Form

**CHOLERA CASE INVESTIGATION FORM**

| Reporting Centre: | Date of report | / | / |

#### 1. Patient information

<table>
<thead>
<tr>
<th>Name</th>
<th>Age (yrs)</th>
<th>Sex</th>
<th>M</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Address</td>
<td>Phone</td>
<td>Occupation</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### 2. Clinical data

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Y</th>
<th>N</th>
<th>Date of onset</th>
<th>/</th>
<th>/</th>
<th>Immunization history</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diarrhoea</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Number of doses</td>
<td></td>
</tr>
<tr>
<td>Vomiting</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Date of last dose</td>
<td></td>
</tr>
<tr>
<td>Dehydration</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Is/was this patient hospitalised?</th>
<th>Y</th>
<th>N</th>
<th>Date(s)</th>
<th>Outcome of illness</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Survived</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Died</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Date:</td>
</tr>
</tbody>
</table>

#### 3. Exposure history

<table>
<thead>
<tr>
<th>Travel history within week prior to onset</th>
<th>Y</th>
<th>N</th>
<th>Country</th>
<th>Date (period)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Details</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Contact with infected material from case</th>
<th>Date</th>
<th>Details</th>
</tr>
</thead>
</table>

| Ingestion of food or drink which may have been infected | |

#### 4. Laboratory data

<table>
<thead>
<tr>
<th>Specimen</th>
<th>Date collected</th>
<th>Date rec’d</th>
<th>Condition</th>
<th>Test</th>
<th>Result</th>
<th>Date sent</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stool</td>
<td></td>
<td></td>
<td></td>
<td>Isolation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vomitus</td>
<td></td>
<td></td>
<td></td>
<td>Isolation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rectal Swab</td>
<td></td>
<td></td>
<td></td>
<td>Isolation</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### 5. Final case classification

<table>
<thead>
<tr>
<th>Clinically confirmed</th>
<th>Epidemiologically confirmed</th>
<th>Laboratory confirmed</th>
<th>Date reported:</th>
<th>To whom:</th>
<th>Route:</th>
<th>Signature:</th>
</tr>
</thead>
</table>
3.3.5 **Specimen Collection and Transport**

a) Fresh stool

10 ml of stool should be collected into a clean dry container and must reach the laboratory within the hour.

b) Rectal swabs or stool in Cary Blair medium

Organisms stored in Cary and Blair medium can remain viable for as long as 48 hours. Transport these specimens on wet ice (4°C).

c) Vomitus

This should be collected into a clean dry container and must reach the laboratory within the hour.

All these specimens should be securely enclosed in a plastic bag with a biohazard sticker, if available.

3.3.6 **Laboratory Diagnosis**

Laboratory criteria for diagnosis:

- Isolation of toxigenic, *Vibrio cholerae* O1 or O139 from stool or vomitus

  or

- Significant rise in vibriocidal or antitoxin antibodies in acute and early convalescent sera

  or

- Significant fall in vibriocidal antibodies in early and late convalescent sera.

3.3.7 **Control and Prevention**

Since Cholera is not endemic in the Caribbean, although it is in many Central and South American countries, current information on geographic distribution should be obtained and made available to all persons responsible at local level. WHO’s Weekly Epidemiology Record (WER), and CAREC’s Surveillance Report (CSR) could provide useful sources of information.

Control and prevention measures are directed largely to ensuring food and water safety, the safe disposal of waste and and advising travellers to endemic areas of appropriate precautions which should be taken.
- Undertake surveillance of Diarrhoeal disease, especially among travellers to or from cholera endemic or epidemic areas. Travel agencies and airlines may be a useful source of information with particular reference to itinerary of tour groups.

- Vaccine use is not recommended.

- Isolation, with hospitalisation in severe cases, with enteric precautions.

- Surveillance of persons who shared food and drink with the infected person within 5 days of last exposure.

- Where the likelihood of secondary transmission exists within households, chemoprophylaxis should be given to those “at risk” household contacts.

- Appropriate guidelines for safe eating and drinking practices should be made available, in writing to travellers whose itinerary may expose them to risk of infection.

- Provide guidelines for safety of water used for drinking or ice-making - chlorination or boiling.

- Intensify safe potable water supply programme — intersectoral co-operation.

- Emphasize the importance of hygiene and sanitation, especially in regard to the disposal of faeces.

- Ensure the ready availability of I.V. fluids and Oral Rehydration Salts as well as guidelines for their timely usage.

- Ensure proper sewage disposal systems.

### 3.3.8 Technical Notes

The case definition used in this section is recommended by WHO for areas where cholera is not known to be present, as is the case in the Caribbean.

Cholera does occur in children under 5-years, however including these cases reduces the specificity of reporting.

Strains of *Vibrio* other than O1 and O139, and non-toxigenic *V. cholerae* O1 should not be reported as cholera.
3.4 Dengue Fever

<table>
<thead>
<tr>
<th>Internationally notifiable:</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reporting interval:</td>
<td>Weekly (outbreaks only)</td>
</tr>
<tr>
<td>Report to (country level):</td>
<td>National Epidemiologist (collective data)</td>
</tr>
<tr>
<td>Report to (regional level):</td>
<td>CAREC’s Epidemiology Division</td>
</tr>
</tbody>
</table>

3.4.1 Introduction

Dengue is an acute febrile illness caused by one of the four types of dengue virus. Viral transmission is through the bite of an infective *Aedes aegypti* mosquito. The disease occurs in all countries infested with the vector and is prevalent in the Caribbean. Dengue is usually seasonal, with an increase in cases occurring after the onset of the rainy season.

The incubation period of dengue is usually 5 to 7 days with a range of 3 to 15 days. Patients are infectious for mosquitoes during the period of viraemia which lasts for 5 days from the day before onset of fever. The illness is characterised by an abrupt onset of fever accompanied by headache, myalgia, arthralgia, retro-orbital pain and rash. In its early stages it may resemble influenza, rubella or measles.

Antibody to the dengue viruses is protective and long lasting but is type specific so that an individual can be infected with each of the 4 types. Reinfection of an individual with a different type may result in the severe forms of the disease, Dengue Haemorrhagic Fever (DHF) and Dengue Shock Syndrome (DSS).

The objective of surveillance for dengue fever is to anticipate large outbreaks of disease in order to reduce virus circulation through vector control and to avoid the high morbidity associated with epidemics. A second objective is to track the circulation of the four serotypes, particularly the introduction of a new serotype into a country and the consequent risk of DHF/DSS.

3.4.2 Case definition

a) Probable case

A person with acute onset of fever and two or more of the following:

- Headache
- Retro-orbital pain
- Myalgia
- Arthralgia
- Rash (may not be visible on dark-skinned persons)
- Haemorrhagic manifestations
- Supportive serology (e.g. a high single HAI titre)
b) Confirmed case

i) Laboratory confirmed case

A probable case with diagnostic laboratory findings (see 3.4.6)

ii) Epidemiologically confirmed case

A probable case occurring at the same location and time as a laboratory confirmed case

Note: During an epidemic it is unnecessary to continue laboratory investigation of probable cases after the diagnosis of dengue has been established and the virus type identified. The great majority of cases will be epidemiologically confirmed.

Laboratory surveillance should be restricted to the collection of specimens from a limited number of probable cases in order to:

- Identify the introduction of any new serotypes into already infected areas
- Identify spread of the epidemic into new areas
- Monitor severe, complicated and fatal cases attributed to dengue fever

3.4.3 REPORTING AND INVESTIGATIVE PROCEDURES

a) Level 1

- Identify probable cases based on the case definition (above).
- Complete case investigation forms.
- Collect acute blood samples and forward to the laboratory.
- If the number of probable cases occurring in a week exceeds usually expected levels, and/or a pattern of increase is observed, report an outbreak to level 2.
- Forward laboratory results as they are received to level 2.

b) Level 2

- Conducts an epidemiological investigation of all cases reported by level 1.
- Forwards a weekly report to the national level. This should include the number of probable and laboratory confirmed cases, age, sex and geographical distribution of cases, and virus type if known.

c) Level 3

- Collates country reports and institute national control measures if necessary.
- Reports monthly summary data to CAREC Epidemiology.
Laboratory confirmation of any dengue type not previously identified in a country or not detected in the country for several years should be immediately reported.

Note: This disease would have been reported as Syndrome 2 (See section 1.2.5)
### DENGUE FEVER CASE INVESTIGATION FORM

**Reporting Centre:**

**Date of report:** / /

1. **Patient information**

<table>
<thead>
<tr>
<th>Name</th>
<th>Age (yrs)</th>
<th>Sex</th>
<th>M</th>
<th>F</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Address</th>
<th>Phone</th>
<th>Occupation</th>
</tr>
</thead>
</table>

2. **Clinical data**

<table>
<thead>
<tr>
<th>Date of onset of illness</th>
<th>/</th>
<th>/</th>
<th><strong>Immunization history</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Symptom</td>
<td>Y</td>
<td>N</td>
<td>Symptom</td>
</tr>
<tr>
<td>Fever</td>
<td>Muscle pain</td>
<td>Vomiting</td>
<td></td>
</tr>
<tr>
<td>Headache</td>
<td>Joint pain</td>
<td>Diarrhoea</td>
<td>Date of last dose</td>
</tr>
<tr>
<td>Rash</td>
<td>Retro-orbital Pain</td>
<td>Respiratory Symptoms</td>
<td></td>
</tr>
<tr>
<td>Jaundice</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is/was this patient hospitalised?</td>
<td>Y</td>
<td>N</td>
<td>Date(s)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3. **Exposure history**

| Has the patient travelled to a dengue epidemic area in the past 3 weeks? | Y | N | Date | Details |
| Has there been in the area/village, within the past 3 weeks, another person with the same symptoms? | Y | N | Date | Details |

4. **Laboratory data**

<table>
<thead>
<tr>
<th>Specimen</th>
<th>Date collected</th>
<th>Date rec’d</th>
<th>Condition</th>
<th>Test</th>
<th>Result</th>
<th>Date sent</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blood, acute</td>
<td></td>
<td></td>
<td>Dengue IgM</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Virus detection</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blood, Convalescent</td>
<td></td>
<td></td>
<td>Flavivirus Antibody</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5. **Final case classification**

<table>
<thead>
<tr>
<th>Clinically confirmed</th>
<th>Epidemiologically confirmed</th>
<th>Laboratory confirmed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date reported:</td>
<td>To whom:</td>
<td>Route:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Signature:</td>
</tr>
</tbody>
</table>
3.4.5 **Specimen Collection and Transport**

a) **Acute blood sample**

It is preferable to collect this within 3 days of onset to increase the probability of virus identification. However, if the patient presents at a later date a sample should still be collected and forwarded to the laboratory.

- Draw a 5 to 10 ml blood sample from each suspected case and place in a sterile tube.
- Send to the laboratory immediately in a cold box at 4–8°C.
- If shipment is to be made outside of the country and shipment is not possible within 48 hrs, centrifuge the blood and transfer the serum to a sterile vial.
- Store at –20°C and ship with frozen icepacks (This sample will be used for serology only).
- Label all tubes and vials with patient name, specimen and date of collection.
- Complete a laboratory request form including date of onset of illness, symptoms and date of specimen collection.

b) **Convalescent blood sample**

- Only if requested by the laboratory, draw a 5ml convalescent blood sample 2 to 3 weeks after the first. Store and ship as above.

3.4.6 **Laboratory Diagnosis**

A laboratory confirmed case of dengue is a probable case with one or more of the following:

- Detection of IgM antibodies to one or more of the dengue virus antigens by capture ELISA (this test is most reliable on blood taken more than 5 days after onset).
- Isolation and identification of dengue virus from acute serum (collected within 3 days of onset) and shipped immediately to the laboratory at 4–8°C.
- Demonstration of dengue virus in clinical material by PCR.
- Demonstration of a fourfold or greater rise in flavivirus antibody titres between acute and convalescent phase serum specimens by the HI test.

3.4.7 **Dengue Control and Prevention**

Control and prevention of outbreaks of dengue fever depend on maintenance of very low levels of the vector, *Aedes aegypti*.

**Emergency control measures include:**

- Rapid reduction of the adult mosquito population through fogging or ultra low volume (ULV) application of insecticide especially in a one mile radius surrounding confirmed cases.
- Ensure that hospital premises are *Aedes* free.
- Nurse febrile patients in screened rooms or use insecticide-impregnated bed nets.
- Enlist the cooperation of the community in vector control through the Health Education unit

**Long-term prevention requires:**

- Elimination of *Aedes aegypti* through intensification of the national programmes of larviciding and source reduction
- Maintenance of community awareness and participation in vector control activities
- Treatment and removal of breeding sites at ports and airports to prevent the establishment of dengue, if introduced strengthening of disease surveillance.
### 3.5 Dengue Haemorrhagic Fever and Dengue Shock Syndrome

#### CLASS 2

<table>
<thead>
<tr>
<th>Internationally notifiable:</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reporting interval:</td>
<td>Immediately</td>
</tr>
<tr>
<td>Report to (country level):</td>
<td>National Epidemiologist</td>
</tr>
<tr>
<td>Report to (regional level):</td>
<td>CAREC’s Epidemiology Division</td>
</tr>
</tbody>
</table>

#### 3.5.1 Introduction

Dengue Haemorrhagic Fever (DHF) and Dengue Shock Syndrome (DSS) are severe manifestations of dengue virus infection. Bleeding at various sites is caused by increased vascular permeability and abnormal blood clotting mechanisms. This may result in hypovolemia and shock.

Health workers should be on the alert for these developments if there is bleeding of the gums, nose or under the skin (petechiae) during the febrile stage. The illness may run a biphasic febrile course, and at the time of defeverescence the patient may deteriorate, becoming weak and restless with cool extremities, a blotchy skin and weak rapid pulse. Emergency medical management is needed at this stage to save the patient’s life, and should not be delayed pending receipt of laboratory results.

Sensitization of host to previous dengue serotypes best explains the pathogenesis of DHF. However, other factors – viral and host related may be involved. DHF can occur in babies whose mothers have had dengue, in young children who may have had mild infections, and in adults.

Surveillance for DHF/DSS is important in the Caribbean where all four types of dengue virus have circulated. Increased reports of DHF highlight the need for control of dengue fever.

#### 3.5.2 Case Definition

a) Probable DHF case

A patient presenting with:

- Fever, or history of fever within the past week.

and

- Haemorrhagic tendencies as evidenced by at least one of the following:
  - Positive tourniquet test
  - Petechiae, ecchymoses, or purpura
  - Bleeding from mucosa, gastrointestinal tract, injection sites, or others
and

- Thrombocytopenia (100,000 mm³ or less)

and

- Plasma leakage due to increased capillary permeability as manifested by at least one of the following:
  - A haematocrit on presentation that is ≥ or > 20% above the average for that age and population
  - A 20% drop in haematocrit following treatment
  - Commonly associated signs of plasma leakage: pleural effusion, ascites, hypoproteinemia.

b) Confirmed DHF case
(i) Laboratory confirmed case

This is a probable case fulfilling one or more of the laboratory test criteria stated in 3.5.6.

(ii) Epidemiologically confirmed case

This is a probable case occurring during an epidemic or period of high endemic activity, with a history of exposure to dengue.

c) Probable DSS case

A probable case of DHF with evidence of circulatory failure manifested by all of the following:

- Rapid and weak pulse
- Narrow pulse pressure (20 mmHg or less) or hypotension for age
- Cold clammy skin and altered mental status

d) Confirmed DSS
(i) Laboratory confirmed case

A probable case fulfilling one or more of the laboratory test criteria stated in 3.5.6.

(ii) Epidemiologically confirmed case

A probable case occurring during an epidemic or period of high endemic activity, with a history of exposure to dengue
3.5.3 Reporting and Investigative Procedures

a) Level 1

- Reports probable cases of DHF and DSS to level 2 within 24 hours
- Confirms that haematological tests have been done
- Ascertain whether acute blood sample had been taken and sent to the laboratory and request IgM result
- If no sample has been taken in the past 3 days, collect blood and refer to the laboratory

b) Level 2

- Confirms information received from level 1 and track pending laboratory results.
- Ensures that information on clinical management is available to physicians attending the case
- Reports case to the national level within 48 hours
- Searches for other cases and report by line listing weekly to the national level

c) Level 3

- Collates country reports, classify all cases, and institute national control measures if necessary
- Reports monthly summary data to CAREC’s Epidemiology Division

Note: This disease would have been reported as Syndrome 6 (See section 1.2.5)
### 3.5.4 Dengue Haemorrhagic Fever/Shock Syndrome Case Investigation Form

<table>
<thead>
<tr>
<th>Reporting Centre:</th>
<th>Date of report</th>
<th>/</th>
<th>/</th>
</tr>
</thead>
</table>

#### 1. Patient Information

<table>
<thead>
<tr>
<th>Name</th>
<th>Age (yrs)</th>
<th>Sex</th>
<th>M</th>
<th>F</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Address</th>
<th>Phone #</th>
<th>Case #</th>
<th>Occupation</th>
</tr>
</thead>
</table>

#### Clinical Data

<table>
<thead>
<tr>
<th>Date of onset of illness</th>
<th>/</th>
<th>/</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Y</th>
<th>N</th>
<th>Symptom</th>
<th>Y</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fever</td>
<td></td>
<td></td>
<td>Purpura</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Pleural effusion</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Petechiae, ecchymoses</td>
<td></td>
<td></td>
<td>Platelet count &lt; 10^5/mm^3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bleeding from gums, GI tract</td>
<td></td>
<td></td>
<td>Elevated haematocrit</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elevated haematocrit</td>
<td></td>
<td></td>
<td>Pulse pressure 20mmHg or less</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive tourniquet test</td>
<td></td>
<td></td>
<td>Cold, clammy skin</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Haematuria</td>
<td>Restlessness</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Is/was this patient hospitalised?</th>
<th>Y</th>
<th>N</th>
<th>Date(s)</th>
<th>Outcome of illness</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Survived</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Died</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Date:</td>
</tr>
</tbody>
</table>

#### 3. Exposure History

<table>
<thead>
<tr>
<th>Has the patient traveled to a dengue epidemic area within the past 3 weeks</th>
<th>Y</th>
<th>N</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Has the patient been in contact with a dengue case within the past 3 weeks</td>
<td>Y</td>
<td>N</td>
<td>Date</td>
</tr>
</tbody>
</table>

#### 4. Laboratory Data

<table>
<thead>
<tr>
<th>Specimen</th>
<th>Date collected</th>
<th>Date rec'd</th>
<th>Condition</th>
<th>Test</th>
<th>Result</th>
<th>Date sent</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>First blood specimen</td>
<td></td>
<td></td>
<td>Virus isolation</td>
<td>IgM ELISA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Second blood specimen</td>
<td></td>
<td></td>
<td>IgG antibody by HAI test</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### 5. Final Case Classification

<table>
<thead>
<tr>
<th>Clinically confirmed</th>
<th>Epidemiologically confirmed</th>
<th>Laboratory confirmed</th>
<th>Date reported:</th>
</tr>
</thead>
<tbody>
<tr>
<td>To whom:</td>
<td>Route:</td>
<td>Signature:</td>
<td></td>
</tr>
</tbody>
</table>
3.5.5 **Specimen Collection and Transport**

See 3.4.5

Additionally,

If the patient should die, heart blood, liver, kidney and spleen should be submitted to the laboratory without fixative at 4–8°C.

3.5.6 **Laboratory Diagnosis**

See 3.4.6

Additionally,

If the patient had been infected previously with another serotype, a single blood specimen from a case of DHF will give a reciprocal IgG antibody titre of = or > 2560 in the HI test.

3.5.7 **Prevention and Control of DHF/DSS**

Prevention of the severe outcomes of dengue fever requires in the short term strict surveillance to detect and treat cases early, and in the long term prevention of dengue virus circulation through control of the mosquito vector.

Prompt and expert clinical management of probable cases is important in reducing the severity of DHF and the mortality due to DSS. Specific training in the management of DHF, especially in children, should be included in the medical curriculum and in refresher courses for all physicians. This training should be supported by an adequate supply of materials at medical institutions.

It is necessary that national epidemiologists work with the clinical team to evaluate clinical data to identify potential early warning signs for DHF in that population.
3.6 **Diphtheria**

**CLASS 2**

<table>
<thead>
<tr>
<th>Internationally notifiable:</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reporting interval:</td>
<td>Immediately</td>
</tr>
<tr>
<td>Report to (country level):</td>
<td>National Epidemiologist</td>
</tr>
<tr>
<td>Report to (regional level):</td>
<td>CAREC’s Epidemiology Division</td>
</tr>
</tbody>
</table>

### 3.6.1 **INTRODUCTION**

Diphtheria is an acute bacterial disease of the upper respiratory tract and occasionally of the skin, conjunctivae or genitalia. It is caused by toxigenic strains of *Corynebacterium diphtheriae*. Infection may be clinically inapparent or may result in a mild nasal discharge in adults or severe laryngeal disease in children characterised by a greyish membrane caused by the bacterial cytotoxin.

Transmission is by contact with a case or carrier and possibly by milk and the disease can occur in epidemic proportions in any community with low immunization coverage. The incubation period is 2 to 5 days. The case fatality rate in recent outbreaks has been 5 to 10%.

Diphtheria vaccine is included in the childhood immunization schedule as part of the triple vaccine DPT - Diphtheria, Pertussis and Tetanus. Four doses constitute the primary series; the first at 6 - 8 weeks, the second and third at intervals of 4 - 8 weeks thereafter, and a booster at 18 months. The toxoid contained in this vaccine induces a long lasting immunity.

The purpose of surveillance is to predict epidemics by early detection of cases so that control measures can be instituted, and to monitor the effectiveness of vaccination.

### 3.6.2 **CASE DEFINITION**

#### a) Probable Case

A **probable case** of diphtheria is anyone presenting with **at least two** of the following:

- Sore throat
- Tonsillitis
- Pharyngitis
- Laryngitis
- Enlarged cervical lymph nodes

and

- A patch or patches of an adherent grey membrane on the tonsils and pharynx with surrounding inflammation.
b) Confirmed case

(i) Laboratory confirmed case
A probable case from which toxigenic *C. diphtheriae* has been cultured

(ii) Epidemiologically confirmed case
A probable case that is linked epidemiologically to a laboratory confirmed case

3.6.3 REPORTING AND INVESTIGATIVE PROCEDURES

a) Level 1
- Reports a probable case within 24 hours to level 2

b) Level 2
- Conducts the case investigation
- Obtains special media (3.6.5) from the laboratory and arranges collection and referral of specimens
- Conducts field investigation - other probable cases, immunization status, etc.
- Reports the first confirmed case within 48 hours to the national level
- Reports subsequent cases weekly, using a line-listing format.

c) Level 3
- Reports number and ages of confirmed cases monthly to CAREC’s Epidemiology Division.

Note: This disease would have been reported as Syndrome 3 (See section 1.2.5)
### 3.6.4 Diptheria Case Investigation Form

**DIPHTHERIA CASE INVESTIGATION FORM**

<table>
<thead>
<tr>
<th>Reporting Centre:</th>
<th>Date of report / /</th>
</tr>
</thead>
</table>

#### 1. Patient information

<table>
<thead>
<tr>
<th>Name</th>
<th>Age (yrs)</th>
<th>Sex M F</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Address</th>
<th>Phone</th>
<th>Case #</th>
</tr>
</thead>
</table>

#### 2. Clinical data

<table>
<thead>
<tr>
<th>Date of onset of illness / /</th>
<th>Immunization history</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Y N</th>
<th>Symptom</th>
<th>Y N</th>
<th>Symptom</th>
<th>Y N</th>
<th>Number of doses:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sore throat</td>
<td></td>
<td>Membrane</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tonsillitis</td>
<td></td>
<td>on pharynx</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pharyngitis</td>
<td></td>
<td>Cervical</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Laryngitis</td>
<td></td>
<td>lymph-adenopathy</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Date of last dose</th>
<th>/ /</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Is / was the patient hospitalised? Y N</th>
<th>Outcome of illness</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Survived:</td>
</tr>
<tr>
<td></td>
<td>Died</td>
</tr>
</tbody>
</table>

#### 3. Exposure history

<table>
<thead>
<tr>
<th>Was there close contact with a case within the past 5 days? Y N</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Was there recent travel to a country experiencing an epidemic? Y N</td>
<td>Details</td>
</tr>
</tbody>
</table>

#### 4. Laboratory data

<table>
<thead>
<tr>
<th>Specimen</th>
<th>Date collected</th>
<th>Date rec’d</th>
<th>Condition</th>
<th>Test</th>
<th>Result</th>
<th>Date sent</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Throat swab</td>
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<td></td>
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<tr>
<td>Nasal swab</td>
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</tbody>
</table>

#### 5. Final case classification

<table>
<thead>
<tr>
<th>Probable case</th>
<th>Epidemiologically confirmed Laboratorily confirmed</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Date reported:</th>
<th>To whom:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Route:</td>
</tr>
<tr>
<td></td>
<td>Signature:</td>
</tr>
</tbody>
</table>
3.6.5 **Specimen Collection and Transport**

**Throat, nose and/or nasopharyngeal swabs**

These are collected from probable cases (See Annex) and placed in Amies transport medium.

Nasopharyngeal and throat swabs are collected from healthy persons who are potential carriers.

**Specimens**

These are transported at ambient temperature accompanied by a request form stating the site of the swab, age of the patient and clinical information.

3.6.6 **Laboratory Diagnosis**

- Laboratory investigation of sporadic cases is necessary to rule out viral or streptococcal pharyngitis, Vincent’s angina, infectious mononucleosis, oral candidiasis or oral syphilis.
- Organisms are cultured and identified as *C. diphtheriae* toxigenic (which is diagnostic) or non-toxigenic.

3.6.7 **Control and Prevention**

A threatened outbreak can be controlled by the following measures:

- Isolate pharyngeal patients and prevent contact with cutaneous cases.
- Treat promptly with antibiotics (penicillin or erythromycin)
- Culture contacts and administer chemoprophylaxis if found to be carriers
- Conduct mass immunization in high risk populations, especially children.

**Long term measures include:**

- Education of parents on the necessity for completing the full schedule of infant immunization.
- Filling in of immunity gaps in any age group using DT or Td vaccine.
- Immunization of those at special risk, e.g. health care workers, and administration of 10-year booster doses. (Note: HIV positive children may be immunised)

3.6.8 **Technical Notes**

Cases of cutaneous diphtheria should not be reported. It should also be noted that vaccination does not eliminate the carriage of *C. diphtheriae* in the pharynx, nose, or on the skin.
3.7 Foodborne Illness (Epidemic)  CLASS 4

Internationally notifiable: No
Reporting interval: Immediately
Report to (country level): National Epidemiologist
Report to (regional level): CAREC’s Epidemiology Division

3.7.1 INTRODUCTION

Foodborne illnesses include, but are not limited to, foodborne intoxications and foodborne infections acquired by the consumption of bacteria contaminated food, or drink. Other causes of foodborne illness which are not covered in this manual include chemical contaminants such as heavy metals, pesticides; organic poisons found for example in ackee, cassava, mushroom or fish – ciguatoxin mainly in large reef fish; viruses and parasitic or protozoal infections.

Epidemics of foodborne illness may be explosive or gradual depending on the causative agent, hygienic practices, and environmental factors. Minor epidemics are sometimes unrecognized depending on severity of illness, or surveillance sensitivity level (in which clusters of illness which may be related to a common source are unreported and therefore not epidemiologically linked). Signs and symptoms and the incubation period depend upon the aetiologic agent.

3.7.2 CASE DEFINITION

a) Probable case

An incident in which:

Two or more people experience a similar illness, after ingestion of a common food or drink

and

Epidemiologic analysis implicates the food or drink as the source of the illness.

b) Confirmed case

A confirmed case is a probable case with laboratory confirmation. Criteria depend upon the aetiologic agent.

Note: One case of botulism or chemical poisoning constitutes an epidemic.
3.7.3 Reporting and Investigative Procedures

Note: During an epidemic it is unnecessary to continue laboratory investigation of all probable cases after the diagnosis has been established and the aetiologic agent has been identified. The great majority of cases will be epidemiologically confirmed.

a) Level 1

- Confirms the occurrence of an epidemic and reports immediately to Level 2.
- Interviews all suspected cases and completes a Case History Form for each suspected case. (Special attention should be paid to the onset of symptoms and the items of food/drink consumed over a 72 hour period prior to the onset of illness).
- Obtains information on recent travel, gatherings/events, visitors or other common circumstances during which food was consumed within the last 72 hours.
- Makes enquiries on the basis of feasibility and potential for productive returns, to discover others who may have shared in this common food consumption experience.
- Collects specimens of blood, stool, vomitus and suitable samples of leftover food where practical and sends to the laboratory (Bear in mind that food may become contaminated before, during, or after preparation. See 3.7.5).

b) Level 2

- Continues investigation of the epidemic and searches for persons who had time, place or person associations with the identified cases.
- Seeks and interviews both ill and well persons who had such associations.
- Plots an epidemic curve to assist in determining common source or person to person spread.
- Determines predominant symptoms, incubation periods and food-specific attack rates.
- Ensures that all specimens sent to the laboratory are accompanied by relevant information and transported under required conditions.
- Compares data analyzed epidemiologically with laboratory results to confirm suspected food and agent responsible for the epidemic.
- Uses the data obtained from the epidemic investigation to identify the source(s) of contamination and to advise on measures to prevent further illness.
### Table 2: Clinical Aspects of Some Foodborne Illnesses

<table>
<thead>
<tr>
<th>Agent</th>
<th>Incubation period (in hours)</th>
<th>Signs and Symptoms</th>
<th>Transmission</th>
</tr>
</thead>
<tbody>
<tr>
<td>Staphylococcus aureus</td>
<td>2 – 4</td>
<td>Abrupt onset, nausea, cramping, vomiting, diarrhoea</td>
<td>Inadequately-cooked or stored foods; pastries, cream, processed foods</td>
</tr>
<tr>
<td>Clostridium perfringens</td>
<td>8 – 16</td>
<td>Abrupt onset, nausea, cramping</td>
<td>Inadequately-cooked or stored foods</td>
</tr>
<tr>
<td>Clostridium botulinum</td>
<td>24 – 96</td>
<td>Vomiting, diarrhoea - rarely</td>
<td>Grows in anaerobic foods and produces toxin</td>
</tr>
<tr>
<td>Vibrio parahaemolyticus</td>
<td>6 – 96</td>
<td>Diarrhoea, cramping, nausea, – fever, – bloody stools</td>
<td>Inadequately-cooked seafood — especially crabs, or food exposed to contaminated seawater</td>
</tr>
<tr>
<td>Bacillus cereus</td>
<td>1 – 8 rarely up to 18</td>
<td>Nausea, vomiting</td>
<td>Inadequately-cooked or stored seafood, especially rice</td>
</tr>
<tr>
<td>Escherichia coli (some strains)</td>
<td>24 – 72</td>
<td>Diarrhoea, cramping, vomiting, – fever. E. coli 0157: H7 produces toxin — may cause haemorrhagic colitis</td>
<td>Contaminated food and water</td>
</tr>
<tr>
<td>Campylobacter jejuni</td>
<td>2 – 10</td>
<td>Diarrhoea, cramping, nausea, vomiting, fever and malaise</td>
<td>Contaminated food and water</td>
</tr>
<tr>
<td>Shigella spp.</td>
<td>24 – 72</td>
<td>Diarrhoea, nausea, vomiting, fever, – toxaemia, – bloody stools</td>
<td>Contaminated food and water</td>
</tr>
<tr>
<td>Salmonella spp.</td>
<td>8 – 48</td>
<td>Diarrhoea, low grade fever</td>
<td>Contaminated food, dairy products, poultry</td>
</tr>
<tr>
<td>Viral agents: Rotavirus Norwalk agent</td>
<td>24 – 72</td>
<td>Nausea, vomiting, diarrhoea, – fever, may be mild and self-limited</td>
<td>Contaminated food and water, Norwalk agent may be spread by respiratory fomites</td>
</tr>
</tbody>
</table>

See relevant sections of Manual for other potential aetiologic agents: 3.2 - brucellosis, 3.3 - cholera, 3.26 - salmonellosis, 3.28 - shigellosis, 3.31 - typhoid fever and 3.32 - viral hepatitis A.
### 3.7.4 Suspect Foodborne Illness Case History Form

<table>
<thead>
<tr>
<th>Name</th>
<th>Address</th>
<th>Phone</th>
<th>Signs &amp; Symptoms (check appropriate items)</th>
<th>TIME OF ONSET – Date:</th>
<th>Time of Day:</th>
<th>Other Information</th>
<th>Place of Employment</th>
<th>Occupation</th>
<th>Sex</th>
<th>Case IDNo</th>
<th>Specimens Obtained</th>
<th>Physician Consulted</th>
<th>Hospital (name)</th>
<th>Laboratory Results</th>
<th>Tele No.</th>
<th>Calendar No.</th>
<th>Remarks and Diagnosis</th>
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</tbody>
</table>
Food history for previous 72 hours or other specified times:

<table>
<thead>
<tr>
<th>Day of Illness</th>
<th>Day Before Illness</th>
<th>Two Days Before Illness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breakfast</td>
<td>Place: __________________</td>
<td>Place: __________________</td>
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<td>Hour: ___________</td>
<td>Hour: ___________</td>
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<tr>
<td>Lunch</td>
<td>Place: __________________</td>
<td>Place: __________________</td>
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<td>Hour: ___________</td>
<td>Hour: ___________</td>
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<td>Supper</td>
<td>Place: __________________</td>
<td>Place: __________________</td>
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<td></td>
<td>Hour: ___________</td>
<td>Hour: ___________</td>
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<tr>
<td>Snacks (item, time and place)</td>
<td>______________________________________</td>
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</tbody>
</table>

History of eating suspect food _________ Source ___________________________ Address _____________________________________________ 

Common event and names and addresses of others at event ____________________________________________________________ 

Recent travel (locations) ________________________________________________________________

Contacts with known cases before illness ________________________________________________________________

Contacts after illness ________________________________________________________________

Pets _________________________ Housing condition ___________________________ Crowding _____________________ Water supply _____________

Excreta disposal ___________________________ Shellfish ___________________________ Milk Supply __________________

REMARKS: ______________________________________________________________________________________________________

INVESTIGATOR: ___________________________________________________________ DATE: ___________________________
## Food-Specific Attack Rate Table

<table>
<thead>
<tr>
<th>Food</th>
<th>Number of Persons Who Ate Specific Food</th>
<th>Number of Persons Who Did Not Eat Specific Food</th>
<th>Difference in Percent</th>
<th>Significance</th>
<th>Remarks and Interpretation: Suspect Food</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Ill</td>
<td>Well</td>
<td>Total</td>
<td>% Ill</td>
<td></td>
</tr>
<tr>
<td></td>
<td>% Ill</td>
<td>% Well</td>
<td>Total</td>
<td>% Ill</td>
<td></td>
</tr>
</tbody>
</table>

### Places of Outbreak

Reference:

- Number of Persons Who Ate Specific Food
- Number of Persons Who Did Not Eat Specific Food
- Difference in Percent
- Significance
- Remarks and Interpretation: Suspect Food
<table>
<thead>
<tr>
<th>Case ID No.</th>
<th>Date of Onset</th>
<th>Name</th>
<th>Address</th>
<th>Age</th>
<th>Sex</th>
<th>Occupation/Place of Work</th>
<th>Lab. Report</th>
<th>S or C</th>
<th>Date of Hospital Admission</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
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</table>

S = Suspected
C = Confirmed
3.7.5 **Specimen Collection and Transport**

a) **Stool and/or vomitus**

Collect into a clean, dry container and transport at 4°C within 24 hours.

b) **Rectal Swabs (To be used if stool is not available)**

Place in Cary Blair transport medium and transport at 4°C within 24 hours.

c) **Leftover foods or other foods**

Samples should be collected aseptically and put into sterile jars or plastic bags. Perishable food which are not frozen at the time of collection should be rapidly chilled to 4°C and kept at this temperature until examined. (Do not freeze these samples as certain bacteria such as *C. perfringens* die off rapidly during frozen storage.

Keep frozen foods frozen until examined.

The laboratory should be alerted and all samples should be received at the laboratory within the shortest possible time.

3.7.6 **Laboratory Diagnosis**

Isolation of the causative organism from clinical specimens and from food samples.

3.7.7 **Control and Prevention**

Food hygiene is defined as “all conditions and measures necessary to ensure the safety and suitability of food at all stages of the food chain.” The microbiologic safety of foods is principally ensured by control at the source, product design, process control, and good hygienic practices during production, processing, handling, distribution, storage, sale, preparation and use. The application of the Hazard Analysis and Critical Control Points (HACCP) system is now an integral component of food hygiene programs. Hazard analysis is defined as “The process of collecting and evaluating information on hazards and conditions leading to their presence to decide which are significant for food safety.” This preventive system offers more control than end product testing because of the limited effectiveness of microbiologic examination to assess the safety of food. HACCP can be used as a corrective risk management option: a risk is identified, and a management option is selected and implemented. HACCP is also used as a preventive risk management tool. In this case, hazard analysis identifies potential hazards in raw materials, production line, and line-environments to the consumer.

Control and prevention of food borne illnesses, regardless of the specific cause, are based on principles directed towards the avoidance of food contamination, destruction or denaturation of contaminants and the prevention of spread or multiplication of contaminants.
Basic food safety practices include the following:

- Choose foods processed to ensure safety.
- Cook food thoroughly.
- Eat cooked foods immediately.
- Store cooked foods carefully.
- Reheat cooked foods thoroughly.
- Avoid contact between raw and cooked foods.
- Wash hands repeatedly.
- Keep all kitchen surfaces meticulously clean.
- Protect food from insects, rodents and other animals.
- Use safe water.

Some areas of specific action include the following:

- Educate food handlers in strict food hygiene, sanitation and cleanliness of kitchens, proper temperature control, handwashing, cleaning of fingernails; and to the danger of working with exposed skin, nose and eye infections and the need to cover wounds.
- Reduce food-handling time (preparation to service) to an absolute minimum, with no more than 4 hours at ambient temperatures.
- Keep hot foods hot (> 60°C) and cold foods cold (< 10°C).
- Temporarily exclude people with boils, abscesses and other purulent lesions of hands, face or nose from food handling.
- Seafood:
  - ensure that cooked seafood reaches a temperature of at least 70°C for at least 15 minutes.
  - handle cooked seafood in a manner that precludes contamination with raw seafood or contaminated sea water.
  - keep all seafood, raw and cooked, adequately refrigerated before eating.
  - avoid the use of sea water in food handling areas.
- Refrigerate leftover foods promptly and reheat rapidly and thoroughly before use.
3.8 Gastroenteritis (Acute Watery Diarrhoea)  
(in children less than 5 years)  

<table>
<thead>
<tr>
<th>Internationally notifiable:</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reporting interval:</td>
<td>Weekly (outbreaks only)</td>
</tr>
<tr>
<td>Report to (country level):</td>
<td>National Epidemiologist (collective data)</td>
</tr>
<tr>
<td>Report to (regional level):</td>
<td>CAREC’s Epidemiology Division</td>
</tr>
</tbody>
</table>

3.8.1 INTRODUCTION

One of the major causes of morbidity in children under 5 is acute watery diarrhoea. This can cause severe dehydration leading to death, or, with repeated episodes, growth retardation through malnutrition.

Gastroenteritis occurs throughout the year with incidence peaks in the dry and rainy seasons. Rainy season disease is most frequently bacterial, while outbreaks in the dry season are frequently associated with viral agents, chiefly rotavirus. Contamination of food and water and poor hygienic practices are responsible for transmission of these agents.

Dehydration must be treated early by the administration of Oral Rehydration Fluid recommended by WHO.

Routine surveillance monitors changes in the incidence and distribution of cases as a guide to control activities.

3.8.2 CASE DEFINITION

A clinical case of gastroenteritis is a child, less than 5 years old, who has passed 3 or more loose or watery stools in the past 24 hours, with or without dehydration.

Note: Laboratory diagnosis is not necessary for case definition but may be useful in clarifying the cause of specific outbreaks. Discussion with laboratory personnel is essential to determine testing capability, laboratory capacity, appropriate specimens and transport conditions.

3.8.3 REPORTING AND INVESTIGATIVE PROCEDURES

a) Level 1

- Identifies cases on the basis of the case definition.
- If a cluster of cases occurs in one week, reports as an outbreak to level 2.
- Collects stool samples into clean dry screw-capped containers and sends to the laboratory.
a) **Level 2**

- Investigates the outbreak, using the case investigation form to collect relevant epidemiological information.
- Level 2 forwards to the national level, monthly, the number of cases which have been reported, with epidemiological information.

**Note:** This disease would have been reported as Syndrome 4 (See section 1.2.5).
### 3.8.4 Gastroenteritis Case Investigation Form

<table>
<thead>
<tr>
<th>Gastroenteritis Case Investigation Form (under 5 years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reporting Centre:</td>
</tr>
<tr>
<td>1. Patient Information</td>
</tr>
<tr>
<td>Name</td>
</tr>
<tr>
<td>Address</td>
</tr>
<tr>
<td>Yrs:</td>
</tr>
<tr>
<td>Occupation</td>
</tr>
<tr>
<td>2. Clinical Data</td>
</tr>
<tr>
<td>Date of onset of illness</td>
</tr>
<tr>
<td>Symptom</td>
</tr>
<tr>
<td>Vaccines given:</td>
</tr>
<tr>
<td>Loose or watery stools</td>
</tr>
<tr>
<td>&gt; 3 stools in past 24 hours</td>
</tr>
<tr>
<td>Fever</td>
</tr>
<tr>
<td>Date of last vaccine</td>
</tr>
<tr>
<td>Vomiting</td>
</tr>
<tr>
<td>Is/was this patient hospitalised?</td>
</tr>
<tr>
<td>Outcomes of illness</td>
</tr>
<tr>
<td>Died</td>
</tr>
<tr>
<td>3. Exposure History</td>
</tr>
<tr>
<td>Y N Date Details</td>
</tr>
<tr>
<td>Are there other diarrhoea cases in the home of patient?</td>
</tr>
<tr>
<td>Are there other cases in the creche or nursery school?</td>
</tr>
<tr>
<td>4. Laboratory Data (outbreaks)</td>
</tr>
<tr>
<td>Specimen</td>
</tr>
<tr>
<td>Date rec’d</td>
</tr>
<tr>
<td>Test</td>
</tr>
<tr>
<td>Date sent</td>
</tr>
<tr>
<td>Stool</td>
</tr>
<tr>
<td>Stool</td>
</tr>
<tr>
<td>5. Final Case Classification</td>
</tr>
<tr>
<td>Laboratory confirmed</td>
</tr>
<tr>
<td>Date reported:</td>
</tr>
<tr>
<td>Route:</td>
</tr>
</tbody>
</table>

**Note:** The table structure and data are incomplete and may require further details or correction.
3.8.5 Specimen Collection and Transport

a) Stool specimens

Collected as soon as possible to the time of onset of diarrhoea and prior to the use of antibiotics.

Collect stool sample into a clean, dry, container with a tightly fitting screw cap.

Transport at ambient temperature to the laboratory within 24 hours.

b) Faecal Swabs

For bacterial culture at an in-country laboratory, plate faecal swab onto a nutrient agar slant and send at ambient temperature.

3.8.6 Laboratory Diagnosis

Based on the clinical and epidemiological information, the laboratory may:

- Culture for enteric bacterial pathogens, identify and type as appropriate
- Test for rotavirus by ELISA.
- Attempt identification of other non-cultivable enteric viruses.
- Test for specific intestinal parasites.

3.8.7 Control and Prevention

The clinical severity of gastroenteritis may be reduced by prompt recognition of the disease and use of Oral Rehydration Fluid.

Activities that will aid in correcting the conditions that favour gastroenteritis are:

- Promotion of breast feeding
- Education of mothers and child minders on the correct preparation and storage of infant food.
- Education of the community on personal and environmental sanitation
- Assurance of plentiful safe water

3.8.8 Technical Notes

The syndromic approach is recommended as the most effective way to report on cases, but this may complicate single disease surveillance.

Acute watery diarrhoea in persons over 5 years old will be reported as suspected cholera (See 3.3.2).
Diahorrea is also a major feature of foodborne illness; its occurrence in a cluster of persons of any age after ingestion of a common food triggers an investigation of probable foodborne illness (See 3.7).
3.9 Hantavirus Pulmonary Syndrome  

CLASS 3

<table>
<thead>
<tr>
<th>Internationally notifiable:</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reporting interval:</td>
<td>Within 48 hours</td>
</tr>
<tr>
<td>Report to (country level):</td>
<td>National Epidemiologist</td>
</tr>
<tr>
<td>Report to (regional level):</td>
<td>CAREC’s Epidemiology Division</td>
</tr>
</tbody>
</table>

Since this disease has not been identified in the Caribbean, suspected cases should be reported immediately to the National and Regional levels.

3.9.1 INTRODUCTION

Hantavirus Pulmonary Syndrome (HPS) is a fatal viral zoonotic disease transmitted to man through contact with rodents. Aerosol transmission from rodent excreta is presumed, but infection may also be transmitted directly through breaks in the skin, into the conjunctivae, or possibly through rodent bites. Infection may also be possible following the ingestion of contaminated food or water.

The disease occurs wherever wild or domestic rodents are infected and the prevalence fluctuates with variations in the rodent population and opportunities for human contact with rodents or HPS cases.

The disease is characterised by a prodrome consisting of fever, chills, myalgia, headache and gastrointestinal symptoms, followed by bilateral interstitial pulmonary infiltrates and cardio-respiratory compromise resembling acute respiratory distress syndrome.

3.9.2 CASE DEFINITION

a) Clinical HPS case

A person with fever (temperature > 38.3°C) and one or more of the following:

- Bilateral diffuse interstitial edema that may radiologically resemble acute respiratory distress syndrome
- Respiratory compromise requiring supplemental oxygen, developing within 72 hours of hospitalization
- An unexplained respiratory illness resulting in death, with an autopsy examination demonstrating non-cardiogenic pulmonary edema without identifiable cause.

b) Laboratory confirmed HPS case

A person with a clinically compatible illness that meets one of the laboratory criteria for diagnosis (See 3.9.6).
3.9.3 REPORTING AND INVESTIGATIVE PROCEDURES

a) Level 1

- Cases of HPS will probably be detected in a hospital which will report clinical HPS to level 2 within 48 hours
- Level 1 collects a blood specimen or a lung sample at autopsy and sends to the laboratory
- Initiates the case investigation

b) Level 2

- Completes the case investigation with emphasis on identifying exposure risk
- Confirms specimen referral and follows up on laboratory results
- Collects all case reports from level 1 and sends a collective weekly report to the national level.
- Initiates rodent and infection control measures

Note: This disease would have been reported as Syndrome 3 (See section 1.2.5)
### HANTAVIRUS PULMONARY SYNDROME CASE INVESTIGATION FORM

<table>
<thead>
<tr>
<th>Reporting Centre:</th>
<th>Date of report / /</th>
</tr>
</thead>
</table>

**Patient information**

<table>
<thead>
<tr>
<th>Name</th>
<th>Age (yrs)</th>
<th>Sex M F</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Address</th>
<th>Phone</th>
<th>Case #</th>
<th>Occupation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Clinical data**

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Y N</th>
<th>Symptom</th>
<th>Y N</th>
<th>Immunization history</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fever &gt;38.3 C</td>
<td>Elevated Creatinine</td>
<td>NOT Applicable</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bilateral diffuse interstitial edema</td>
<td>Oxygen saturation &lt;90%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Respiratory compromise requiring supplemental oxygen</td>
<td>Elevated haematocrit</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non cardiogenic pulmonary edema on autopsy</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thrombocytopenia (platelets &lt;150,000m³)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Is/was this patient hospitalised?</th>
<th>Date(s)</th>
<th>Outcome of illness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y N</td>
<td></td>
<td>Survived</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Died</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Date:</td>
</tr>
</tbody>
</table>

**Exposure history**

<table>
<thead>
<tr>
<th>Was there exposure to rodents during 6 weeks prior to onset?</th>
<th>Y N</th>
<th>Date</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Place of contact?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 4. Laboratory data

<table>
<thead>
<tr>
<th>Specimen</th>
<th>Date collected</th>
<th>Date rec’d</th>
<th>Condition</th>
<th>Test</th>
<th>Result</th>
<th>Date sent</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serum (1)</td>
<td></td>
<td></td>
<td></td>
<td>Hanta IgM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Serum (2)</td>
<td></td>
<td></td>
<td></td>
<td>IgG on paired sera</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blood clot</td>
<td></td>
<td></td>
<td></td>
<td>PCR</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lung tissue</td>
<td></td>
<td></td>
<td></td>
<td>Hantavirus antigen</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 5. Final case classification

<table>
<thead>
<tr>
<th>Clinically confirmed</th>
<th>Epidemiologically confirmed</th>
<th>Laboratory confirmed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date reported:</td>
<td>To whom:</td>
<td>Route:</td>
</tr>
<tr>
<td></td>
<td>Signature:</td>
<td></td>
</tr>
</tbody>
</table>
3.9.5 **Specimen Collection and Transport**

a) **Acute blood sample**

- A blood specimen, (minimum 5ml), should be drawn as soon as possible after admission of the case. Hold at room temperature or at 4°C until clot retraction. Carefully remove the serum to a sterile tube and retain the clot. Label both tubes with patient name, specimen type and date of collection.

- Blood and clot should be shipped immediately to the laboratory with cold packs, accompanied by a completed specimen referral form.

b) **Convalescent blood sample**

- This should be collected approximately 21 days after the first specimen. The serum should be separated and shipped to the laboratory with cold packs.

c) **Tissues**

- If an autopsy is being performed, lung, kidney, spleen and heart blood should be collected. The tissues should be at least 1 cm³. Fresh tissues must be shipped on dry ice, but if formalin fixed or paraffin blocks are available they should be sent at ambient temperature.

- Immunohistochemistry can be done on formalin fixed tissues for all viral haemorrhagic diseases i.e DHF and yellow fever and for rabbies. If formalin fixed tissue is received in the laboratory, it should be immediately placed in 70% alcohol to preserve the antigen.

3.9.6 **Laboratory Diagnosis**

A clinical case of HPS is laboratory confirmed by one of the following criteria:

- Detection of hantavirus-specific IgM
- Detection of rising titers of hantavirus IgG on paired acute and convalescent sera
- Detection of hantavirus-specific RNA sequences by PCR on tissues or blood clot
- Detection of hantavirus antigen by immunohistochemistry.

Laboratory test results must be confirmed at a reference laboratory.

3.9.7 **Prevention and Control of Hantavirus Pulmonary Syndrome**

This virus is maintained in nature in an enzootic cycle involving various species of rodents. Preventive measures include:

- Identification of common areas of exposure, if clusters of cases occur
Education of persons coming into contact with wild rodents.
Maintaining sea and airports free of rodents

3.9.8 **TECHNICAL NOTES**

Hantavirus does not cause apparent illness in the reservoir hosts. However, because the clinical illness is non-specific and ARDS is common, a screening case definition can be used to determine which patients to investigate for hantavirus.
3.10 Influenza

Internationally notifiable: Yes
Reporting interval: Immediately
Report to (country level): National Epidemiologist
Report to (regional level): CAREC’S Epidemiology Division

3.10.1 INTRODUCTION

Influenza is an acute systemic febrile respiratory disease of world-wide distribution. It affects all age groups and is characterised by fever, chills, headache, myalgia, malaise, mild sore throat, coryza and cough. Individuals may experience disease ranging from mild respiratory illness to fatal viral pneumonia. The elderly, and those compromised by chronic pulmonary, cardiac or metabolic disease are more susceptible to severe or fatal disease. Influenza has a short incubation period of 2–3 days and is spread by respiratory droplets.

The importance of the virus lies in its epidemic and pandemic potential, which has led to international surveillance of the disease coordinated by the WHO.

There are 3 types of influenza virus, A, B and C. Types A and B are associated with epidemics and type C with sporadic disease. Influenza A viruses, which affect both man and animals, contain 2 major antigens, the haemagglutinin (H) and the neuraminidase (N). These antigens are subject to frequent major and minor changes, resulting in new sub-types which are responsible for epidemics or pandemics, depending on their ability to spread.

Influenza is diagnosed by virus isolation or by serology. Isolated strains can be typed (A,B) and subtyped (A/H3N2, A/H5N2). Due to rapid antigenic variation, influenza vaccine formulation is changed each year to reflect the prevailing strains detected by a laboratory based surveillance system. Trivalent vaccine is manufactured containing 2 influenza A and one B strain and is offered annually to persons in high-risk groups.

3.10.2 CASE DEFINITION

a) Suspected case
A person with fever, headache, myalgia, cough

b) Confirmed case
   i) Laboratory confirmed case

A laboratory confirmed case is a suspected case with positive laboratory findings (See 3.10.6).
ii) Epidemiologically confirmed case

An epidemiologically confirmed case is a suspected case linked to a laboratory confirmed case in an epidemic situation.

3.10.3 REPORTING AND INVESTIGATIVE PROCEDURES

a) Level 1
   - Reports suspected case within 24 hours to the district level
   - Conducts preliminary case investigation

b) Level 2
   - Completes case investigation and searches for additional cases
   - Arranges for the collection and referral of specimens to the laboratory
   - Receives and collates laboratory results
   - Reports confirmed cases weekly to the national level

Note: During an epidemic it is unnecessary to continue laboratory investigation of all probable cases after the diagnosis of influenza has been established and the virus type has been identified. The great majority of cases will be epidemiologically confirmed.

c) Level 3
   - Collates reports from Level 2 and determines the existence of an epidemic
   - Reports epidemic to CAREC’s Epidemiology Division
   - Reports epidemic to WHO/HQ, with information on influenza virus type and sub-type
   - Determines the availability of vaccine and anti-virals, should they be needed

Laboratory

Refers influenza virus isolates to a designated WHO reference laboratory

Note: This disease would have been reported as Syndrome 1 or 3 (See Section 1.2.5)
### 3.10.4 Influenza Case Investigation Form

<table>
<thead>
<tr>
<th>Reporting Centre:</th>
<th>Date of report</th>
<th>/</th>
<th>/</th>
</tr>
</thead>
</table>

#### 1. Patient information

<table>
<thead>
<tr>
<th>Name</th>
<th>Age (yrs)</th>
<th>Sex</th>
<th>M</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Address</td>
<td>Phone</td>
<td>Case #</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### 2. Clinical data

<table>
<thead>
<tr>
<th>Date of onset of illness</th>
<th>/</th>
<th>/</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Immunization history</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Y</th>
<th>N</th>
<th>Symptom</th>
<th>Y</th>
<th>N</th>
<th>Symptom</th>
<th>Y</th>
<th>N</th>
<th>Number of doses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fever</td>
<td></td>
<td></td>
<td>Sore throat</td>
<td></td>
<td></td>
<td>Reye’s Syndrome</td>
<td></td>
<td></td>
<td>Influenza vaccine</td>
</tr>
<tr>
<td>Headache</td>
<td></td>
<td></td>
<td>Cough</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prostration</td>
<td></td>
<td></td>
<td>Pneumonia</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Myalgia</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Date of last dose</th>
<th>/</th>
<th>/</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Outcome of illness</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Is / was the patient hospitalised?</th>
<th>Y</th>
<th>N</th>
<th>Date(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Survived: Died</td>
<td>Date / /</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### 3. Exposure history

<table>
<thead>
<tr>
<th>Y</th>
<th>N</th>
<th>Dates</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Was there close contact with a case within the past 7 days?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is there a cluster of similar cases in the District</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### 4. Laboratory data

<table>
<thead>
<tr>
<th>Specimen</th>
<th>Date collected</th>
<th>Date rec’d</th>
<th>Condition</th>
<th>Test</th>
<th>Result</th>
<th>Date sent</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nasopharyngeal swabs</td>
<td></td>
<td></td>
<td>Virus isolation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nasal washing</td>
<td></td>
<td></td>
<td>Virus isolation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acute blood</td>
<td></td>
<td></td>
<td>VI / FA</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Convalescent blood</td>
<td></td>
<td></td>
<td>Serology</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Serology</th>
</tr>
</thead>
</table>

#### 5. Final case classification

| Date reported: |
| To whom: |
| Route: |
| Signature: |
3.10.5 Specimen Collection and Transport

a) Throat and nasal swabs

These are collected within the first 3 days of onset of illness, placed in viral transport medium, and shipped to the laboratory within 24 hours on wet ice. If this is not possible, specimens should be stored at –70°C and shipped on dry ice to the laboratory.

b) Naso-pharyngeal washings

These are collected within the first 3 days of onset into a sterile vial and transported immediately to the laboratory on wet ice.

c) Blood samples

Acute and convalescent samples may be drawn from a number of suspected cases, the former within 3 days of onset and the latter 14 days later. The serum is separated by centrifugation and sent in sterile tubes to the laboratory for serological testing.

Note: Specimens a and b are preferred for Influenza diagnosis.

3.10.6 Laboratory Diagnosis

Laboratory confirmation of influenza infection rests on one of the following:

- Isolation and typing of influenza virus from nasopharyngeal specimens.
- Detection of influenza antigen in epithelial cells from nasal washings by immunofluorescence
- Demonstration of a four-fold or greater increase in antibody titer between acute and convalescent serum specimens by the HI test.

3.10.7 Control and Prevention of Influenza

- During an influenza epidemic, attempts should be made to prevent severe disease in persons at high risk (the elderly; cardiac patients; those with chronic bronchitis, emphysema, asthma; those with renal disease or diabetes). They should if possible be separated from acute cases and treated with amantadine hydrochloride, which is effective against influenza A.

- Appropriate antibiotics should be used if secondary bacterial pneumonia is suspected.

- The public should be educated on the danger of unprotected coughs and sneezes.
• Crowding of large numbers of people in enclosed places should be avoided, but closing of schools has been found not to be effective.

• The current formulation of influenza vaccine should be administered before the season, or prior to an anticipated outbreak. Target groups are those mentioned in (1) above. Healthcare workers and those in essential community services should also be protected by vaccination.
3.11 Legionnaires’ Disease

INTERNATIONALLY NOTIFIABLE: No
REPORTING INTERVAL: Immediately
REPORT TO (COUNTRY LEVEL): National Epidemiologist
REPORT TO (REGIONAL LEVEL): CAREC's Epidemiology Division

3.11.1 INTRODUCTION

A bacterial illness with acute onset, commonly characterized by fever, headaches and myalgia, followed by signs and symptoms of pneumonia as confirmed by chest X-Ray. Sporadic cases may hardly ever be recognized. Outbreaks of legionellosis are due to a variety of sources that aerosolize water and have been commonly associated with contaminated water sources such as shower heads, faucets, air-conditioning cooling towers and ventilation systems.

The case fatality rate may be high in hospitalized or immunocompromised people.

3.11.2 CASE DEFINITION

a) Suspected case

An illness that meets the clinical description for legionnaires’ disease, characterized by fever, headaches and myalgia, followed by signs and symptoms or radiological evidence of pneumonia.

b) Confirmed case

Clinical or radiological evidence of pneumonia with laboratory isolation of L. pneumophila or serological findings as listed at 3.11.7.

3.11.3 REPORTING AND INVESTIGATIVE PROCEDURES

a) Level 1

- Reports first case immediately to level 2, followed by weekly line listing reports.
- Initiates case investigations.
- Carries out investigations of contacts and determines source of infection.

b) Level 2

- Conducts case investigation.
- Carries out investigations of contacts, and field investigations to determine source of infection.
- Liaises with personnel from other disciplines relevant to tracing source of infection.
Legionnaires' Disease

- Ensures that appropriate specimens, human and environmental, are forwarded to the laboratory.
- Reports to level 3 at weekly intervals.

Note: This disease would have been reported as Syndrome 3 (See Section 1.2.5)
### LEGIONNAIRES’ DISEASE CASE INVESTIGATION FORM

<table>
<thead>
<tr>
<th>Reporting Centre:</th>
<th>Date of report / /</th>
</tr>
</thead>
</table>

#### 1. Patient information

<table>
<thead>
<tr>
<th>Name</th>
<th>Age (yrs)</th>
<th>Sex</th>
<th>M</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Address</td>
<td>Phone</td>
<td>Occupation</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### 2. Clinical data

<table>
<thead>
<tr>
<th>Date of onset / /</th>
<th>Immunization history</th>
</tr>
</thead>
<tbody>
<tr>
<td>Symptom</td>
<td>Y</td>
</tr>
<tr>
<td>Fever</td>
<td>Dyspnoea</td>
</tr>
<tr>
<td>Chills</td>
<td>Malaise</td>
</tr>
<tr>
<td>Headache</td>
<td>Myalgia</td>
</tr>
<tr>
<td>Cough</td>
<td>Abdominal Pain</td>
</tr>
<tr>
<td>Chest Pain</td>
<td>Diarrhoea</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Is/was this patient hospitalised?</th>
<th>Y</th>
<th>N</th>
<th>Date(s)</th>
<th>Outcome of illness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Survived</td>
<td>Died</td>
<td>Date:</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### 3. Exposure history

<table>
<thead>
<tr>
<th>Contaminated environment: (air/water/aerosol)</th>
<th>Y</th>
<th>N</th>
<th>Date</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>- occupational</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- recreational</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- other</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### 4. Laboratory data

<table>
<thead>
<tr>
<th>Specimen</th>
<th>Date collected</th>
<th>Date rec’d</th>
<th>Condition</th>
<th>Test</th>
<th>Result</th>
<th>Date sent</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blood</td>
<td>Isolation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blood 1st</td>
<td>IFA titre</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blood 2nd</td>
<td>IFA titre</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Respiratory secretions</td>
<td>FA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pleural fluid</td>
<td>FA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urine</td>
<td>RIA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### 5. Final case classification

<table>
<thead>
<tr>
<th>Laboratory confirmed</th>
<th>Discarded</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date reported:</td>
<td>To whom:</td>
</tr>
<tr>
<td>Route:</td>
<td>Signature:</td>
</tr>
</tbody>
</table>

Note findings of other investigations here:
Chest X-Ray:
3.11.5 **SPECIMEN COLLECTION AND TRANSPORT**

a) **Blood, respiratory secretions, pleural fluid and urine**

These are collected as early as possible in the illness. If submitted for isolation of bacteria they should be transported immediately at room temperature (CSF should reach the laboratory within one hour).

b) **Blood for Serology**

Paired sera are required for antibody titres. The first specimen should be collected as early as possible in the illness, and the second one week later.

Specimens of blood for serology transported to the laboratory on wet ice (4°C). They should not be frozen and should be received at the laboratory within 24 hours of collection.

3.11.6 **LABORATORY DIAGNOSIS**

Laboratory criteria for diagnosis are:

- Isolation of **Legionella** from lung tissue, respiratory secretions, pleural fluid, blood, or other normally sterile sites, or

- Demonstration of a fourfold or greater rise in the reciprocal IF (immunofluorescence) antibody titre to \(^3\) 128 against **Legionella pneumophila** serogroup 1, or

- Demonstration of **L. pneumophila** serogroup 1 in lung tissue, respiratory secretions, or pleural fluid by direct fluorescence antibody testing, or

- Demonstration of **L. pneumophila** serogroup 1 antigen in urine by radioimmunoassay.

**NOTE:** Not all the relevant tests may be available or practical either in-country or regionally at the present time

3.11.7 **CONTROL AND PREVENTION**

- If a single confirmed nosocomial case is detected, initiate investigation for a hospital source, and other possible infected persons.

- Investigate cases and contacts early with a view to identifying and decontaminating source of infection.
• Carry out preventive maintenance of air-conditioning and ventilation systems in accordance with manufacturer’s instructions/guidelines. Routine decontamination is recommended.

• Implement special surveillance of illness among workers whose occupations are considered high-risk for exposure to infection.

• Such surveillance should be qualified, as it does not refer to ongoing routine surveillance related to all potential sources of infection, but is activated on epidemiologic considerations in the event of disease occurrence.

• Routine environmental sampling is not recommended, except for cooling towers implicated during an investigation.
3.12  Leprosy (Hansen’s Disease)  

<table>
<thead>
<tr>
<th>Internationally notifiable:</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reporting interval:</td>
<td>Monthly</td>
</tr>
<tr>
<td>Report to (country level):</td>
<td>National Epidemiologist</td>
</tr>
<tr>
<td>Report to (regional level):</td>
<td>CAREC’s Epidemiology Division</td>
</tr>
</tbody>
</table>

3.12.1  INTRODUCTION

Infection with Mycobacterium leprae may result in chronic disease having a broad clinical spectrum and characterized by involvement of skin and/or peripheral nerves. Clinical presentation includes pale, anaesthetic macular or erythematous skin lesions; superficial nerve-thickening with associated anaesthesia. History of childhood residence in an endemic area is common.

WHO has targeted this disease for elimination and aims to reduce the number of cases to <1 per 10,000 population. The program aims to attain a level of control through the reduction of prevalence, prevention of disabilities and achievement of a gradual and sustained reduction in incidence such that leprosy no longer constitutes a public health problem. The main technical component of leprosy elimination is to expand the coverage of multidrug therapy (MDT) in an opportune and regular way, together with the early detection of new patients.

Hansen’s disease manifests itself in different clinical types depending on the immunological status of the individual, and the presentation varies in a continuous spectrum between 2 polar forms, lepromatous and tuberculoid leprosy.

<table>
<thead>
<tr>
<th>Level of Resistance</th>
<th>Type of Disease</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very high</td>
<td>No disease develops</td>
<td>Indeterminate (I)</td>
</tr>
<tr>
<td>High</td>
<td>Localized disease</td>
<td>Tuberculoid Leprosy  (TT)</td>
</tr>
<tr>
<td>Moderately high</td>
<td>Fairly localized</td>
<td>Borderline Tuberculoid (BT)</td>
</tr>
<tr>
<td>Low</td>
<td>Fairly widespread</td>
<td>Mid-Borderline (BB)</td>
</tr>
<tr>
<td>None</td>
<td>Widespread</td>
<td>Borderline Lepromatous (BL)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lepromatous Leprosy  (LL)</td>
</tr>
</tbody>
</table>

For the purpose of treatment, patients with I, TT and BT leprosy with 5 or less skin lesions are known as paucibacillary (PB). Patients with LL, BL, BB or BT leprosy with more than 5 skin lesions are known as multibacillary (MB). A patient with a positive skin smear is MB.
3.12.2 **CASE DEFINITION**

**a) Clinical classification**

- **Lepromatous** leprosy (multibacillary): nodules, papules, macules and diffuse infiltrations are bilateral, symetrical and usually numerous and extensive; involvement of the nasal mucosa may lead to crusting, obstructed breathing and epistaxis; ocular involvement leads to iritis and keratitis.

- **Tuberculoid** leprosy (paucibacillary): skin lesions are single or few, sharply demarcated, anaesthetic or hypoesthetic, bilateral and asymmetrical; peripheral nerve involvement tends to be severe.

- **Borderline** leprosy: has features of both polar forms and is more labile.

- **Indeterminate** leprosy: manifested by hypo-pigmented maculae with ill-defined borders, and if untreated, may progress to tuberculoid, borderline or lepromatous disease. Most indeterminate lesions self heal.

**b) A leprosy case**

A case of leprosy is defined as a person having one or more of the following features, and who has yet to complete a full course of treatment:

- Hypopigmented or reddish skin lesion(s) with definite loss of sensation;
- Involvement of the peripheral nerves, as demonstrated by definite thickening with loss of sensation;
- Skin smear positive for acid-fast bacilli.

3.12.3 **REPORTING AND INVESTIGATIVE PROCEDURES**

Report monthly by numbers and type classification to Level 2.

**a) Level 1**

- Reports suspected case to level 2 and initiates arrangements for case to be seen by dermatologist or at special skin/leprosy clinic where these exist.
- Identifies household contacts and other long-term contacts with possible old/new cases of leprosy.

**b) Level 2**

- Continues case-finding investigations.
- Refers suspected cases or contacts for appropriate investigation and management.
- Follows-up results of laboratory referrals.
- Reports collective cases by type classification monthly to level 3.
### 3.12.4 Leprosy (Hansen’s Disease) Case Investigation Form

**LEPROSY (HANSEN’S DISEASE) CASE INVESTIGATION FORM**

| Reporting Centre: | Date of report | / | / |
|-------------------|----------------|---------------|

#### 1. Patient information

<table>
<thead>
<tr>
<th>Name</th>
<th>Age (yrs)</th>
<th>Sex</th>
<th>M</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Address</td>
<td>Phone</td>
<td>Occupation</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### 2. Clinical data

<table>
<thead>
<tr>
<th>Date of onset</th>
<th>/</th>
<th>/</th>
<th>Immunization history</th>
</tr>
</thead>
<tbody>
<tr>
<td>Symptom</td>
<td>Y</td>
<td>N</td>
<td>Symptom</td>
</tr>
<tr>
<td>Skin rash</td>
<td></td>
<td></td>
<td>Hypopigmentation</td>
</tr>
<tr>
<td>Sensory loss</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nodules</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Infiltration</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Is/was this patient hospitalised?</th>
<th>Y</th>
<th>N</th>
<th>Date(s)</th>
<th>Outcome of illness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Survived</td>
<td></td>
<td></td>
<td></td>
<td>Died</td>
</tr>
</tbody>
</table>

#### 3. Exposure history

<table>
<thead>
<tr>
<th>Y</th>
<th>N</th>
<th>Date</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Childhood exposure</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Household contact</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other prolonged contact</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Droplet exposure</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### 4. Laboratory data

<table>
<thead>
<tr>
<th>Specimen</th>
<th>Date collected</th>
<th>Date rec’d</th>
<th>Condition</th>
<th>Test</th>
<th>Result</th>
<th>Date sent</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skin smear</td>
<td></td>
<td></td>
<td></td>
<td>Histology</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Biopsy</td>
<td></td>
<td></td>
<td></td>
<td>Histology</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### 5. Final case classification:

<table>
<thead>
<tr>
<th>Clinically confirmed:</th>
<th>Date reported:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laboratory confirmed:</td>
<td>To whom:</td>
</tr>
<tr>
<td>Route:</td>
<td>Signature:</td>
</tr>
</tbody>
</table>
3.12.5 **Specimen Collection and Transport**

a) **Skin smear slide**

This is placed on a slide, dried and sent to laboratory for histology.

b) **Biopsy of skin lesion or of thickened nerve**

This is transported to the laboratory in normal saline.

Specimens should be accompanied by request form with clinical findings and other relevant information.

3.12.6 **Laboratory Diagnosis**

Demonstration of acid-fast bacilli on microscopy.

3.12.7 **Control and Prevention**

- Detect cases early (particularly infectious multi-bacillary cases), and administer appropriate multi-drug therapy on a regular out-patient basis whenever possible.

- Investigate contacts and source of infection, with early diagnosis and treatment to render the patient non-infectious.

- If possible, periodically examine household and other close contacts at 12-month intervals for at least 5 years after last contact with an infectious case. If not possible, at least once.

- Carry out health education programmes to encourage the seeking of early medical attention. Give information on early signs and symptoms, the availability of the effective multi-drug therapy, the absence of infectivity of patients under continuous treatment and the prevention of physical and social disabilities.
3.13 **Leptospirosis**

<table>
<thead>
<tr>
<th>Internationally notifiable:</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reporting interval:</td>
<td>Immediately</td>
</tr>
<tr>
<td>Report to (country level):</td>
<td>National Epidemiologist</td>
</tr>
<tr>
<td>Report to (regional level):</td>
<td>CAREC’s Epidemiology Division</td>
</tr>
</tbody>
</table>

### 3.13.1 Introduction

An acute and often severe bacterial zoonotic disease, that frequently affect the liver and other organs. Usually characterized by fever, headache, chills, myalgia, conjunctival suffusion, and less frequently by meningitis, rash, jaundice or renal insufficiency. Symptoms may be biphasic. Infection may be caused by several serovars of *Leptospira interrogans*. Infection by the rat-borne serovar (*L. icterohaemorrhagiae*) is probably the commonest seen in the Caribbean, and usually causes the most severe illness. The leptospires are often transmitted to humans by the ingestion of food or drink contaminated by the urine of the reservoir animals and may enter through minor skin lesions and mucous membranes. Cases can follow swimming in contaminated water. Certain occupations may be at high risk for infection.

### 3.13.2 Case Definition

**a) Suspected case**

Any person presenting three or more of the following:

- Fever
- Headache
- Myalgia of calves and/or thighs
- Conjunctival suffusion
- Meningitis
- Jaundice

**b) Confirmed case**

A suspected case that is laboratory confirmed.

(See Laboratory diagnosis, section 3:13:6 and Technical Note 3.13.8)
3.13.3 REPORTING AND INVESTIGATIVE PROCEDURES

a) Level 1

- Identifies a suspected case using the standard case definition.
- Reports immediately (within 24 hours) to Level 2.
- Conducts preliminary investigation.

b) Level 2

- Continues case investigations to identify contacts and source of infection (exposure to infected animals, contaminated food or drink, potentially contaminated waters or occupational sources).
- Ensures that suitable specimens are sent to the laboratory.
- Maintains line listing of cases including those clinically diagnosed but not yet laboratory confirmed.
- Reports to Level 3 monthly, or weekly in an outbreak situation.
### 3.13.4 Leptospirosis Case Investigation Form

<table>
<thead>
<tr>
<th>Reporting Centre:</th>
<th>Date of report: / /</th>
</tr>
</thead>
</table>

#### 1. Patient information

<table>
<thead>
<tr>
<th>Name</th>
<th>Age (yrs)</th>
<th>Sex</th>
<th>M</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Address</td>
<td>Phone</td>
<td>Occupation</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### 2. Clinical data

<table>
<thead>
<tr>
<th>Date of onset</th>
<th>/ /</th>
<th>Sudden</th>
<th>Gradual</th>
<th>Immunization history</th>
</tr>
</thead>
<tbody>
<tr>
<td>Symptom</td>
<td>Y</td>
<td>N</td>
<td>Symptom</td>
<td>Y</td>
</tr>
<tr>
<td>Headache</td>
<td></td>
<td></td>
<td>Conjunctival suffusion</td>
<td></td>
</tr>
<tr>
<td>Fever</td>
<td>Myalgia</td>
<td>Weakness</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anorexia</td>
<td>Rash</td>
<td>Liver tenderness</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vomiting</td>
<td>Bleeding</td>
<td>Hepatomegaly</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jaundice</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Is/was this patient hospitalised?</th>
<th>Y</th>
<th>N</th>
<th>Date(s)</th>
<th>Outcome of illness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Survived</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Died</td>
<td>Date:</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### 3. Exposure history

<table>
<thead>
<tr>
<th>During the 3 weeks prior to onset</th>
<th>Y</th>
<th>N</th>
<th>Date</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact with animals (including pets) or their excreta at home or in travel</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contact with known (or possibly) contaminated water</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ingested possibly rodent-contaminated food/drink</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contact with case of leptospirosis</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### 4. Laboratory data

<table>
<thead>
<tr>
<th>Specimen</th>
<th>Date collected</th>
<th>Date rec’d</th>
<th>Condition</th>
<th>Test</th>
<th>Result</th>
<th>Date sent</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blood – 1st</td>
<td></td>
<td></td>
<td></td>
<td>Leptospira</td>
<td>Agglut. titre</td>
<td>ELISA IgM</td>
<td></td>
</tr>
<tr>
<td>Blood – 2nd</td>
<td></td>
<td></td>
<td></td>
<td>Leptospira</td>
<td>Agglut. titre</td>
<td>ELISA IgM</td>
<td></td>
</tr>
<tr>
<td>Blood, Urine, CSF, Tissue</td>
<td></td>
<td></td>
<td></td>
<td>IF identification</td>
<td>Isolation, PCR</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### 5. Final case classification

<table>
<thead>
<tr>
<th>Laboratory confirmed</th>
<th>Date reported:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discarded</td>
<td>To whom:</td>
</tr>
<tr>
<td></td>
<td>Route:</td>
</tr>
<tr>
<td></td>
<td>Signature:</td>
</tr>
</tbody>
</table>
3.13.5 **Specimen Collection and Transport**

a) **Acute blood, urine, CSF or tissue**

Specimens for isolation of *Leptospira* should be transported to the laboratory at ambient temperature within 24 hours.

Urine specimens may be taken 10 days after the onset of illness for *Leptospira* isolation.

Other specimens should be taken as soon as the patient is seen.

b) **Blood for ELISA IgM**

This should be collected when the patient is seen and transported to the laboratory at 4°C within 24 hours. Only one specimen is needed for ELISA IgM titre. If the result falls in the doubtful category, then a second sample is requested.

c) **Convalescent blood specimen**

A second blood sample should be collected at least 3 weeks after the first, and transported to the laboratory at 4°C within 24 hours.

**Note:** In order to make a serological diagnosis of Leptospirosis, both acute and convalescent sera are needed.

Only one specimen is needed for ELISA IgM titre. If the result falls in the doubtful category, then a second sample is requested.

Specimens must be properly sealed and labelled and accompanied by the following minimum information: Name of patient, address, date of onset, date of specimen, occupation of patient and history of animal contact.

3.13.6 **Laboratory Diagnosis**

Laboratory criteria for diagnoses are:

- Isolation of *Leptospira* from a clinical specimen (blood, urine, CSF or tissue), or
- Four-fold or greater increase in *Leptospira* agglutination titre between acute and convalescent serum obtained 3-2 weeks apart.
- Demonstration of *Leptospira* in a clinical specimen by immunofluorescence or PCR.
LEPTOSPIROSIS

Selected Diseases under Surveillance

109

- ELISA IgM antibody. *(this is the only test currently being used at CAREC)*

- Interpretation of ELISA IgM:
  - Titres of > 1:640 – indicative of a current infection
  - Titres of 1:80 to 1:320 – doubtful diagnosis
  - Titres of < 1:10 to 1:40 – negative

3.13.7 CONTROL AND PREVENTION

- Observe blood and body fluid precautions during patient care.

- Disinfect articles soiled with urine from infected animals.

- Prompt specific antimicrobial treatment is essential. Start as early in the illness as possible.

- Search for contacts and source of infection.

- Educate the public on modes of transmission and relevant recommended precautions.

- Protect workers in high-risk occupations by providing suitable gear.

- Recognize potentially contaminated waters including recreational pools and institute appropriate control measures.

- Control rodents in human habitations. Take special precautions in mass evacuation and temporary accommodation of disaster victims.

- Isolate infected domestic animals to prevent contamination of the living, utility and recreational environment of human populations.

- Maintain liaison with veterinary, rodent control, public health and other relevant personnel to facilitate co-ordination of prevention measures.

3.13.8 TECHNICAL NOTES

The WHO does not define a probable case of Leptospirosis. However, the US CDC defines a probable case as:

- A suspected case with a Leptospira agglutination titre of ≥ 200 in one or more serum specimens.

However, the titres upon which the CDC case definition is based, are too low for the Caribbean region. A more suitable case definition for a probable case in the Caribbean region would be:
- A suspected case with a Leptospira “microscopic agglutination titre of ≥ 800”.

The preferred agglutination test is the microscopic agglutination test (MAT).

Ideally, serological analysis by an agglutination test should use a panel of *Leptospira* antigens that represent the locally occurring strains.

A probable case has also been defined as a suspected case with an ELISA IgM titre of 1:80 - 1:320. These IgM ELISA titres are also too low, and a titre of ≥ 320 is probably more useful. Titres lower than this may be retained for many years after infection, even subclinical infection.
3.14 Malaria

Internationally notifiable: See note on Reporting below
Reporting interval: Immediately
Report to (country level): National Epidemiologist
Report to (regional level): CAREC’s Epidemiology Division

Note on Reporting: Malaria is a Disease under Surveillance by WHO. National health administrations are expected to notify WHO twice a year of:

i. those areas originally malarious with no present risk of infection,
ii. those malaria cases imported into areas free of disease but with continuing risk of transmission,
iii. those areas with chloroquine-resistant strains of parasites, and
iv. those international ports and airports free of malaria.

3.14.1 Introduction

A parasitic disease of variable signs and symptoms resulting from infection with the Plasmodium species. Most cases will experience fever which is usually cyclical in occurrence with sequential attacks of chills, fever and sweating. After a symptom-free interval, the cycle of chills, fever and sweating is repeated either daily, every other day, or every third day depending on the infecting species of Plasmodium, of which there are four. Other commonly associated symptoms include headache, myalgia, nausea and vomiting. Complications of falciparum infection may result in cerebral-related findings (mental disturbances, neurologic signs and convulsions), haemolytic anaemia, dark urine anuria and diarrhoea. The Plasmodium parasites are transmitted through the bite of the infected female Anopheles mosquito.

3.14.2 Case Definition

a) Suspected case

A person with chills followed by fever and sweating.

b) Confirmed case

A suspected case with laboratory confirmation – identification of Plasmodium species on peripheral blood smear.

Confirmed cases are classified as follows:

- Imported

Malaria acquired outside the country
• Autochthonous - Indigenous
Malaria acquired by mosquito transmission in an area where malaria is a regular occurrence

• Autochthonous - Introduced
Malaria acquired by mosquito transmission from an imported case in an area where malaria is not a regular occurrence

• Induced
Malaria acquired through artificial means (e.g. blood transfusion, sharing of syringes or needles)

• Congenital
Malaria acquired through transplacental transmission

• Cryptic
An isolated case of malaria not associated with secondary cases, as determined by appropriate epidemiologic investigations.

3.14.3 REPORTING AND INVESTIGATIVE PROCEDURES
a) Level 1

• Identifies a suspected case in accordance with the definition at 3.14.2.

• Reports immediately to level 2.

• Conducts preliminary investigation using the prescribed form. Special attention is paid to travel history, and to other persons who may have travelled together with the suspected case.

• Initiates steps to ensure that the patient remains in a mosquito-proof area while awaiting further investigations, and advises other members of the household accordingly.

• Alerts the authority responsible for vector control.
b) Level 2

- On receiving report from level 1, immediately dispatches a case investigator and ensures that the person responsible for vector control and the person responsible for taking blood smears are alerted.

- Completes the case investigation and ensures that the required blood smears have been taken. Both thick and thin smears should be taken.

- Searches for other cases on the basis of epidemiologic principles and the use of antibody detection tests. Collect blood spots and send to laboratory.

- Alerts physicians/medical institutions to report cases which fit the definition of a suspected case.

- Arranges for treatment of confirmed case(s) under supervision. Maintain nursing care in an Anopheles-free area until blood smears taken on 3 successive days are negative.

- Reports confirmed case(s) to level 3 weekly

- Sends weekly reports of numbers of clinical cases to level 3

- Sends report of zero cases when no new cases are identified, and when all confirmed cases have reverted to consecutive blood films.

Note: This disease would have been reported as Syndrome 1 (See Section 1.2.5)
### 3.14.4 Malaria Case Investigation Form

<table>
<thead>
<tr>
<th>Malaria Case Investigation Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reporting Centre: ___________</td>
</tr>
<tr>
<td>Date of reporting: / / / /</td>
</tr>
<tr>
<td>Patient’s name: ________________</td>
</tr>
<tr>
<td>Age: ______ yrs</td>
</tr>
<tr>
<td>Sex: M F</td>
</tr>
<tr>
<td>Present address: ____________________________________________</td>
</tr>
<tr>
<td>Permanent home address: ___________________________________</td>
</tr>
<tr>
<td>Date of onset of THIS attack:</td>
</tr>
<tr>
<td>Place of onset of THIS attack:</td>
</tr>
<tr>
<td>Name/Address/Phone No. of Reporting Physician:</td>
</tr>
<tr>
<td>Laboratory Results Smear: Date taken ______</td>
</tr>
<tr>
<td>Positive</td>
</tr>
<tr>
<td>Negative</td>
</tr>
<tr>
<td>No smear taken</td>
</tr>
<tr>
<td>Species: Vivax</td>
</tr>
<tr>
<td>Falciparum</td>
</tr>
<tr>
<td>Malariae</td>
</tr>
<tr>
<td>Ovale</td>
</tr>
<tr>
<td>Not determined</td>
</tr>
<tr>
<td>Has patient been out of the country? Yes</td>
</tr>
<tr>
<td>No</td>
</tr>
<tr>
<td>If yes, list all countries visited with dates</td>
</tr>
<tr>
<td>Was malaria prophylaxis taken for endemic areas? Yes</td>
</tr>
<tr>
<td>No</td>
</tr>
<tr>
<td>Drugs: Chloroquine</td>
</tr>
<tr>
<td>Primaquine</td>
</tr>
<tr>
<td>Fansidar</td>
</tr>
<tr>
<td>Other (specify) ________________</td>
</tr>
<tr>
<td>Blood transfusion within past 2 years? Yes</td>
</tr>
<tr>
<td>No</td>
</tr>
<tr>
<td>If yes, give date/s of transfusion/s _____________________________</td>
</tr>
<tr>
<td>Has the patient had a past history of confirmed malaria? Yes</td>
</tr>
<tr>
<td>No</td>
</tr>
<tr>
<td>If yes, give details: ___________________________________________</td>
</tr>
<tr>
<td>Classification: Imported</td>
</tr>
<tr>
<td>Induced</td>
</tr>
<tr>
<td>Cryptic</td>
</tr>
<tr>
<td>Introduced</td>
</tr>
<tr>
<td>Indigenous</td>
</tr>
<tr>
<td>Congenital</td>
</tr>
<tr>
<td>Final case classification: Laboratory confirmed</td>
</tr>
<tr>
<td>Other (Specify) ________________</td>
</tr>
<tr>
<td>Date reported:</td>
</tr>
<tr>
<td>To Whom:</td>
</tr>
<tr>
<td>Route:</td>
</tr>
<tr>
<td>Signature:</td>
</tr>
<tr>
<td>Investigator:</td>
</tr>
<tr>
<td>Additional Information:</td>
</tr>
</tbody>
</table>
3.14.5 Specimen Collection and Transport

a) Thick and thin blood smears

These are taken from the peripheral blood stream and remain the mainstay of diagnosis.

Because the level of parasitaemia varies from hour to hour, especially for *P. falciparum* infections in which parasite may be difficult to find, blood should be examined at 8-hour intervals ideally, for 3 days, during and between febrile spikes. Infection is more readily detected on a thick film and the less sensitive thin film is used primarily for species identification.

Ensure that slides with the blood films are properly labelled. Dates are important since serial specimens are taken from each case and the results are important to case management.

b) Blood for serology

Serologic tests are not used in diagnosis of acute attacks since they do not distinguish between present and past infections antibody to which may persist for 10 years or more.

However, the Immunofluorescent Antibody Test (IFAT) provides a useful tool for screening in epidemics or where large numbers of cases are involved, so that the taking of blood smears may be prioritized.

3.14.6 Laboratory Diagnosis

- Confirmation is made by the identification of the *Plasmodium* parasite in the peripheral blood film.

- The specie of *Plasmodium* should also be reported — *P. vivax*, *P. malariae*, *P. ovale*, *P. falciparum* or mixed.

- All blood smears submitted should be examined without delay and the results immediately reported to levels 1 and 2. Both positive and negative specimens should be reported.

- IFAT – a blood drop from a finger prick is collected on a strip of special filter paper and examined for antibody. This serological test is a useful tool when a large number of persons are being screened.
3.14.7 **CONTROL AND PREVENTION**

- Prompt investigation of suspected cases and close surveillance of those at high risk.

- Immediate commencement of treatment of confirmed cases (results of sequential blood smears should give an indication of drug resistance and the need for modification of chemotherapeutic regime).

- Nurse patient in mosquito-proof area, especially from dusk to dawn.

- Investigate contacts and try to identify the source of infection. The latter may provide a lead to other cases with inapparent infection.

- Undertake “Active Fever Surveillance” – examine smears from febrile persons presenting to health facilities in case vicinity.

- Undertake “Active Geographical Surveillance” – examine smears from persons living in surrounding households – with or without fever. A one-mile radius around a positive household is a commonly used guide.

- In epidemics, plot epidemic curve utilizing line listing data, and use spot maps to monitor distribution of cases and direct vector control activity.

- Maintain updated information on endemic countries and those in which epidemics are occurring as an item of surveillance data (WER, CSR).

- Put in place systems to facilitate access to information on countries visited by travellers, e.g., collaboration with Immigration Department, links with travel agencies, regular tour organizers and airlines may provide information useful for traveller surveillance.

- Provide appropriate chemoprophylaxis for persons travelling to endemic areas.

- Maintain the use of Health Alert Cards for arriving passengers at Ports of arrival.

- In endemic areas, examine blood for parasites as part of routine screening at blood banks.

- Educate the public on the mode of transmission and of precautions which can help to prevent contracting malaria.

- Institute measures to reduce the Anopheles population in endemic areas, in areas surrounding locations where cases have been identified, and around the premises where the patient has been 30 days prior to the onset of illness (aim at covering a radius of 1 mile around these areas).

- Maintain rigid anti-mosquito control for a distance of 400 metres around the perimeter of airports and seaports.
3.14.8 TECHNICAL NOTES

The first attack in a country regardless of whether the person has had previous attacks in other countries should be counted as a new case in that country. A subsequent attack in the same person in the same country caused by a different *Plasmodium* species should be counted as another case.

The suggested definition for a suspected case is deliberately broad and is primarily based on clinical symptoms. Because presentation of the disease is not uniform, case definitions for surveillance must be adapted by each country depending on patterns of transmission and disease manifestation. Case definitions apply to endemic areas and to persons exposed to these areas, e.g. history of travel to an endemic area.

A subsequent attack in the same person in the same country caused by the same *Plasmodium* species may indicate relapsing infection, or treatment failure due to drug resistance.

In areas where other diseases with similar symptomatology are prevalent, especially other diseases spread by vectors (e.g. yellow fever and dengue), co-infection should be considered even with the demonstration of malarial parasites.

New serological tests are available in which blood from a finger prick is drawn into a capillary tube and used to identify the presence of the *Plasmodium* parasite by species by means of biochemical reaction.
3.15 Measles

<table>
<thead>
<tr>
<th>Internationally reportable:</th>
<th>Yes, disease subject to special surveillance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reporting interval:</td>
<td>Immediately</td>
</tr>
<tr>
<td>Report to (country):</td>
<td>National Epidemiologist</td>
</tr>
<tr>
<td>Report to (regional):</td>
<td>CAREC’s Epidemiology Division, EPI Regional Advisor</td>
</tr>
</tbody>
</table>

3.15.1 INTRODUCTION

Measles is a systemic disease characterised by fever and a generalised maculopapular rash. Its distribution is global and it can occur in all age groups but is particularly severe in malnourished young children among whom the case fatality rate can be as high as 30%. The three major causes of high mortality are the complications of pneumonia, diarrhoea and croup but other complications can occur such as otitis media, blindness (associated with vitamin A deficiency), deafness and encephalitis.

The disease is transmitted by respiratory droplets and is highly contagious in the early clinical stages which follow an incubation period of 10 days (range 7 to 18 days). This early stage is characterised by fever, conjunctivitis, coryza, cough and koplik spots on the buccal mucos.

Following the appearance of the rash, infectivity declines and uncomplicated recovery takes place in 2 to 3 weeks.

Measles may resemble clinical infections with Rubella, Dengue fever, ECHO, Coxsackie, Parvovirus B19 and Herpesvirus 6 viruses, as well as some bacterial and rickettsial diseases.

PAHO (WHO Region of the Americas) has declared a goal of Measles elimination by the year 2000. The virus is considered eradicable due to its single serotype, effective vaccine, lack of naturally occurring non-human reservoirs and rarity of asymptomatic infection. Elimination strategies, formulated by PAHO, have been successfully implemented in the CAREC member countries.

The purpose of measles surveillance in the Caribbean is the rapid detection of measles virus circulation through identification of every case, and the use of this information to strengthen elimination strategies to interrupt transmission of the virus in the Region by 2000. This requires intensive case-based surveillance to detect, investigate, and confirm every suspected measles case in the community.

Surveillance for two of the febrile rash diseases, Measles and Rubella, has been integrated and a case investigation form and flow chart developed (See pages 114 and 115).
3.15.2 **Case Definition**

a) **Suspected measles case**

A person with:

- Fever, and
- Maculopapular rash, and
- At least one of the following: cough, coryza (runny nose), or conjunctivitis

Or Any person in whom a health worker suspects measles infection.

b) **Confirmed measles case**

(i) **Laboratory confirmed:**

A suspected case that meets one of the laboratory criteria for diagnosis, which are:

- Presence of measles-specific IgM antibodies
- A four-fold increase in measles antibody between acute and convalescent stages
- Isolation of measles virus

(ii) **Epidemiologically confirmed:**

Any suspected case linked epidemiologically to a laboratory confirmed case.

(iii) **Clinically confirmed:**

A suspected case where no blood sample is taken or where the patient cannot be assessed. (This category denotes a weakness in the surveillance system)

**Measles case classification scheme**

```
Suspect Measles Case
  \- Adequate blood specimen
    \- Igm POSITIVE \- Laboratory confirmed
    \- Igm negative \- Discard
  \- No adequate blood specimen
    \- No epidemiologic link to laboratory confirmed case \- Clinically confirmed
    \- Epidemiologic link to laboratory confirmed case
```

A Caribbean Communicable Disease Surveillance Manual for Public Health Action, CAREC    October 1999
3.15.3 **Reporting and Investigative Procedures**

a) **Level 1**
   - Identifies a clinical case using the standard measles case definition
   - Reports immediately (within 24 hours) to level 2
   - Conducts preliminary case investigation
   - Reports zero cases if no clinical cases have been seen for the week

b) **Level 2**
   - Dispatches a case investigator within 48 hours who confirms clinical measles.
   - Completes the case investigation, assigning a unique number
   - Collects a blood specimen 3 - 28 days after rash onset and sends to the lab
   - Forwards individual report of laboratory confirmed measles to the national manager
   - Sends a weekly line-listing of clinical cases not yet laboratory confirmed
   - Sends a weekly report of zero cases

c) **Laboratory**
   - Confirms receipt of an adequate specimen (3-28 days after onset).
   - Performs Measles IgM ELISA test and reports to the referrer at the national level and the Regional EPI Advisor.
   - Reports results of any other tests done

d) **National EPI Advisor**
   - Receives reports of clinical and laboratory confirmed measles and prepares weekly summary to CAREC (Regional EPI Advisor) and PAHO
   - Monitors performance indicators (timeliness, completeness, proportion of cases laboratory confirmed)
   - Provides status reports to district and peripheral levels.

**Note:** This disease would have been reported as Syndrome 2 (See section 1.2.5)
3.15.4A **FLOWCHART FOR MEASLES/RUBElla SURVEILLANCE**

HEALTH WORKER SEES PATIENT WITH FEVER AND/OR GENERALIZED RASH AND SUSPECTS EITHER MEASLES OR RUBElla

ADEQUATE BLOOD SPECIMEN OBTAINED?

NO

EPI LINK TO A LAB CONFIRMED CASE?

NO

CONFIRMED CLINICALLY*

MEASLES* RUBELLA*

YES

EQUIVALENT TO

LAB CONFIRMED

POSITIVE IgM

NEGATIVE IgM

DISCARD

MEASLES RUBELLA

* Based on available Clinical and Epidemiological Information
3.15.4b  **Suspected Measles/Rubella Case Investigation Form**
3.15.5 Specimen Collection and Transport

Blood sample.

a) Although the IgM ELISA gives the most reliable results on a blood sample collected 3–28 days after rash onset, an “adequate” specimen for measles surveillance is one sample of blood collected on first contact with the patient.

b) Collect 5 ml of blood into a sterile tube. Forward to the laboratory on ice within 24 hours, accompanied by a completed specimen referral form.

c) If immediate shipment is not possible, centrifuge the blood and transfer serum to a sterile tube with a secure cap. Store at -20°C and ship frozen.

d) Include patient, clinical, immunization and exposure data, and the date of specimen collection.

3.15.6 Laboratory Diagnosis

The assay recommended for case confirmation in countries in the measles elimination phase is the ELISA test for measles-specific IgM antibodies.

Kits are commercially available for ‘Indirect’ or ‘Capture’ assays. The CAREC laboratory is a member of a Regional Measles laboratory network which uses approved kits and participates in assessment and confirmatory testing of results.

Blood samples collected within the first 72 hours after rash onset may yield false negative IgM results. Tests on such patients should be repeated using a blood sample collected more than 72 hours after rash onset.

Specimens negative for measles IgM should be tested for rubella and dengue which are prevalent in the Caribbean. A positive result indicating recent infection with either of these viruses will strengthen the decision to discard the case as measles.

3.15.7 Control and Prevention

Prevention of measles at the community level requires the simultaneous vaccination of a large proportion of children in an epidemiologically determined age range.

In the Caribbean a one-time mass immunization campaign was conducted in 1991 resulting in high coverage of the age group 1 to 14 years. Even with high routine coverage in succeeding years the number of susceptibles will increase to the critical level of one birth cohort. Periodic mass immunization campaigns for a smaller age group (possibly 9 to 59 months) to reduce the number of susceptibles, is an important adjunct in measles control programmes.
Imported measles, detected by sensitive surveillance can be controlled by limited supplemental immunization. See technical note 3.15.8

3.15.8 TECHNICAL NOTES

Imported measles:

A case that is imported from another country with rash onset <18 days of entering the country, in a person who has resided continuously out of the country for that period.

Indigenous measles:

A case not proved to be imported. Local cases linked to imported cases are indigenous.

Performance indicators of surveillance quality are:

Proportion of reporting sites that report each week (target 80%),
Proportion of sites reporting at least one suspected measles case per year (80%)
Proportion of cases investigated within 48 hours of notification (target 80%)
Proportion of cases with adequate specimens or epidemiologic linkage to a laboratory confirmed measles case (target 80%)
Proportion of total laboratory confirmed cases with source of infection identified (target 80%)
3.16 Meningitis (due to *Haemophilus influenzae*)  CLASS  3

<table>
<thead>
<tr>
<th>Internationally notifiable:</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reporting interval:</td>
<td>Weekly</td>
</tr>
<tr>
<td>Report to (country level):</td>
<td>National Epidemiologist</td>
</tr>
<tr>
<td>Report to (regional level):</td>
<td>CAREC’s Epidemiology Division</td>
</tr>
</tbody>
</table>

3.16.1 INTRODUCTION

Invasive disease with *Haemophilus influenzae* may produce any of several clinical syndromes such as epiglottitis, pneumonia, or a bacteraemia with widely spread infection including involvement of the meninges and resulting in *Haemophilus influenzae* meningitis. The onset may be subacute or more usually sudden. Symptoms include fever, vomiting, lethargy and meningeal irritation with bulging fontanelle in infants or stiffness of neck or back in older children. Progressive stupor or coma is common. Occasionally there may be a low-grade fever lasting several days, with less severe CNS symptoms. *H. influenzae* serotype b strains are a common cause of meningitis in childhood but adults may also be affected.

Transmission is by droplet infection and discharges from nose and throat during the infectious period which lasts as long as organisms are present. With effective antibiotic therapy the disease becomes non-communicable within 24 to 48 hours after the start of treatment.

The portal of entry is most commonly the nasopharynx.

3.16.2 CASE DEFINITION

a) Suspected Case

A person presenting with:

- Fever – usually of sudden onset
- Headache
- Signs of meningeal irritation/or bulging fontanelles in babies (commonly preceded by an upper or lower respiratory tract infection).

and

two of the following

- Pleocytosis of the CSF
- Elevated levels of proteins in CSF (> 45mg/100ml.)
- Raised CSF pressure (> 180mm water).
b) **Probable case**
A clinically compatible illness with detection of *H. influenzae* type b antigen in cerebrospinal fluid.

c) **Confirmed case**
A clinically compatible illness that is culture confirmed.

### 3.16.3 REPORTING AND INVESTIGATIVE PROCEDURES

a) **Level 1**
- Reports a probable case immediately to level 2.
- Ensures that all appropriate clinical specimens are collected and sent to the laboratory for investigation.
- Ensures respiratory isolation for 24–48 hours after the commencement of chemotherapy.

b) **Level 2**
- Conducts investigations to discover household and other contacts of reported case.
- Investigates contacts and source of infection and observes for signs of illness especially fever (include daycare centres, nurseries etc. on the basis of epidemiologic findings, paying special attention to household and other close contacts).
- Educates family about symptoms and risk of spread especially in children < 4-years.

**Note:** This disease would have been reported as Syndrome 7 (See Section 1.2.5)
### 3.16.4 Meningitis (due to *Haemophilus influenzae*) Case Investigation Form

Meningitis (due to *Haemophilus influenzae*)

**CASE INVESTIGATION FORM**

<table>
<thead>
<tr>
<th>Reporting Centre:</th>
<th>Date of report / /</th>
</tr>
</thead>
</table>

#### 1. Patient information

<table>
<thead>
<tr>
<th>Name</th>
<th>Age (yrs)</th>
<th>Sex M F</th>
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<table>
<thead>
<tr>
<th>Address</th>
<th>Phone</th>
<th>Occupation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</table>

#### 2. Clinical data

<table>
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<tr>
<th>Date of onset / /</th>
<th>Immunization history</th>
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</table>

<table>
<thead>
<tr>
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<th>Y N</th>
<th>Symptom</th>
<th>Y N</th>
<th>Symptom</th>
<th>Y N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fever</td>
<td></td>
<td>Vomiting</td>
<td></td>
<td>Lethargy</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Y N</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Date of last dose</th>
<th>Number of doses</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Neck stiffness</th>
<th>Stupor</th>
<th>Coma</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y N</td>
<td>Y N</td>
<td>Y N</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Outcome of illness</th>
<th>Y N</th>
<th>Date(s)</th>
</tr>
</thead>
<tbody>
<tr>
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<td>Y N</td>
<td></td>
</tr>
<tr>
<td>Died</td>
<td>Y N</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Is/ was this patient hospitalised?</th>
<th>Date(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y N</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Is/ was this patient hospitalised?</th>
<th>Date:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y N</td>
<td></td>
</tr>
</tbody>
</table>

#### 3. Exposure history

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<thead>
<tr>
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<th>Details</th>
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<tr>
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<td></td>
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</tbody>
</table>

Case contact

Household contact

Institutional contact (e.g. daycare centre etc.)

#### 4. Laboratory data

<table>
<thead>
<tr>
<th>Specimen</th>
<th>Date collected</th>
<th>Date rec’d</th>
<th>Condition</th>
<th>Test</th>
<th>Result</th>
<th>Date sent</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
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<td></td>
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<th>Test</th>
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<tbody>
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<th>Date rec’d</th>
<th>Condition</th>
<th>Test</th>
<th>Result</th>
<th>Date sent</th>
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<table>
<thead>
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<th>Specimen</th>
<th>Date collected</th>
<th>Date rec’d</th>
<th>Condition</th>
<th>Test</th>
<th>Result</th>
<th>Date sent</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSF</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CSF</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### 5. Final case classification

<table>
<thead>
<tr>
<th>Laboratory confirmed</th>
<th>Date reported:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>To whom:</td>
</tr>
<tr>
<td></td>
<td>Route:</td>
</tr>
<tr>
<td></td>
<td>Signature:</td>
</tr>
</tbody>
</table>
3.16.5 Specimen Collection and Transport

a) Cerebrospinal fluid

This should be collected before the start of antibiotic therapy and sent to the laboratory for detection of *H. influenzae* type b antigen or bacterial isolation.

The specimen of CSF must be transported at room temperature to reach the laboratory within one hour.

b) Blood

This should be collected before the start of antibiotic therapy for bacterial isolation.

Specimens should be transported at room temperature and be should be received at the laboratory within 1 hour of collection.

3.16.6 Laboratory Diagnosis

Laboratory confirmation is made by bacterial isolation.

3.16.7 Control and Prevention

- Respiratory precautions should be observed during the nursing care of patients until at least 24 hours from the start of antibiotic treatment.
- Chemoprophylaxis measures should be applied to household and other close contacts of a known case, especially where these include children and infants unprotected by immunization.
- Chemoprophylaxis of staff and children in daycare centres should be considered when 1 case has occurred, and is recommended when 2 or more cases have occurred among the children. It is also recommended when children under 12 months of age or 12 – 24 months of age who are inadequately immunized have been exposed.

3.16.8 Technical Notes

A protein polysaccharide conjugate vaccine effective in children > 2 months is available, either individually or combined with DPT.
3.17 Meningitis/Encephalitis (Viral)  

Internationally notifiable: No  
Reporting interval: Immediately  
Report to (country level) National Epidemiologist  
Report to (regional level) CAREC’s Epidemiology Division

3.17.1 Introduction

Invasion of the central nervous system (CNS) by viral agents occurs either as the primary pathologic event in the infection or as a rare complication. Clinical expression ranges from mild aseptic meningitis to severe life threatening encephalitis.

Viruses which may be involved include:

- The enteroviruses Coxsackie B, Echovirus, Enterovirus 71, and occasionally poliovirus and Coxsackie A
- Arboviruses Eastern and Venezuelan Equine Encephalitis, St Louis Encephalitis and West Nile Virus
- Mumps, measles, herpes and varicella

For many of these viruses there are no vaccines and, although antibody protects against re-infection with a specific agent, the multiple aetiology makes repeated occurrences possible. Treatment options are limited to a few anti-virals and clinical management.

Laboratory diagnosis is possible but the resources needed to investigate sporadic cases are considerable and results may be delayed. Priority should be given to clusters of cases or patients with severe disease or special risk factors.

3.17.2 Case definition

a) Viral meningitis suspected case

Fever of sudden onset, followed by two or more of the following:

- Headache
- Nausea
- Vomiting
- Stiffness and pain in the neck
- Maculopapular, vesicular or petechial rash

and two of the following
b) **Viral encephalitis, suspected case**

Fever of sudden onset, followed by three or more of the following:

- Headache
- Meningeal signs
- Drowsiness, stupor
- Confusion, disorientation
- Tremors, convulsions
- Coma
- Spasticity, spastic paralysis

c) **Probable viral meningitis/encephalitis**

- A suspected case with concurrent or recent symptoms of a disease which is known to be associated with CNS infection, e.g. herpes, mumps, measles.
- A suspected case with laboratory detection of an enterovirus in a site other than the CNS, e.g. faeces.

d) **Laboratory confirmed viral meningitis/encephalitis**

A suspected or probable case with:

- Detection of a virus or viral protein in the central nervous system.
- Specific viral antibody for herpes, mumps, or measles in the CSF.
- Positive serology for an arbovirus known to be associated with CNS infection.
- Positive enterovirus serology and epidemiological linkage to a case with enterovirus in the CNS.

### 3.17.3 REPORTING AND INVESTIGATIVE PROCEDURES

a) **Level 1**

- Detects and reports suspected case of meningitis or encephalitis to level 2 within 24 hours.
- Conducts preliminary case investigation.
- Collects specimens and sends to the laboratory with comprehensive clinical data.

b) **Level 2**

- Continues case investigation and field investigation.
- Receives and records laboratory results as they become available.
MENINGITIS/ENCEPHALITIS (Viral)

- Reports probable and confirmed cases to the national authorities within 48 hours.
- Reports collective data on subsequent cases to national level by weekly line listing.

c) Level 3

- Coordinates national control action and community education as applicable.
- Sends monthly national data to CAREC’s Epidemiology Division.

**Note:** This disease would have been reported as Syndrome 7 (See 1.2.5)
### 3.17.4 Viral Meningitis/Encephalitis Case Investigation Form

**VIRAL MENINGITIS/ENCEPHALITIS CASE INVESTIGATION FORM**

<table>
<thead>
<tr>
<th>Reporting Centre:</th>
<th>Date of report</th>
<th>/ /</th>
</tr>
</thead>
</table>

#### 1. Patient information

<table>
<thead>
<tr>
<th>Name</th>
<th>Age (yrs)</th>
<th>Sex</th>
<th>M</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Address</td>
<td>Phone</td>
<td>Occupation</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### 2. Clinical data

<table>
<thead>
<tr>
<th>Date of onset</th>
<th>/ /</th>
</tr>
</thead>
</table>

**Immunization history**

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Y</th>
<th>N</th>
<th>Symptom</th>
<th>Y</th>
<th>N</th>
<th>Symptom</th>
<th>Y</th>
<th>N</th>
<th>Number of doses MMR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fever</td>
<td></td>
<td></td>
<td>Rash</td>
<td></td>
<td></td>
<td>Tremors</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Headache</td>
<td></td>
<td></td>
<td>Drowsiness</td>
<td></td>
<td></td>
<td>Convulsions</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nausea</td>
<td></td>
<td></td>
<td>Confusion</td>
<td></td>
<td></td>
<td>Spasticity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vomiting</td>
<td></td>
<td></td>
<td>Stupor</td>
<td></td>
<td></td>
<td>Coma</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neck stiffness</td>
<td></td>
<td></td>
<td>Disorientation</td>
<td></td>
<td></td>
<td>Vesicles on hands &amp; feet</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Is/was this patient hospitalised?</th>
<th>Y</th>
<th>N</th>
<th>Date(s)</th>
<th>Outcome of illness</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Survived</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Died</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Date:</td>
</tr>
</tbody>
</table>

#### 3. Exposure history

<table>
<thead>
<tr>
<th>Has there been a history of recent herpes</th>
<th>Y</th>
<th>N</th>
<th>Date</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Has there been recent measles?</td>
<td>Y</td>
<td>N</td>
<td>Date</td>
<td>Details</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is there mumps in the patient or contacts?</td>
<td>Y</td>
<td>N</td>
<td>Date</td>
<td>Details</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recent travel to a peri-sylvatic area?</td>
<td>Y</td>
<td>N</td>
<td>Date</td>
<td>Details</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### 4. Laboratory data

<table>
<thead>
<tr>
<th>Specimen</th>
<th>Date collected</th>
<th>Date rec’d</th>
<th>Condition</th>
<th>Test</th>
<th>Result</th>
<th>Date sent</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute blood</td>
<td></td>
<td></td>
<td>Virus isolation/ PCR</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conv Blood</td>
<td></td>
<td></td>
<td>Serology</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Throat swab</td>
<td></td>
<td></td>
<td>Virus isolation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CSF</td>
<td></td>
<td></td>
<td>Virus isolation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stool</td>
<td></td>
<td></td>
<td>Virus isolation/ PCR</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vesicle swab</td>
<td></td>
<td></td>
<td>FA</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brain biopsy</td>
<td></td>
<td></td>
<td>FA PCR</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### 5. Final case classification

<table>
<thead>
<tr>
<th>Clinically confirmed</th>
<th>Epidemiologically confirmed</th>
<th>Laboratory confirmed</th>
<th>Date reported:</th>
<th>To whom:</th>
<th>Route:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
3.17.5 Specimen Collection and Transport

a) Acute blood sample

- Draw a 5 to 10 ml blood sample from each suspected case and place in a sterile tube.
- Send to the laboratory immediately in a cold box at 4–8°C.
- If shipment is not possible within 24 hours, centrifuge the blood and transfer the serum to a sterile vial. Store at –20°C and ship with frozen icepacks.
- Complete a laboratory request form with clinical information and date of onset of illness.

b) Convalescent blood sample

- Draw a 5ml convalescent blood sample 2 to 3 weeks after the first.
- Store and ship as above.

c) Throat and vesicle swabs

- Collect early in the course of the illness and place in viral transport medium.
- Send immediately to the laboratory in a cold box.

d) Cerebrospinal fluid, brain biopsy or autopsy specimens

- These are collected under sterile conditions by trained personnel and forwarded immediately to the laboratory in a cold box.

NOTE: For laboratory diagnosis of meningitis/encephalitis due to herpes, measles or mumps, blood samples alone are insufficient. A CSF specimen should also be submitted.

3.17.6 Laboratory Diagnosis

Laboratory tests are selected based on the clinical and epidemiological information provided and on the date of specimen collection relative to the date of onset of illness. Careful attention should be paid to the interpretation of test results.

The specific infecting virus may be determined by:

- Isolation in cell culture or suckling mice.

- Demonstration of viral antigen in tissues and cells by immunofluorescence (FA) or PCR.

- A four-fold or greater increase in antibody level between acute and convalescent blood samples.
3.17.7 **Control and Prevention of Viral Meningitis/Encephalitis**

- If an arbovirus is responsible, intensify mosquito control measures (See 3.4.7).
- If mumps or measles are involved, improve vaccine coverage of the population.
- Control of herpes requires health education on recognition of the disease and prevention of transmission.
- Enterovirus circulation can be reduced by education on personal hygiene and care of infants in day care centres (See 3.8.7).

3.17.8 **Technical Notes**

Viral meningitis and encephalitis are grouped for routine surveillance purposes because of their clinical similarity in the early stages. Similar specimens are collected for referral to the laboratory where an in-house testing algorithm is used based on clinical data and the availability of diagnostic reagents.

Should a cluster of suspected cases be reported, investigations will be focused on determining if there is a common aetiology. For this purpose specimens may be forwarded to other reference laboratories.
3.18 Meningococcal Infection  
(due to Neisseria meningitidis)  

CLASS 2

Internationally notifiable: No  
Reporting interval: Immediately  
Report to (country level): National Epidemiologist  
Report to (regional level): CAREC’s Epidemiology Division

3.18.1 INTRODUCTION

An acute bacterial disease caused by Neisseria meningitidis of which one of several serogroups may be implicated. Untreated, some of those who acquire infection will progress to invasive disease characterized by one or more clinical syndromes, including meningococcaemia, sepsis, pneumonia or meningitis. Onset is usually sudden with fever, headache, nausea often with vomiting and a petechial rash may appear. Delirium and coma may occur and occasional fulminating cases may present with prostration, ecchymoses and shock at the onset. Pockets of asymptomatic carriers are usually present in communities. The reservoir is human and transmission is by direct contact, including respiratory droplets from nose and throat of infected persons.

3.18.2 CASE DEFINITION

a) Suspected case

An individual presenting with sudden onset of fever > 38.5°C and one of the following:

- Neck stiffness
- Altered consciousness
- Other meningeal signs
- A petechial or purpurral rash
- A bulging fontanelle in children < 1 year

b) Probable case

A suspected case with a turbid CSF.

or

A suspected case identified during an ongoing epidemic with an epidemiologic link to a confirmed case.

c) Confirmed case

A clinically compatible case that is culture confirmed.
3.18.3 Reporting and Investigative Procedures

a) Level 1

- Reports a probable case of acute meningococcal infection to Level 2 within 24 hours.
- Initiates case investigation and obtains preliminary information relevant to tracing household and other contacts of the case.

b) Level 2

- Continues case investigation and conducts field investigation to locate contacts, and identify source of infection if possible.
- Ensures that appropriate specimens are sent to the laboratory under appropriate transport conditions.
- Determines whether or not an epidemic is occurring.
- Coordinates with laboratory to ensure that results of investigations are sent to health care personnel responsible for the management of the case and for epidemiologic investigations.
- Reports index case on confirmation to Level 3 within 24 hours.
- Reports subsequent cases collectively to Level 3 at weekly intervals.
- Directs the administration of chemoprophylaxis to ensure that the therapeutic agent being used is appropriate, and that it is given only to those for whom it is indicated.

Note: This disease would have been reported as Syndrome 7 (See Section 1.2.5)
### 3.18.4 Meningococcal Meningitis (due to Neisseria meningitidis) Case Investigation Form

<table>
<thead>
<tr>
<th>Reporting Centre:</th>
<th>Date of report / /</th>
</tr>
</thead>
</table>

#### 1. Patient information

<table>
<thead>
<tr>
<th>Name</th>
<th>Age (yrs)</th>
<th>Sex M F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Address</td>
<td>Phone</td>
<td>Occupation</td>
</tr>
</tbody>
</table>

#### 2. Clinical data

<table>
<thead>
<tr>
<th>Date of onset / /</th>
<th>Immunization history</th>
</tr>
</thead>
<tbody>
<tr>
<td>Symptom Y N</td>
<td>Symptom Y N</td>
</tr>
<tr>
<td>Fever</td>
<td>Rash</td>
</tr>
<tr>
<td>Headache</td>
<td>Ecchymoses</td>
</tr>
<tr>
<td>Nausea/vomiting</td>
<td>Delirium</td>
</tr>
<tr>
<td>Neck stiffness</td>
<td>Coma</td>
</tr>
<tr>
<td>Pneumonia</td>
<td>Other (specify)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Is/was this patient hospitalised? Y N Date(s)</th>
<th>Outcome of illness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Survived</td>
<td>Died</td>
</tr>
</tbody>
</table>

#### 3. Exposure history

<table>
<thead>
<tr>
<th>Y N</th>
<th>Date</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Case contact</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Place of contact</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Period of contact</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unknown (e.g. carrier)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### 4. Laboratory data

<table>
<thead>
<tr>
<th>Specimen</th>
<th>Date collected</th>
<th>Date rec’d</th>
<th>Condition</th>
<th>Test</th>
<th>Result</th>
<th>Date sent</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSF</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CSF</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blood</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Naso/pharyngeal swab</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### 5. Final case classification

<table>
<thead>
<tr>
<th>Laboratory confirmed</th>
<th>Date reported:</th>
</tr>
</thead>
<tbody>
<tr>
<td>To whom: Route:</td>
<td>Signature:</td>
</tr>
</tbody>
</table>
3.18.5 **Specimen Collection and Transport**

a) **Blood and CSF** specimens are collected from a probable case and transported at Room Temperature and should be received at the laboratory within 1 hour of collection.

Blood and CSF should be collected early in the illness (before antibiotic treatment is started).

b) **Nasopharyngeal swabs** (for carriers) should be transported in Stuarts or Amies transport media at room temperature to reach the laboratory within 24 hours of collection.

3.18.6 **Laboratory Diagnosis**

Laboratory diagnosis is confirmed by a positive culture obtained from blood, CSF or nasopharynx. Isolates should be serotyped.

Where antibiotics had been started on presumptive diagnosis or on other clinical grounds, cultures may be negative and the organism is demonstrated by direct gram stain on these specimens.

3.18.7 **Control and Prevention**

Respiratory isolation of patients until 24 hours after the start of antibiotic therapy.

Concurrent disinfection of nasal and throat discharges and of articles soiled by these.

Close surveillance of household and other intimate contacts for early signs of illness and the prompt administration of chemotherapy where indicated.

Chemoprophylaxis should be limited to intimate contacts. (household contacts and people socially close enough to have shared eating utensils, e.g., close friends at school but not the whole class).

Even healthcare personnel are rarely at risk when caring for patients and only intimate exposure to nasopharyngeal secretions (e.g., as in mouth to mouth resuscitation) warrants prophylaxis.

In epidemic situations, major emphasis should be placed on careful surveillance, early diagnosis and immediate treatment.

**NOTE:** Widespread nasopharyngeal swab collecting and active search for carriers, in the occurrence of either sporadic cases or an epidemic is non-productive and is not recommended.
Separate individuals, and ventilate living and sleeping quarters of all persons who are exposed to infection because of crowding or congested living conditions. e.g., soldiers, prisoners, worksite campers, etc.

Vaccine use is subject to the consideration of individual administrations and is not routinely recommended in our region.
3.19 Mumps

Internationally notifiable: No
Reporting interval: Within 48 hours
Report to (country level): National Epidemiologist (collective data)
Report to (regional level): CAREC’s Epidemiology Division

3.19.1 INTRODUCTION

Mumps is an acute viral disease whose most characteristic sign is swelling and tenderness of the salivary glands, usually the parotid and sometimes the sub-lingual and sub-maxillary. It is accompanied by fever, and frequently in children by invasion of the central nervous system causing aseptic meningitis or meningo-encephalitis. Orchitis occurs in 15–25% of males.

The virus is spread by respiratory droplets and has an incubation period of 2 to 3 weeks. Asymptomatic infections are common and such persons are infectious. Symptomatic cases are infectious several days before the swelling of the salivary glands and for as long as 9 days after. Mumps virus may be isolated from saliva, urine and cerebrospinal fluid.

Mumps is preventable by vaccination with live attenuated virus, usually administered as a component of the triple Mumps/Measles/Rubella vaccine.

3.19.2 CASE DEFINITION

a) Suspected case

A person presenting with fever and swelling of the salivary glands.

b) Confirmed case

A laboratory confirmed case is a suspected case with positive laboratory findings. (See 3.19.6)

3.19.3 REPORTING AND INVESTIGATIVE PROCEDURES

a) Level 1

● Reports suspected case to Level 2 within 48 hours
● Collects appropriate specimens and refers to the laboratory
● Initiates case investigation, including immunization history
b) Level 2

- Collects case reports from level 1 and laboratory results
- Checks hospital for aseptic meningitis cases
- If found collects and refers specimens to the laboratory
- Sends a collective monthly report to the national level

c) Level 3 (National Epidemiologist or National EPI Advisor)

- Reports monthly data to CAREC and Regional EPI Advisor
### Mumps Case Investigation Form

**MUMPS CASE INVESTIGATION FORM**

<table>
<thead>
<tr>
<th>Reporting Centre:</th>
<th>Date of report / /</th>
</tr>
</thead>
</table>

#### 1. Patient Information

<table>
<thead>
<tr>
<th>Name</th>
<th>Age (yrs)</th>
<th>Sex M F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Address</td>
<td>Phone</td>
<td>Case #</td>
</tr>
</tbody>
</table>

#### 2. Clinical data

<table>
<thead>
<tr>
<th>Date of onset of illness / /</th>
<th>Immunization history</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fever</td>
<td>Mumps vaccine</td>
</tr>
<tr>
<td>Aseptic Meningitis</td>
<td>Mumps vaccine</td>
</tr>
<tr>
<td>Meningo-Encephalitis</td>
<td>MMR vaccine</td>
</tr>
<tr>
<td>Symptom Y N</td>
<td>Symptom Y N</td>
</tr>
<tr>
<td>Fever</td>
<td>Salivary glands</td>
</tr>
<tr>
<td>Aseptic Meningitis</td>
<td>Mumps vaccine</td>
</tr>
<tr>
<td>Meningo-Encephalitis</td>
<td>MMR vaccine</td>
</tr>
<tr>
<td>Date of last dose / /</td>
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</tr>
</tbody>
</table>

#### 3. Exposure history

<table>
<thead>
<tr>
<th>Dates</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y N</td>
<td>Was there close contact with a case within the past 14 days?</td>
</tr>
<tr>
<td>Y N</td>
<td>Is there a cluster of similar cases in the District?</td>
</tr>
</tbody>
</table>

#### 4. Laboratory data

<table>
<thead>
<tr>
<th>Specimen</th>
<th>Date collected</th>
<th>Date rec’d</th>
<th>Condition</th>
<th>Test</th>
<th>Result</th>
<th>Date sent</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Saliva</td>
<td></td>
<td></td>
<td>Virus isolation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CSF</td>
<td></td>
<td></td>
<td>Virus isolation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urine</td>
<td></td>
<td></td>
<td>VI / FA</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acute blood</td>
<td></td>
<td></td>
<td>Serology</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Convalescent blood</td>
<td></td>
<td></td>
<td>Serology</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### 5. Final case classification

<table>
<thead>
<tr>
<th>Suspected</th>
<th>Epidemiologically confirmed</th>
<th>Laboratory confirmed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date reported:</td>
<td>To whom:</td>
<td>Route:</td>
</tr>
<tr>
<td>Signature:</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
3.19.5 SPECIMEN COLLECTION AND TRANSPORT

a) Saliva

Collect in the acute stage of the illness by aspiration from the buccal cavity, or using cotton swabs. Place in viral transport medium, store at 4°C, and send to the laboratory within 24 hours.

b) CSF

If cerebro-spinal fluid is being collected, an aliquot may be placed in a sterile vial and sent immediately to the laboratory at 4°C.

c) Urine

Collect 10 ml urine up to 7 days after onset of illness. Place in a sterile screw-capped container and send immediately to the laboratory at 4°C.

d) Blood samples

Collect an acute sample within one week of onset, and a convalescent sample 2 weeks later. Following clot retraction the serum is transferred to a sterile vial. Serum may be stored at 4°C for 48 hours, or at –20°C if immediate shipment to the laboratory is not possible.

3.19.6 LABORATORY DIAGNOSIS

Laboratory confirmation of mumps virus infection rests upon:

- Isolation of the virus from saliva, CSF or urine.
- Detection of viral antigen by direct or indirect immunofluorescence on epithelial cells in urine sediment.
- Demonstration of a four-fold or greater increase in specific antibody between the acute and convalescent stages of the disease.

3.19.7 CONTROL AND PREVENTION

The spread of a mumps epidemic may be controlled by isolation of suspect cases for 9 days from the onset of parotid swelling. However, transmission will still occur from asymptomatic cases.

The inclusion of MMR vaccine in the routine infant immunization programme is recommended for prevention of disease. Males with no history of mumps disease or immunization may be vaccinated with the single vaccine as they approach maturity.
3.20 Pertussis

<table>
<thead>
<tr>
<th>Internationally notifiable:</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reporting interval:</td>
<td>Immediately</td>
</tr>
<tr>
<td>Report to (country level):</td>
<td>National Epidemiologist</td>
</tr>
<tr>
<td>Report to (regional level):</td>
<td>CAREC’s Epidemiology Division</td>
</tr>
</tbody>
</table>

3.20.1 Introduction

Pertussis, (whooping cough), is an acute bacterial infection of the respiratory tract caused by *Bordetella pertussis*. Its distribution is world wide and it is seen most frequently in children under 5 years.

The onset of symptoms is insidious with a catarrhal stage leading to a cough which becomes paroxysmal and which may last for up to 2 months. The main symptom is easily recognisable - a series of rapid coughs ending in inhalation which produces the characteristic “whoop”. This is followed by vomiting. Mortality is high in malnourished infants with other respiratory and enteric infections or those who succumb to the complications of broncho-pneumonia or encephalopathy.

Transmission is by droplet contact with secretions from the respiratory tract and the patient is most infectious in the catarrhal stage. The incubation period is 6 to 20 days.

Pertussis is one component of the triple vaccine DPT which is included in the routine schedule of the EPI (See 3.6.1). Waning immunity may permit cases in adolescents and young adults. Second attacks sometimes occur in persons who were infected with the wild organism.

The purpose of surveillance is to detect cases early enough to prevent community outbreaks, to monitor the impact of vaccination and to identify high risk areas. **All suspected cases should be investigated immediately and confirmed by the laboratory.**

3.20.2 Case definition

a) Suspected case

A suspected case of pertussis is anyone presenting with a cough lasting at least 2 weeks and

- Paroxysms (fits) of coughing
- Inspiratory “whoop” at the end of the coughing fit
- Vomiting after coughing
b) Confirmed case

   (i) Laboratory confirmed case
A case that is a suspected case with positive laboratory findings (see 3.15.6).

   (ii) Epidemiologically confirmed case
A suspected case that is linked epidemiologically to a laboratory confirmed case.

3.20.3 REPORTING AND INVESTIGATIVE PROCEDURES

a) Level 1
   - Reports a suspected case within 24 hours to level 2

b) Level 2
   - Conducts the case investigation, including immunization history.
   - Obtains special media (3.15.5) from the laboratory and arranges collection and referral of specimens.
   - Conducts field investigation for other suspected cases.
   - Reports the first confirmed case within 48 hours to the national level.
   - Reports subsequent cases weekly, using a line-listing format.

c) Level 3
   - Reports number and ages of confirmed cases monthly to CAREC’s Epidemiology Division.

Note: This disease would have been reported as Syndrome 3 (See section 1.2.5)
### PERTUSSIS CASE INVESTIGATION FORM

**1. Patient information**

<table>
<thead>
<tr>
<th>Name</th>
<th>Age (yrs)</th>
<th>Sex (M/F)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Address</th>
<th>Phone</th>
<th>Case #</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**2. Clinical data**

<table>
<thead>
<tr>
<th>Date of onset of illness</th>
<th>Symptoms</th>
<th>Immunization history</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Y N</td>
<td>DPT</td>
</tr>
<tr>
<td></td>
<td>Y N</td>
<td>DtaP</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cough more than 2 weeks</th>
<th>Symptom</th>
<th>Date of last dose</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Y N</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Paroxysms</th>
<th>Symptom</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pneumonia</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>“whoop”</th>
<th>Symptom</th>
</tr>
</thead>
<tbody>
<tr>
<td>Encephalitis</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Is / was this patient hospitalised?</th>
<th>Date(s)</th>
<th>Outcome of illness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y N</td>
<td></td>
<td>Survived</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Died</th>
<th>Date:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
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**3. Exposure history**

<table>
<thead>
<tr>
<th>Has there been contact with a case during the past 3 weeks?</th>
<th>Y N</th>
<th>Dates</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Has the patient received antibiotics?</th>
<th>Y N</th>
<th>Dates</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tr>
</tbody>
</table>

**4. Laboratory data**

<table>
<thead>
<tr>
<th>Specimen</th>
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<th>Date rec’d</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Throat swab</td>
<td></td>
<td></td>
<td>Culture</td>
</tr>
<tr>
<td>Nasal swab</td>
<td></td>
<td></td>
<td>Culture</td>
</tr>
<tr>
<td>N/P washings</td>
<td></td>
<td></td>
<td>FA</td>
</tr>
<tr>
<td>Serum</td>
<td></td>
<td></td>
<td>IgM EIA</td>
</tr>
</tbody>
</table>

**5. Final case classification**

<table>
<thead>
<tr>
<th>Suspected</th>
<th>Epidemiologically confirmed</th>
<th>Laboratory confirmed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Date reported:</th>
<th>To whom:</th>
<th>Route:</th>
<th>Signature:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
3.20.5 Specimen Collection and Transport

a) Throat swabs and nasal swabs

If laboratory facilities exist in country, throat swabs and nasal swabs are collected in the early stages of the cough and rapidly transported to the laboratory on blood agar plates at ambient temperature.

b) Nasopharyngeal washings, if rapidly transported to the laboratory (same day), may be used for immunofluorescence (FA).

c) In an outbreak situation blood samples may be drawn from a number of suspected cases. The serum is separated by centrifugation and sent in sterile tubes to CAREC for serology.

3.20.6 Laboratory Diagnosis

Laboratory confirmation of a suspected case of pertussis rests on one of the following:

- Bacterial culture of *Bordetella pertussis* from nasopharyngeal secretions
- Demonstration of bacterial antigen in cells from the nasopharynx by direct FA (fluorescent antibody test). This test has low sensitivity and specificity and should only be performed by experienced technicians.
- Detection of specific IgM antibody in serum by the ELISA technique.

3.20.7 Control and Prevention

Some measure of control of transmission may be achieved by:

- Treatment of cases and immediate close contacts with appropriate antibiotics, which reduces communicability but may not stop the cough.
- Isolation of the affected child in the early stages, when unfortunately pertussis may not be suspected.
- Exclusion of incompletely immunised household contacts younger than 7 years from school for 14 days.
- During outbreaks, protection of health care workers in close contact with cases with a 14 day course of erythromycin.
- Long term prevention rests on the maintenance of high vaccination coverage in the population.
- The immunization status of each suspected case should be specifically assessed and the schedule completed if found to be incomplete.
- Children less than 7 years with the last dose more than 3 years ago should be given boosters.
- The public should be educated about the disease and encouraged to bring children for the full immunization series.
3.21  Plague

Internationally notifiable: Yes
Reporting interval: Immediately
Report to (country level): National Epidemiologist
Report to (regional level): CAREC’s Epidemiology Division

Report to World Health Organization/Pan American Health Organization in accordance with the International Health Regulations.

3.21.1  INTRODUCTION

A specific zoonosis involving rodents and their fleas which transfer infection with the bacteria *Yersinia pestis* to various animals and to man. It is transmitted among rodents and to man by bites of the fleas or from contact with infected animals. Plague may also be transmitted by direct exposure to infected tissues or respiratory droplets from a person with secondary pneumonic plague. Primary pneumonic plague may then lead to localized or widespread epidemics. The onset is sudden, with high fever, malaise, intense headache, severe muscular pains and prostration. Pneumonic plague gives rise to tachypnoea, productive cough with blood-tinged sputum and even cyanosis and death. A pustule or ulcer may develop at the site of inoculation. Lymphadenitis (bubo) may develop involving axillary, inguinal and cervical lymph nodes which become enlarged and may eventually suppurate and drain. The disease is endemic in South America and in the Mid-West U.S.A.

3.21.2  CASE DEFINITION

a)  Suspected case

A person presenting with fever and leukocytosis

and

One or more of the following:

- Regional lymphadenitis (bubonic or pharyngeal plague)
- Septicaemia without an evident bubo (septicaemic plague)
- Pneumonia
- Primary pneumonic plague (inhalation of infectious droplets)
- Secondary pneumonic plague (haematogenous spread in a bubonic or septicaemic case)
b) **Probable case**

A suspected case with supportive laboratory results:

- Demonstration of *Yersinia pestis* antigen in appropriate clinical specimens

or

- Single or high antibody titre to *Yersinia pestis* in the absence of a history of immunization

c) **Confirmed case**

A suspected or probable case with:

- Isolation of *Yersinia pestis* from a clinical specimen

or

- Demonstration of a fourfold or greater rise in reciprocal serum IgG antibody titres to *Yersinia pestis*

### 3.21.3 **REPORTING AND INVESTIGATIVE PROCEDURES**

a) **Level 1**

- Identifies a clinical case and **reports immediately to Level 2**
- Conducts preliminary investigation and identifies other cases possibly associated with first case through contact or common source of infection.
- Identifies any special risk factors peculiar to the case(s).

b) **Level 2**

- Reports case identification (suspected, probable or confirmed) immediately to Level 3.
- Continues case investigation to identify possible source/place/mode of infection.
- Co-ordinates required follow-up action with respect to all suspected cases, case contacts, and persons at high risk.
- Liaises with appropriate personnel to institute measures relevant to rodent control and animal surveillance as indicated.
- Reports weekly to Level 3 on new cases and related action being taken.
- Monitors reports on specimens submitted to the laboratory.
- Reports **confirmed** cases to Level 3 on receiving laboratory report(s).
c) Level 3

- Reports confirmed case to WHO/PAHO in accordance with the International Health Regulations.
- Utilizes the media to inform, reduce panic, and enlist the required co-operation of the public in epidemic situations.
- Facilitates co-ordination with and assistance from Regional/International agencies if extra-country resources are required.

Note: This disease would have been reported as syndrome 3 (See Section 1.2.5)
### 3.21.4 Plague Case Investigation Form

**PLAGUE CASE INVESTIGATION FORM**

<table>
<thead>
<tr>
<th>Reporting Centre:</th>
<th>Date of report / /</th>
</tr>
</thead>
</table>

#### 1. Patient Information

<table>
<thead>
<tr>
<th>Name</th>
<th>Age (yrs)</th>
<th>Sex</th>
<th>M</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Address</td>
<td>Phone</td>
<td>Occupation</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### 2. Clinical Data

<table>
<thead>
<tr>
<th>Date of onset / /</th>
<th>Immunization history</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Y</th>
<th>N</th>
<th>Symptom</th>
<th>Y</th>
<th>N</th>
<th>Symptom</th>
<th>Y</th>
<th>N</th>
<th>Number of doses</th>
</tr>
</thead>
<tbody>
<tr>
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<td>Delirium</td>
<td>Skin ulcer</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Malaise</td>
<td>Haemoptysis</td>
<td>Lymphadenitis</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Headache</td>
<td>Tachypnoea</td>
<td>Bubo</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Myalgia</td>
<td>Cyanosis</td>
<td>Purpura</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
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<td>Tachycardia</td>
<td>Coma</td>
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<td></td>
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</table>

<table>
<thead>
<tr>
<th>Is/was this patient hospitalised?</th>
<th>Y</th>
<th>N</th>
<th>Date(s)</th>
<th>Outcome of illness</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Survived</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Died</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Date:</td>
</tr>
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</table>

#### 3. Exposure History

<table>
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<th>N</th>
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<th>Details</th>
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</thead>
<tbody>
<tr>
<td>Flea bite</td>
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</tr>
<tr>
<td>Case contact (droplet infection)</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Handling of infected tissues/exudate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cat bite/scratch</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### 4. Laboratory Data

<table>
<thead>
<tr>
<th>Specimen</th>
<th>Date collected</th>
<th>Date rec’d</th>
<th>Condition</th>
<th>Test</th>
<th>Result</th>
<th>Date sent</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
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<td></td>
<td>Isolation</td>
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<td></td>
</tr>
<tr>
<td>Blood - acute</td>
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<td></td>
<td>Antibody titre</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Blood –conval.</td>
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<td></td>
<td>Antibody titre</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smear from – bubo/sputum</td>
<td></td>
<td></td>
<td>Microscopy</td>
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<td></td>
</tr>
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</table>

#### 5. Final Case Classification

<table>
<thead>
<tr>
<th>Laboratory confirmed</th>
<th>Date reported:</th>
</tr>
</thead>
<tbody>
<tr>
<td>To whom:</td>
<td></td>
</tr>
<tr>
<td>Route:</td>
<td></td>
</tr>
<tr>
<td>Signature:</td>
<td></td>
</tr>
</tbody>
</table>
3.21.5 **SPECIMEN COLLECTION AND TRANSPORT**

a) Blood specimen for isolation of *Yersinia pestis*.

b) Acute and convalescent blood specimens collected 1 week apart for serum antibody titres.

c) Blood, bubo exudates or aspirates and sputum smears sent for microscopic examination.

Transport within 24 hours at 4°C.

**Note:** Bubos and abscesses should not be excised or incised and drained for diagnostic purposes because excessive manipulation may result in haematogenous seeding of *Yersinia pestis* throughout the body. Drainage should not be attempted until after specific chemotherapy has been in effect for 24 hours or more.

3.21.6 **LABORATORY DIAGNOSIS**

- Isolation of *Yersinia pestis* from a clinical specimen

or

- Fourfold or greater increase in serum antibody titres to *Yersinia pestis*.

3.21.7 **CONTROL AND PREVENTION**

- Use appropriate isolation practices in nursing cases of plague.
- Investigate contacts and source of infection.
- Administer specific treatment as early as possible.
- Educate the public in enzootic areas on modes of human and domestic transmission, importance of rat-proofing buildings, preventing access to food and shelter by peri-domestic rodents through appropriate storage and disposal of food, garbage and refuse and the importance of avoiding flea bites by use of insecticides and repellants.
- Rat suppression should always be preceded by measures to control fleas.
- Survey rodent population periodically and implement rat suppression measures.
- Control rats on ships and docks, in warehouses and cargoes, especially containerized cargoes, before shipment and on arrival from plague-endemic locations.
### 3.22 Pneumococcal Infection (Invasive)  
**CLASS 3**

<table>
<thead>
<tr>
<th>Internationally notifiable:</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reporting interval:</td>
<td>Within 24 hours</td>
</tr>
<tr>
<td>Report to (country level):</td>
<td>National Epidemiologist</td>
</tr>
<tr>
<td>Report to (regional level):</td>
<td>CAREC’s Epidemiology Division</td>
</tr>
</tbody>
</table>

#### 3.22.1 INTRODUCTION

Pneumococci are common inhabitants of the human respiratory tract among varying percentages of the population. The normal human respiratory tract is provided with a variety of mechanisms which guard the lungs against infection. Any anatomical or physiological derangement of these built-in defenses lead to susceptibility to infection.

Upper or lower respiratory tract infections may occur and otitis media, mastoiditis and sinusitis can be caused by infection with the gram-positive pneumococcus bacteria.

The lung is the most common site of infection leading to the development of pneumococcal pneumonia especially in the very young and in the elderly, especially those with certain chronic conditions.

Failure of local defense mechanisms in the lungs results in spread of pneumococci to the hilar lymph nodes, and if unchecked via the thoracic duct into the circulation. Through the resulting bacteraemia, extrapulmonary infections can also occur.

The reservoir is human and transmission occurs by droplet spread, by direct oral contact, or indirectly through articles freshly soiled with respiratory discharges.

#### 3.22.2 CASE DEFINITION

a) Clinical case

The signs and symptoms of pulmonary infection are those of a pneumonia. Other presentations depend upon the organ/tissue affected.

(i) Pulmonary (pneumococcal pneumonia)

An illness characterised by the sudden onset of fever with 2 or more of the following:

- Productive cough
- Rigors
- Dyspnoea
- Early pleuritic chest pain
- Clinical or x-ray evidence of pneumonia
(ii) Extra-pulmonary

Extra-pulmonary presentations are preceded by a pneumonia and require laboratory confirmation. They may include:

- Upper respiratory tract infection
- Meningitis
- Pericarditis
- Endocarditis
- Arthritis

b) Confirmed case

A clinically compatible case that is laboratory confirmed by isolation of pneumococci from blood or respiratory tract secretions.

3.22.3 Reporting and Investigative Procedures

a) Level 1

- Reports a confirmed case immediately to Level 2.

- Ensures that appropriate specimens are collected and sent to the laboratory under recommended transport conditions, and that essential clinical information is included in the request form.

b) Level 2

- Advises patient care providers on mode of transmission and on respiratory precautions as may be applicable, on the need for concurrent disinfection of discharges from nose and throat, and on terminal cleaning.

- Maintains surveillance to establish whether or not other cases are occurring.

Note: This disease would have been reported as syndrome 3 (See Section 1.2.5)
### Pneumococcal Infection (Invasive) Case Investigation Form

**Reporting Centre:**

**Date of report:**

#### 1. Patient Information

- **Name**
- **Age (yrs)****Sex**
- **M**
- **F**
- **Address**
- **Phone**
- **Occupation**

#### 2. Clinical Data

- **Date of onset**
- **Immunization history**

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Y</th>
<th>N</th>
<th>Symptom</th>
<th>Y</th>
<th>N</th>
<th>Symptom</th>
<th>Y</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fever</td>
<td></td>
<td></td>
<td>Cough</td>
<td></td>
<td></td>
<td>Dyspnoea</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Other (depending on infection site):</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Outcome of illness**
- **Is/was this patient hospitalised?**
- **Y**
- **N**
- **Date(s)**
- **Outcome of illness**
- **Survived**
- **Died**
- **Date:**

#### 3. Exposure History

- **Close contact of case before start of treatment**
- **Y**
- **N**
- **Date**
- **Details**
- **Respiratory discharges of case**
- **Other**

#### 4. Laboratory Data

- **Specimen**
- **Date collected**
- **Date rec’ed**
- **Condition**
- **Test**
- **Result**
- **Date sent**
- **Comment**

<table>
<thead>
<tr>
<th>Specimen</th>
<th>Date collected</th>
<th>Date rec’d</th>
<th>Condition</th>
<th>Test</th>
<th>Result</th>
<th>Date sent</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blood</td>
<td></td>
<td></td>
<td>Culture</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sputum</td>
<td></td>
<td></td>
<td>Culture</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### 5. Final Case Classification

- **Laboratory confirmed**
- **Date reported:**
- **To whom:**
- **Route:**
- **Signature:**
3.22.5 COLLECTION AND TRANSPORT OF SPECIMEN

a) Specimen of blood collected for culture. The specimen should be collected before the start of antibiotic treatment and transported at room temperature to reach the laboratory within 1 hour.

b) Specimens of sputum and respiratory secretions should be sent to the laboratory in sterile containers for culture and Gram stain microscopy. These specimens should be transported at room temperature and should be received at the laboratory within 24 hours of collection.

3.22.6 LABORATORY DIAGNOSIS

Laboratory confirmation is based on a positive pneumococcal culture.

3.22.7 CONTROL AND PREVENTION

- In hospitals, respiratory isolation may be warranted for patients with antibiotic-resistant infection to curtail the risk of transmission to other patients whose resistance to infection may be compromised or who are otherwise at high risk.

- Ensure concurrent disinfection of discharges from nose and throat of patient.

- Where diagnostic facilities are limited and a delay in treatment could prove fatal, antibiotic treatment of infants and young children should be started on the basis of history and clinical findings.

- Cost-effectiveness of vaccine use as an intervention for controlling spread should be carefully evaluated by individual health administrations in the context of other parameters of public health practice.

3.22.8 TECHNICAL NOTES

Because of the increasing resistance to commonly used first-line antibiotics, sensitivity testing would provide useful information for case management as well as for inclusion in the laboratory’s antibiogram databank.

Investigation of contacts and source of infection are of no practical value.

A vaccine is available and its use may be indicated in specific populations, such as children with sickle cell disease in the first few years of life.
3.23 Poliomyelitis

**CLASS 1**

<table>
<thead>
<tr>
<th>Internationally reportable:</th>
<th>Yes, disease subject to special surveillance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reporting interval:</td>
<td>Immediately</td>
</tr>
<tr>
<td>Report to (country):</td>
<td>National Epidemiologist</td>
</tr>
<tr>
<td>Report to (regional):</td>
<td>CAREC, EPI Regional Advisor</td>
</tr>
</tbody>
</table>

**3.23.1 INTRODUCTION**

Poliomyelitis is a permanent flaccid paralysis of the muscles without sensory loss, which frequently but not exclusively affects the lower limbs. It follows acute infection with the poliovirus types 1, 2 or 3, enteric viruses that are transmitted by the faecal-oral route.

WHO has targeted this disease for global eradication by the year 2000 and it has already been eradicated from the Region of the Americas. Until the global goal is achieved continued surveillance is necessary in the Caribbean to confirm the absence of polio virus circulation and to detect importation.

Surveillance for poliomyelitis is based upon detection, rapid reporting and thorough investigation of all cases of Acute Flaccid Paralysis in the population.

Detection of wild polio virus circulation in the community would trigger a response of mass immunization with oral polio vaccine in an area and age group to be determined by the epidemiology unit.

**3.23.2 CASE DEFINITION**

a) **Suspected case**

Any person with acute flaccid paralysis (AFP) (including Guillain-Barré Syndrome and transverse myelitis) *or* any person with paralytic illness at any age when polio is suspected.

b) **Confirmed, compatible or discarded cases**

The scheme overleaf is used in the PAHO region for case classification.
3.23.3 Reporting and Investigative Procedures

a) Level 1

- Immediately, (in <24 hours), reports AFP cases (suspected polio cases) to the district level
- Conducts preliminary case investigation
- Collects a stool sample within 14 days of onset of paralysis (see 3.21.5)
- Sends stool sample to the laboratory with specimen referral data
- If no AFP cases are seen, sends a weekly zero report to the district

b) Level 2

- Dispatches a case investigator within 48 hours of initial case report
- Completes case investigation form including information on immunization history
- Assigns a specific EPID number to the case
- Confirms or initiates specimen collection and referral
- Includes the 60-day follow-up report on the case investigation form
- Forwards a weekly line listing of AFP case reports to the national level (EPI)
- Includes zero reports in the weekly aggregated data to the national level

c) Laboratory

- Reports on the “adequacy” of the stool sample received
- Reports to district and national level preliminary virus isolation results
- Refers polio virus isolates to a reference laboratory for differentiation as wild or vaccine derived

Note: For definition of “wild poliovirus”, “adequate specimen”, and “follow-up” see sections 3.23.6, 3.23.5 and 3.23.4. The isolation of wild poliovirus from an inadequate specimen results in confirmation of the case, whether or not there is residual paralysis.
d) National EPI Manager

- Receives and collates clinical, epidemiological and laboratory data
- Classifies AFP case as poliomyelitis, compatible or non-polio with the help of an expert committee (3.21.2)
- Reports classified cases to PAHO/WHO EPI Advisor weekly
- Reports on performance indicators (AFP detection rate, timeliness, completeness)

**Note:** This disease would have been reported as Syndrome 7 (See section 1.2.5)
### 3.23.4 Poliomyelitis Case Investigation Form

#### Poliomyelitis Case Investigation Form

<table>
<thead>
<tr>
<th>Reporting Centre:</th>
<th>Date of report: / /</th>
</tr>
</thead>
</table>

#### 1. Patient information

<table>
<thead>
<tr>
<th>Name</th>
<th>Age (yrs)</th>
<th>Sex M F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Address</td>
<td>Phone</td>
<td>EPID No.</td>
</tr>
</tbody>
</table>

#### 2. Clinical data

<table>
<thead>
<tr>
<th>Date of onset of paralysis: / /</th>
<th>Immunization history</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Y N</th>
<th>Symptom</th>
<th>Y N</th>
<th>Symptom</th>
<th>Y N</th>
<th>Number of doses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fever</td>
<td></td>
<td>Vomiting</td>
<td></td>
<td>Asymmetric?</td>
<td></td>
<td>OPV</td>
</tr>
<tr>
<td>Malaise</td>
<td></td>
<td>Neck stiffness</td>
<td></td>
<td>Residual weakness at 60 days</td>
<td></td>
<td>Date of last dose: / /</td>
</tr>
<tr>
<td>Headache</td>
<td></td>
<td>Flaccid paralysis</td>
<td></td>
<td>Lost to followup</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Is / was the patient hospitalised?: Y N</th>
<th>Date(s)</th>
<th>Outcome of illness</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Survived</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Died</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Date: / /</td>
</tr>
</tbody>
</table>

#### 3. Exposure history

<table>
<thead>
<tr>
<th>Y N</th>
<th>Dates</th>
<th>Place/Details</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Has the patient traveled within the past 30 days?</th>
<th>Y N</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Has there been close contact with a recently vaccinated person?</th>
<th>Y N</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Have there been other AFP cases in the household, school, village?</th>
<th>Y N</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### 4. Laboratory data

<table>
<thead>
<tr>
<th>Specimen</th>
<th>Date Collected</th>
<th>Date rec’d</th>
<th>Condition ***</th>
<th>Test</th>
<th>Result</th>
<th>Date sent</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stool (1)</td>
<td></td>
<td></td>
<td>Virus isolation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stool (2)</td>
<td></td>
<td></td>
<td>Virus isolation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

***Note: An “adequate specimen is one collected within 14 days of onset, and arriving at the laboratory in “good condition”, i.e. no leakage, no desiccation, presence of ice and completed laboratory request form.***

#### 5. Final case classification

<table>
<thead>
<tr>
<th>Polio confirmed</th>
<th>Polio compatible</th>
<th>Discarded</th>
<th>Date reported:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>To whom:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Route:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Signature:</td>
</tr>
</tbody>
</table>
3.23.5 **Specimen Collection and Transport**

**Stool specimen**

a) **Procedure:**

- A stool sample of approximately 8 gms (2 adult thumbnails) should be collected as soon as possible, and in any event within 14 days of onset of paralysis.

- This is placed in a clean, dry, screw-capped container and labeled with patient name, EPID number (if available) and date of collection.

- Stool samples are placed immediately in a cold box or refrigerator at 4°C, and shipped to the laboratory within 48 hours in a cold box.

- If immediate shipment is impossible, the specimen must be stored in a freezer at −20°C, and shipped on frozen icepacks.

b) **Adequacy of stool sample**

The laboratory will record and report on the adequacy of the specimen based on the following:

- Interval between onset of paralysis and stool collection (<14 days)
- Volume of specimen (approximately 8 gms)
- Absence of leakage or desiccation
- Presence of ice or temperature indicator showing maintenance of cold chain
- Completed request form

c) **Laboratory request form**

- The accompanying request form must include the following:
  - Patient information including unique identification number (EPID number)
  - Date of onset of paralysis
  - Date of collection and shipment of specimen
  - Immunization history, especially date of last OPV
  - Name and address of person to whom laboratory results should be sent.

b) **Contact sampling**

- If an adequate sample if not taken from the case, stool samples are collected from close contacts, the number to be determined by the epidemiologist
- Contact sampling may also be done if the case is highly suspicious
3.23.6 **Laboratory Diagnosis**

- A case of Acute Flaccid Paralysis is confirmed as Poliomyelitis if wild polio virus is isolated from the stool. (see 3.23.2)

- Stool specimens must be tested in a WHO accredited laboratory which will be using standard methods and approved reagents, and which will have passed a recent proficiency test.

- The laboratory is required to report on the presence or absence of polio virus within 28 days of receipt of the specimen. A further 2 weeks may be required to determine whether the polio virus is wild or vaccine derived.

**Note:** The presence of a vaccine derived virus in the stool of a paralysed child is not proof of vaccine-related poliomyelitis. Given the extensive use of OPV in routine and mass campaigns, vaccine poliovirus may be circulating widely in the community.

3.23.7 **Control and Prevention**

In the Americas, given the absence of wild poliovirus since 1991, detection of a single case of wild polio virus in the community represents a public health emergency. This should be immediately followed by investigation of contacts and source of infection, and a search for additional cases complete with immunization history. Concurrently, there should be a “mop-up” immunization campaign which may be district or country wide, and may involve house-to-house delivery. The targeted age group is usually less than 5 years but may be varied. The objective is immediate interruption of virus circulation.

Genomic analysis of a wild polio virus can provide important information on its source. Its sequences may show a close relationship with currently circulating strains from another country, or they may indicate re-appearance of an indigenous virus.

If importation is suspected special surveillance should be put in place to detect recurrence and to monitor arrivals.

If an indigenous virus has reappeared an investigation should be launched to identify risk factors and to protect high-risk populations.

The community should be advised to observe enteric precautions.

3.23.8 **Performance Indicators of Surveillance Quality**

The sensitivity of the surveillance system must be maintained by close attention to the surveillance indicators. A decline in any of the following criteria should lead to corrective action:
• AFP detection rate (Target 1/100,000)
• Completeness of monthly reporting (Target >90%)
• Timeliness of monthly reporting (Target >80%)
• AFP cases investigated in <48 hours (Target 80%)
• AFP cases with adequate specimens (Target 80%)
• AFP cases receiving 60-day follow-up examination (Target 80%)
• Specimens arriving at the laboratory in “good” condition. (Target 80%)
• Specimens with turn-around time of <28 days (Target 80%)
• Stool specimens from which a non-polio enterovirus was isolated (Target >10%)
3.24 Rabies  

<table>
<thead>
<tr>
<th>Internationally notifiable:</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reporting interval:</td>
<td>Immediately</td>
</tr>
<tr>
<td>Report to (country level):</td>
<td>National Epidemiologist</td>
</tr>
<tr>
<td>Report to (regional level):</td>
<td>CAREC’s Epidemiology Division</td>
</tr>
</tbody>
</table>

### 3.24.1 Introduction

Rabies is a fatal zoonotic disease transmitted to humans through contact with infected animals, both wild and domestic. Surveillance is recommended since rabies is present in the Caribbean in livestock, wild and domestic animals, and bats.

Rabies virus is transmitted to man through entry of virus-laden animal saliva via the skin (bites, scratches), or rarely via mucous membranes (contact with the eyes). Other forms of contact such as petting, or contact with blood, urine or faeces of a rabid animal do not constitute exposure and are not indications for prophylaxis.

The incubation period may vary from days to years but is usually in the range 30 to 90 days. Following exposure to a rabid animal, avoidance of disease is possible through very rapid action. Surveillance therefore encompasses rabies exposure as well as clinical cases.

### 3.24.2 Case Definition

a) Suspected rabies case

Rabies may be suspected in a person with any of the following clinical signs:

- Acute encephalomyelitis preceded by fever, headache, malaise, anxiety or apprehension
- Spasm of the muscles on attempt to swallow
- Delirium and convulsions
- Hyper activity or paralysis
- Coma and death usually by respiratory failure within 7 to 10 days of onset

b) Probable rabies case

- A case that meets the clinical case definition above and who has been exposed to a suspected rabid animal within the past 3 months
- Any person who has had abrasive contact with a confirmed rabid animal
c) Rabies exposure

- History of abrasive contact (bite or scratch) with an animal suspected of being rabid
- History of contact with livestock suspected of being rabid
- History of contact with bats

d) Laboratory confirmed rabies case

- Any suspected or probable case with a positive diagnostic laboratory result (see 3.24.6 laboratory diagnosis)

3.24.3 REPORTING AND INVESTIGATIVE PROCEDURES

Note: Unlike other diseases, rabies exposure is reportable since actions may be taken to protect the individual and others if the exposure is confirmed

a) Level 1

Rabies exposure

- Performs emergency wound treatment (see 3.24.7)
- Initiates investigation on the circumstances of exposure
- Reports within 24 hours to level 2

Suspected rabies and probable rabies

- Reports within 24 hours to level 2
- Initiates case investigation

b) Level 2

Rabies exposure

- Continues investigation on the exposed person
- Co-ordinates with veterinary public health authorities who will attempt confirmation on the animal
- Locates and ensures the administration of Rabies Immune Globulin and vaccine as appropriate (see 3.24.7)

Suspected rabies and probable rabies

- Completes case investigation and follow up
- Ensures that appropriate specimens are collected and referred to the laboratory
Laboratory confirmed rabies

- Reports within 24 hours to level 3
- Refers epidemiological data to the national level

c) Level 3

- Conducts epidemiological analysis
- Reviews pre-exposure policy and implementation
- Reports regionally to CAREC Epidemiology

Note: This disease would have been reported as Syndrome 7 (See section 1.2.5)
### 3.24.4 Rabies Case Investigation Form

#### Rabies Case Investigation Form

<table>
<thead>
<tr>
<th>Reporting Centre:</th>
<th>Date of report: / /</th>
</tr>
</thead>
</table>

#### 1. Patient information

<table>
<thead>
<tr>
<th>Name</th>
<th>Age (yrs)</th>
<th>Sex M F</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Address</th>
<th>Phone</th>
<th>Occupation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### 2. Clinical data

<table>
<thead>
<tr>
<th>Date of onset of illness: / /</th>
<th>Rabies Vaccine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Symptom Y N</td>
<td>Symptom Y N</td>
</tr>
<tr>
<td>Headache</td>
<td>Hyperactivity</td>
</tr>
<tr>
<td>Fever</td>
<td>Paralysis</td>
</tr>
<tr>
<td>Malaise</td>
<td>Encephalitis</td>
</tr>
<tr>
<td>Anxiety</td>
<td>Muscle spasm on swallowing</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Was/ is the patient hospitalised?</th>
<th>Y N</th>
<th>Date(s)</th>
<th>Outcome of illness</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Survived</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Died</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Date / /</td>
</tr>
</tbody>
</table>

#### 3. Exposure history:

<table>
<thead>
<tr>
<th>Animal bite or scratch</th>
<th>Animal</th>
<th>Date</th>
<th>Location</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contact with rabid livestock</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contact with bats</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### 4. Laboratory data:

<table>
<thead>
<tr>
<th>Specimen</th>
<th>Date collected</th>
<th>Date rec’d in lab</th>
<th>Test</th>
<th>Test result</th>
<th>Date sent</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corneal / skin scrapings</td>
<td></td>
<td>FA for antigen</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Saliva / CSF</td>
<td></td>
<td>Isolation Antibody</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brain (fresh)</td>
<td></td>
<td>FA, Isolation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brain (formalin)</td>
<td></td>
<td>PCR</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### 5. Final case classification

<table>
<thead>
<tr>
<th>Clinically confirmed</th>
<th>Epidemiologically confirmed</th>
<th>Laboratory confirmed</th>
<th>Discarded</th>
</tr>
</thead>
<tbody>
<tr>
<td>To whom:</td>
<td>Route:</td>
<td>Signature:</td>
<td>Date reported:</td>
</tr>
</tbody>
</table>
3.24.5 **Specimen Collection and Transport**

Specimen collection from a suspected rabies case will be done in a hospital ward under appropriate medical supervision, or at autopsy. Specimens must be accompanied by patient, clinical and epidemiological data. A copy of the case investigation form may be used, even if incomplete.

a) **Ante-mortem specimens:**

- Corneal smear. Spread on a glass slide, air dry and ship immediately.
- Scrapings of the buccal mucosa (as above).
- Saliva. Collect in a sterile vial, store and ship on ice.
- CSF (as above).
- Nuchal sample.

b) **Post-mortem specimens:**

- Brain tissue. Sections of the cerebellum, pons, brain stem and upper spinal cord. Place cm² blocks of tissue into sterile jars of viral transport medium or saline. Ship on ice.

[If a suspected animal is to be tested, the head should be surrounded with ice and shipped immediately to the laboratory].

3.24.6 **Laboratory Diagnosis**

Tests for rabies virus are available at veterinary diagnostic laboratories. If one is not available in country, CAREC can facilitate referral of specimens to the appropriate laboratory. One or more of the following tests may be done. Each report must be accompanied by interpretation and comment and should be sent to the national level as well as to the referring centre.

- Fluorescent antibody test for rabies antigen on corneal or skin scrapings
- Fluorescent antibody on brain tissue for antigen detection
- Virus isolation from brain, saliva or CSF in cell culture or suckling mice
- PCR for antigen detection from fresh or preserved brain, saliva or skin scrapings
- Rabies neutralizing antibody in the CSF of an unvaccinated person

The fluorescent antibody test is preferred since results are available within 2 days of receipt of the specimen in the laboratory.

3.24.7 **Rabies Control and Prevention**

a) **Pre-exposure**

Rabies vaccination is recommended for high-risk individuals such as veterinary workers, abattoir staff and laboratory technologists. A three-dose schedule with tissue culture derived vaccine is usually adequate.
b) **Post-exposure**

Rapid action may prevent disease in an individual exposed to a rabid animal. The extent of the response will depend on the animal’s behavior, circumstances of the injury, presence of rabies in the area, or confirmation of rabies in the animal by Immunofluorescence.

Emergency actions

- Allow the wound to bleed, wash thoroughly with soap and water
- Do not suture unless absolutely necessary
- Administer Rabies Immune Globulin** by infiltration around and into the wound.
- Give as much as possible in this way and the rest of the dose by intramuscular injection at a site distant from vaccine (Dose=20 I.U per Kg body weight)
- Give the first of a 5-dose series of vaccine as soon as possible
- Give subsequent doses on days 3, 7, 14, 28 after the first.

Rabies prevention and control demand close collaboration between Public Health and Veterinary Public Health departments at district and national levels.

**CAREC can assist in identifying sources of Rabies Immune Globulin.**
3.25 Rubella and Congenital Rubella Syndrome  CLASS 3

Internationally notifiable: No
Reporting interval: Within 48 hours
Report to (country level): National Epidemiologist (collective data)
Report to (regional level): CAREC’s Epidemiology Division

3.25.1 INTRODUCTION

Rubella is a febrile rash disease that is worldwide in distribution and endemic in most countries. It is spread by contact with nasopharyngeal secretions, by droplet or direct contact, and is highly infectious in closed populations such as day care centres and summer camps. The incubation period is 16–18 days and the outcome of exposure can range from asymptomatic infection with the development of antibody, to a disease characterised by fever, lymphadenopathy, maculopapular rash, arthritis and arthralgia.

The importance of rubella derives from the effect that it may have on the foetus if the mother is infected during the first trimester of pregnancy. The risk of Congenital Rubella Syndrome (CRS) is lower in the second and third trimester. CRS may occur after asymptomatic infection. The baby may be born with two or more of the symptoms of CRS and may develop others during the first year (see 3.25.2 below). Affected babies may excrete rubella virus for as long as one year and are highly infectious to susceptible contacts.

Rubella and CRS can be prevented through immunization. The live attenuated vaccine is given either as a single antigen or in combination with measles and mumps.

Surveillance for rubella seeks to document the pattern of circulation of the virus in the community and to guide immunization strategy towards the prevention of CRS.

3.25.2A CASE DEFINITION, RUBELLA

Special attention should be paid to the diagnosis of rubella in pregnancy in view of the mild and non-specific nature of many of the symptoms, and the grave consequences to the child.

a) Probable rubella case

A person experiencing an acute illness with low grade fever, and a diffuse, punctate, maculopapular rash, and two or more of the following

- Headache
- Malaise
- Mild coryza
- Conjunctivitis
b) Confirmed rubella case

(i) Laboratory confirmed case

- A probable case with a positive laboratory test result (see 3.19.6).

(ii) Epidemiologically confirmed case

- A probable case who had been in contact with a laboratory confirmed case within the past 18 days.

3.25.2b Case Definition, Congenital Rubella Syndrome (CRS)

Congenital rubella syndrome is defined by a constellation of symptoms which were traditionally divided into the two following groups:

Group A symptoms

- Cataract and/or congenital glaucoma
- Congenital heart disease
- Loss of hearing
- Pigmentary retinopathy

Group B symptoms.

- Purpura
- Splenomegaly
- Hepatomegaly/jaundice
- Microcephaly
- Mental retardation
- Meningoencephalitis
- Radiolucent bone disease
- Intrauterine growth retardation

In view of a sub-region decision to eliminate rubella and CRS, CRS surveillance should only target infants less than one year of age.

a) Suspected CRS case

An infant less than one year of age presenting with one or more of the following: Cataracts, low birth weight, hepatosplenomegaly, Patent Ductus Arteriosus, purpura, or hearing impairment; OR whose mother had laboratory confirmed rubella infection during pregnancy; AND there is a clinical suspicion of CRS in that infant.
b) Laboratory confirmed CRS case

A suspected case of CRS with supportive laboratory evidence (see 3.25.6)

3.25.3A REPORTING AND INVESTIGATIVE PROCEDURES - RUBELLA

Level 1

- Reports suspected case to level 2 within 48 hours
- Collects a blood specimen and refers to the laboratory
- Initiates case investigation.

Level 2

- Completes case investigation and confirms specimen referral
- Collects case reports from level 1 and laboratory results
- Sends a collective monthly report to the national level

3.25.3B REPORTING AND INVESTIGATIVE PROCEDURES – CRS

a) Level 1 (Probably a hospital)

- Reports clinical CRS to level 2 within 48 hours
- Collects a blood specimen and refers to the laboratory
- Collects throat swab, urine and additional blood samples, if necessary
- Conducts case investigation

b) Level 2

- Sends weekly reports of CRS to the national level with laboratory results if available.

Note: This disease would have been reported as Syndrome 2 (See section 1.2.5)
3.25.4A **SUSPECTED MEASLES/RUBELE CASE INVESTIGATION FORM**
3.25.4b  **Congenital Rubella Syndrome Case Investigation Form**
3.25.4c Algorithm for CRS in Children Less Than One Year of Age

Sentinel Events

- Infant born to mother with laboratory confirmed rubella during pregnancy
- Cataracts, PDA, Low Birth Weight, Hearing Impairment, Purpura, Hepatosplenomegaly or any other CRS compatible finding?

Suspect CRS

Blood sample obtained?

- No *
  - Clinically Confirmed

- Yes
  - IgM
    - Discard
  - IgM
    - Laboratory Confirmed CRS

* This path should only be followed after repeated attempts to obtain an adequate sample have failed.
### 3.25.5 Specimen Collection and Transport

**a) Blood sample, acute**

A blood specimen should be drawn on first contact with the patient, although rubella IgM is most reliably detected after 7 days of onset. The blood should be kept cool and shipped to arrive at the laboratory within 24 hours or the serum should be separated and frozen at –20°C for later shipment with cold packs. This acute sample should be sent to the laboratory as soon as possible to facilitate IgM testing or virus isolation if this is to be attempted.

**b) Blood sample, convalescent**

This will be requested if needed by the laboratory.

**c) Urine**

This is collected into a clean, preferably sterile container and shipped immediately to the laboratory on ice.

**d) Throat swab or naso-pharyngeal washing**

To be collected in the acute stage of the disease and transported in viral transport medium.

---

**Note: From suspected or probable CRS cases collect**

- A blood sample as soon as possible after birth
- Further blood samples at 2, 4 and 6 months
- Throat swabs and urine specimens

### 3.25.6 Laboratory Diagnosis

Laboratory testing is necessary to distinguish acute rubella from mild measles, scarlet fever, dengue, infectious mononucleosis and enterovirus infections.

Criteria for laboratory diagnosis of rubella are:

- Presence of rubella specific IgM antibody in serum by ELISA
- Demonstration of a four-fold increase in antibody titer between acute and convalescent sera measured by Hemagglutination inhibition (HI), or latex agglutination (LA).
- Isolation of rubella virus from throat swab, urine or blood

**Laboratory confirmation of CRS depends upon:**

- Presence of rubella specific IgM in serum within the first week of life
- Isolation of rubella virus from urine, throat swab or blood
• Maintenance of IgG antibody level during the first 6 months of life, shown by an HI titer that fails to decrease at the expected rate of a two fold dilution per month
• Detection of rubella virus in tissues by PCR

3.25.7 Prevention and Control of Rubella and CRS

Attempts to control rubella transmission are often not very effective due to the mild nature of the illness. Some success has been achieved in schools and military camps by mass immunization.

The prevention of rubella and CRS rests on immunization of various population groups.

Infants, as part of the EPI schedule, are given MMR (measles, mumps and rubella) or MR (measles and rubella).

Rubella vaccine may be given to pre-pubertal girls in a school-based programme.

Vaccine may be offered to pre-marital and post-partum women.

Specially at-risk groups such as child-care workers, nurses and teachers can be routinely covered.

All strategies demand appropriate public education to sensitise the community to the danger and consequences of CRS.

3.25.8 Technical Notes

False positive rubella IgM test results have been reported in persons with other viral infections (EBV, infectious mononucleosis, CMV, and parvovirus), or in the presence of rheumatoid factor.

Theoretically, live rubella vaccine should not be given to pregnant women, or to women likely to become pregnant within 2 months of vaccination. However, no defects attributable to vaccine virus have been detected in the babies of women given the vaccine during pregnancy.

If the vaccine is inadvertently given to a pregnant patient, she should be counseled and the theoretical risks explained.

After birth the child should be monitored as a suspect case of CRS.
3.26 Salmonellosis

Internationally notifiable: No
Reporting interval: Weekly
Report to (country level): National Epidemiologist
Report to (regional level): CAREC’s Epidemiology Division

3.26.1 INTRODUCTION

An acute diarrhoeal disease resulting from infection with *Salmonellae* bacteria. Asymptomatic infections may occur and the organism can cause extra-intestinal infection. Transmission occurs most frequently through the ingestion of these organisms in food derived from infected food-animals or contaminated by faeces of an infected person or animal. Common sources of infection include raw and undercooked eggs and egg products, raw milk and unpasteurized dairy products, meat and meat products, poultry being a common source. Processed meat products and contaminated water are not uncommon causes of epidemics.

An acute enterocolitis, onset is sudden and the diarrhoea is accompanied by headache, cramping abdominal pain, nausea and sometimes vomiting. Fever is almost always present. The disease is usually self-limited, with the diarrhoea lasting about 3-5 days. It may however, develop into a septicaemia and localization in bones and joints may occur. Less frequently, other sites such as the pericardium, lungs, pleurae, kidneys and other organs may become involved. In the absence of fluid replacement, especially among the infants and the elderly, dehydration may be severe.

3.26.2 CASE DEFINITION

a) Suspected case

A person presenting with an acute illness characterized by diarrhoea with one or more of the following:

- Fever
- Abdominal pain
- Nausea and/or vomiting
- Headache

b) Probable case

- A suspected case that is epidemiologically linked to a confirmed case through ingestion of contaminated food.
c) **Confirmed case**

A **confirmed** case is a suspected or probable case or any other individual with:

- Laboratory confirmation — isolation of *Salmonella* from stools or any other body site.

### 3.26.3 Reporting and Investigative Procedures

#### a) Level 1

- Reports a suspected case to level 2 within 48 hours.
- Initiates immediate investigation and searches for other cases in the same general geographic area, including any that may have sought attention at a health facility.
- Reports immediately to level 2 if an epidemic is suspected.
- Interviews individual cases and obtains information on food and drink consumed during the 72 hours previous to onset of illness, as well as the sources of the items consumed.
- Completes Case History Form and Food Preference Forms.
- Alerts the laboratory in the case of a suspected epidemic and requests advice and sample containers etc. as necessary.
- Collects appropriate samples of clinical specimens as well as of food and drink and arranges for prompt transport to the laboratory.

#### b) Level 2

- Continues investigations.
- Checks storage areas for items that may have been overlooked and collect samples as may be indicated for laboratory investigation.
- Completes Food-specific Attack Rate Tables and Line Listing Forms and analyzes data.
- If a food is already suspect, interviews all persons who were directly involved in processing, preparing, or storing of the food.
- Uses investigative data for the prevention of further illness.

Note: This disease would have been reported as syndrome 4 (See Section 1.2.5)
**SUSPECT FOODBORNE ILLNESS**  
**CASE HISTORY FORM**

<table>
<thead>
<tr>
<th>Name</th>
<th>Age</th>
<th>Sex</th>
<th>Case ID No</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Address</th>
<th>Occupation</th>
<th>Place of Employment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
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</table>

<table>
<thead>
<tr>
<th>Phone</th>
<th>Other Information</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tr>
</tbody>
</table>

**Signs & Symptoms (check appropriate items)**

**TIME OF ONSET — Date:**

**Hour:** am/pm

<table>
<thead>
<tr>
<th>Intoxications</th>
<th>Enteric Infections</th>
<th>Neurological</th>
</tr>
</thead>
<tbody>
<tr>
<td>Burning Sensation (mouth)</td>
<td>Headache</td>
<td>Numbness</td>
</tr>
<tr>
<td>Metallic Taste</td>
<td>Chills</td>
<td>Dizziness</td>
</tr>
<tr>
<td>Excessive Salivation</td>
<td>Myalgia</td>
<td>Double Vision</td>
</tr>
<tr>
<td>Nausea</td>
<td>Oedema</td>
<td>Blurred Vision</td>
</tr>
<tr>
<td>Vomiting</td>
<td>Jaundice</td>
<td>Dysphagia</td>
</tr>
<tr>
<td>Flushing</td>
<td>Anorexia</td>
<td>Dysphoria</td>
</tr>
<tr>
<td>Itching</td>
<td>Rash</td>
<td>Delirium</td>
</tr>
<tr>
<td>Prostration</td>
<td>Weakness</td>
<td>Paralysis</td>
</tr>
<tr>
<td>Cyanosis</td>
<td>Duration</td>
<td>Coma</td>
</tr>
</tbody>
</table>

**Other symptoms**

**Duration**

**Severity**

**Fatal**

**Treatment**

**Physician Consulted**

**Address**

**Tel No**

**Hospital (name)**

**Address**

**Tel No**

**Specimens Obtained**

**Date of Collection**

**Laboratory Results**

**REMARKS AND DIAGNOSIS**

________________________________________________________________________________________

________________________________________________________________________________________

________________________________________________________________________________________

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________________________________________________________________________________________

________________________________________________________________________________________

________________________________________________________________________________________
### SUSPECT FOODBORNE ILLNESS FOOD PREFERENCE FORM

<table>
<thead>
<tr>
<th>Day of Illness</th>
<th>Date:</th>
<th>Hour:</th>
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<tbody>
<tr>
<td>Breakfast:</td>
<td>Place:</td>
<td></td>
</tr>
<tr>
<td>Lunch:</td>
<td>Place:</td>
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<tr>
<td>Supper:</td>
<td>Place:</td>
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<tr>
<td>Snacks (time, time and place)</td>
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<table>
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<tr>
<th>History of eating suspect food</th>
<th>Source</th>
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<table>
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<tr>
<th>Common event and names and address of others at event</th>
<th>History of eating suspect food</th>
<th>Source</th>
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</thead>
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<table>
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<tr>
<th>Recent travel (locations)</th>
<th>Contacts with known cases before illness</th>
<th>Contacts after illness</th>
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<table>
<thead>
<tr>
<th>Pets</th>
<th>Excreta disposal</th>
<th>Remarks</th>
<th>Investigator:</th>
<th>Date:</th>
</tr>
</thead>
</table>

**Note:**
- Fill out all relevant fields for each specified day and time.
- Include details of food items, times, and places.
- Record any history of eating suspect food and sources.
- Note common events, names, and addresses of others.
- Include recent travel locations and contacts with known cases.
- Mention pets, excreta disposal, and any remarks.

**INVESTIGATOR:** ___________________________ **DATE:** ___________________________
## FOODBORNE ILLNESS
### Food-Specific Attack Rate Table

<table>
<thead>
<tr>
<th>Food</th>
<th>Number of Persons Who Ate Specific Food</th>
<th>Number of Persons Who Did Not Eat Specific Food</th>
<th>Difference in Percent</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Ill</td>
<td>Well</td>
<td>Total</td>
<td>% Ill</td>
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</tbody>
</table>

Remarks and Interpretation: Suspect Food
### 3.26.4D Line Listing

<table>
<thead>
<tr>
<th>Case ID No.</th>
<th>Date of Onset</th>
<th>Name</th>
<th>Address</th>
<th>Age</th>
<th>Sex</th>
<th>Occupation/Place of Work</th>
<th>S or C</th>
<th>Laboratory Report</th>
<th>Remarks</th>
<th>Date of Hospital Admission</th>
<th>S or C = Suspected C = Confirmed</th>
</tr>
</thead>
</table>
3.26.5 Specimen Collection and Transport

a) Stool and/or vomitus

Collect into a clean, dry container and transport at 4°C within 24 hours.

b) Rectal Swabs (To be used if stool is not available)

Place in Cary Blair transport medium and transport at 4°C within 24 hours.

c) Leftover foods or other foods

Samples should be collected aseptically and put into sterile jars or plastic bags. Perishable food which are not frozen at the time of collection should be rapidly chilled to 4°C and kept at this temperature until examined. (Do not freeze these samples as certain bacteria such as \textit{C. perfringens} die off rapidly during frozen storage).

Keep frozen foods frozen until examined.

The laboratory should be alerted and all samples should be received at the laboratory within the shortest possible time.

3.26.6 Laboratory Diagnosis

Isolation of the causative \textit{Salmonella} organism from clinical specimens and from food samples.

Phage typing confirms the food item/s responsible for the outbreak.

3.26.7 Control and Prevention

Educate food handlers on the importance of safe food handling practices placing emphasis on:

- Handwashing before, during and after food preparation and especially after using the toilet.

- Refrigerating prepared foods in containers that would allow the stored food to reach the required temperatures.

- Thoroughly cooking all foodstuffs derived from animal sources, particularly poultry, egg products, pork and other meat dishes.

- Avoiding recontamination after cooking.
Maintaining sanitary utensils and surfaces in the kitchen and other food preparation and serving areas.

Educate the public to:

- Avoid consuming raw or undercooked eggs, and using dirty or cracked eggs in making eggnogs or icecream.
- Avoid the use of pooled eggs or egg products which have not been pasteurized or irradiated.
- Exclude individuals with diarrhoea from food handling, especially in institutions providing care for the ill, the elderly or children.
- Recognize the risk of *Salmonella* infections in pets such as chicks and turtles especially for small children.
- Monitor and advise on adequate sanitation in abattoirs, butcher shops and food processing plants.
- Assist in establishing *Salmonella* control programs in commercial food outlets.
3.27  Sexually Transmitted Diseases and Syndromes  CLASS 3

Internationally notifiable:  No
Reporting interval:  Within 48 hours
Report to (country level):  National Epidemiologist (collective data)
Report to (regional level):  CAREC’s Epidemiology Division

Note: These diseases would have been reported as Syndrome 8 (See section 1.2.5)

3.27.1  INTRODUCTION

Sexually transmitted diseases (STD) are a cause of considerable morbidity in all countries. If HIV/AIDS is included, this group of diseases ranks among the five most important causes of healthy years of life lost in developing countries. STDs are prevalent in the Caribbean and surveillance is conducted for five entities:

Three specific diseases

Chlamydia (3.27.2)
Gonorrhoea (3.27.3)
Syphilis (3.27.4)

And two syndromes

Genital discharge (3.27.5)
Genital ulcer (3.27.6)

These are caused by a wide range of bacterial and viral agents, some of which are detected by laboratory tests that may not be available in the region. Their common transmission mode allows similar control and preventive measures to be undertaken in an integrated programme.

3.27.2  CHLAMYDIA

Introduction

Infection by Chlamydia trachomatis serotypes D to K can result in acute or persistent genital infections in adults, inclusion conjunctivitis in newborns and pneumonia in babies. The incubation period after sexual exposure is 5–7 days following which there may be a urethral discharge in males, and inapparent infection in females leading to cervicitis and salpingitis. Infection does not confer protection and re-infection is possible.
Case definition

Chlamydia may be suspected if one of the following is present:

a) **In males**
   - Opaque urethral discharge
   - Urethral itching
   - Burning on urination

b) **In females**
   - Genital discharge
   - Cervicitis
   - Salpingitis

c) **In babies 5–12 days old**
   - Acute papillary conjunctivitis
   - Mucopurulent discharge from the eyes

Reporting and investigative procedures

a) **Level 1**
   - Reports suspected case to level 2
   - Collects appropriate specimen and forwards to the laboratory
   - Treats with appropriate antibiotics

b) **Level 2**
   - Sends a collective monthly report to the national level
   - Arranges contact tracing and treatment
   - Works with Health Education on community behavior change programmes

Specimen collection and transport

a) **From adults**
   - Urethral or endocervical swabs in transport medium placed at 4–8°C and transported in a cold box
   - Genital scrapings spread on a microscope slide, air dried and transported rapidly at room temperature

b) **From babies with conjunctivitis**
   - Eye swab in transport medium or conjunctival scrapings on a microscope slide transported as above
c) From babies with pneumonia

Trachial aspirate in a sterile tube transported at 4–8°C.

Laboratory diagnosis

- Demonstration by Giemsa staining of intracytoplasmic inclusions in epithelial cells from the genital tract, eye or respiratory tract is highly suggestive of Chlamydial infection.
- Demonstration of specific Chlamydial antigen by immunofluorescence is a definitive diagnosis.
- Isolation of Chlamydia in cell culture demands special techniques and may not be readily available in the region.
- ELISA for Chlamydial antigen detection.

Prevention and control — see section 3.27.7

### 3.27.3 Gonorrhoea

**Introduction**

This is a world wide genital disease common among sexually promiscuous adults and occurring in sexually molested children. Males present with a purulent urethral discharge and dysuria which may progress to epididimitis, while females have mild urithritis or cervicitis which may develop into endometritis or pelvic inflammatory disease.

Pharyngeal and anal infections occur in both sexes and rare complications include septicemia, arthritis, skin lesions, endocarditis and meningitis.

Chronic maternal infection of the endocervix, often asymptomatic, may result in infection of the newborn and development of gonococcal conjunctivitis 1–5 days after birth. If untreated, this may lead to corneal ulcer perforation and blindness.

**Case definition**

a) Gonorrhoea is suspected in adults presenting with

- Purulent discharge from the urethra
- Dysuria
- Vaginal discharge
- Anal discharge
b) In newborns gonorrhoea is suspected if, 1–5 days after birth, the baby develops

- Redness and swelling of the conjunctivae
- Mucopurulent or purulent discharge from the eyes

**Reporting and investigative procedures**

a) Level 1

- Reports suspected case to level 2
- Collects appropriate specimen and forwards to the laboratory
- Treats with appropriate antibiotics

b) Level 2

- Sends a collective monthly report to the national level
- Arranges contact tracing and treatment
- Works with Health Education on community behavior change programmes

**Specimen collection and transport**

**From adults**

- Collect male urethral or female endocervical swabs, place immediately into pre-packaged bacterial transport medium or plate onto Thayer-Martin medium
- Prepare smears of male urethral exudates on microscope slides and air dry
- Collect scrapings from the endocervix and spread onto microscope slides
- All specimens should be rapidly transported to the laboratory at room temperature to preserve bacterial viability or cellular integrity

**From babies**

- Prepare conjunctival swabs and scrapings on microscope slides or place in transport medium and transport rapidly to the laboratory

**Laboratory diagnosis**

Infection with the gonococcus is confirmed by

Demonstration of gram negative intracellular diplococci in male urethral smears or culture of *Neisseria gonorrhoea* on special media. Repeated cultures may be necessary in the female.

**Prevention and control — see section 3.27.7**
3.27.4 Syphilis

Introduction

Sexually transmitted syphilis has been increasing in incidence over the past 20 years despite the effectiveness of penicillin treatment. The infectious agent is Treponema pallidum, a spirochete, which is transmitted by contact with body fluids – semen, vaginal secretions, saliva, and blood – during the early stages of the disease. During acute maternal infection the organism can cross the placenta causing congenital syphilis in the newborn.

If untreated, the disease progresses through 3 stages – primary syphilis appearing 3 weeks after exposure as a painless papule at the site of entry; secondary syphilis, appearing 4 - 6 weeks later as generalised eruptions of the skin and mucous membranes; late syphilis often occurring after a latent period of weeks or years and affecting the bone, viscera, central nervous and cardiovascular systems.

Surveillance of symptomatic sexually active persons permits early treatment and contact tracing. Serological screening of pregnant women provides information about latent and asymptomatic infection in this group and can be considered an approximation of syphilis prevalence in the general population.

Case definition

a) Clinical adult syphilis
   - Painless papule on the genitalia, eroding into a chancre
   - Skin rash and mucous membrane eruptions
   - CNS disease; cardiovascular disease

b) Laboratory detected syphilis
   An individual, usually a pregnant woman, testing positive by one of several laboratory screening methods (see next page).

c) Congenital syphilis
   - Generalised systemic disease
   - Characteristic stigmata

Reporting and investigative procedures

a) Level 1
   - Reports suspected case to level 2
   - Collects appropriate specimen and forwards to the laboratory
   - Treats with appropriate antibiotics
b) **Level 2**

- Sends a collective monthly report to the national level
- Arranges contact tracing and treatment
- Works with Health Education on community behavior change programmes

**Specimen collection and transport**

a) Collect exudates from lesions and prepare smears on microscope slides. Send to the laboratory at ambient temperature.
b) Draw 5–10 ml of blood into a sterile tube. Hold at room temperature for clot retraction. Remove serum and either transport immediately at 4–8°C or freeze for later shipment to the laboratory.

**Laboratory diagnosis**

Infection with *Treponema pallidum* is confirmed by:

- Demonstration of the organism by dark-field or phase-contrast microscopy on exudates.
- Positive VDRL test confirmed by treponema pallidum haemagglutination (TPHA) or fluorescent antibody (FTA).
- Rapid Plasma Reagin test, similarly confirmed.

**Prevention and control — see section 3.27.7**

### 3.27.5 Genital Discharge Syndrome

**Introduction**

Infections with several sexually transmitted agents result in a urethral or vaginal discharge. The syndrome of genital discharge is the most frequently seen at health facilities and the use of a syndromic definition will, in many instances, simplify the reporting of sexually transmitted disease.

**Case definition**

- Urethral discharge in men, with or without dysuria.
- Abnormal vaginal discharge with or without lower abdominal pain or specific symptoms or specific risk factor

**Reporting and investigative procedures**

a) **Level 1**

- Report cases to level 2 within 48 hours
SEXUALLY TRANSMITTED DISEASES

- If laboratory facilities are available, collect specimens for gonorrhoea and chlamydia testing
- Treat with appropriate antibiotics

b) Level 2

- Collect level 1 reports and investigate cases epidemiologically
- Forward collective data to the national level by mail weekly or monthly
- Collate laboratory results when available and analyse for risk factors and cause
- Work with Health Education to implement community behavior change programmes

Specimen collection and transport

Prepare smears of urethral or genital discharges on microscope slides if a basic laboratory is available.

Laboratory diagnosis

This is not essential to syndromic STD surveillance. If possible, a gram stain can be done to detect gram negative diplococci.

If more sophisticated laboratory facilities are available, follow procedures in 3.27.2 and 3.27.3.

Prevention and control — see section 3.27.7.

3.27.6 Genital Ulcer Syndrome

Introduction

Sexually transmitted Herpes simplex, chancroid, lymphogranuloma venereum and syphilis may all present as an ulcerative condition of the genitalia, difficult to diagnose without sophisticated laboratory facilities. Surveillance of the genital ulcer syndrome will enable health authorities to monitor changes in incidence and plan appropriate interventions.

Case definition

Ulcer, with or without pain, on penis or scrotum
Ulcer on labia, vagina or cervix with or without inguinal adenopathy

Reporting and investigative procedures

a) Level 1

- Report cases to level 2 within 48 hours
b) Level 2

- Collect level 1 reports and investigate cases epidemiologically
- Forward collective data to the national level by mail weekly or monthly
- Collate laboratory results when available and analyse for risk factors and cause
- Work with the Health Education unit to implement community behavior change programmes

Specimen collection and transport

Vesicle fluid or material from the base of a recent ulcer can be collected by swab into viral transport medium if virology laboratories exist

Laboratory diagnosis

This is not essential to syndromic STD surveillance.

If laboratory facilities exist, consultation should be held with the microbiologist concerning available tests and appropriate specimens.

3.27.7 Prevention and Control of Sexually Transmitted Diseases

- Community health and sex education should be ongoing and particularly directed towards pre-pubertal and adolescent age groups.
- Facilities should be provided for early diagnosis and treatment of STD.
- Infected persons should be counseled on measures of avoiding transmission.
- Sexual contacts of infected adults should be contacted for treatment and counseling.
- Condom use for extra-marital sex should be promoted.
### SEXUALLY TRANSMITTED DISEASES CASE INVESTIGATION FORM

<table>
<thead>
<tr>
<th>Reporting Centre:</th>
<th>Date of report / /</th>
</tr>
</thead>
</table>

#### 1. Patient information

<table>
<thead>
<tr>
<th>Name</th>
<th>Age (yrs)</th>
<th>Sex</th>
<th>M</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Address</th>
<th>Phone</th>
<th>Occupation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### 2. Clinical data

<table>
<thead>
<tr>
<th>Date of onset of illness / /</th>
<th>Immunization history</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Y</th>
<th>N</th>
<th>Symptom</th>
<th>Y</th>
<th>N</th>
<th>Symptom</th>
<th>Y</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Genital discharge</td>
<td></td>
<td></td>
<td>Genital ulcer</td>
<td></td>
<td></td>
<td>Lower abdominal pain</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Itching</td>
<td></td>
<td></td>
<td>Papule</td>
<td></td>
<td></td>
<td>Conjunctivitis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Burning</td>
<td></td>
<td></td>
<td>Inguinal adenopathy</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dysuria</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anal discharge</td>
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<td></td>
<td></td>
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<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Is/was this patient hospitalised?</th>
<th>Y</th>
<th>N</th>
<th>Date(s)</th>
<th>Outcome of illness</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Survived</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Died</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Date:</td>
</tr>
</tbody>
</table>

#### 3. Exposure history

<table>
<thead>
<tr>
<th>Is the patient pregnant?</th>
<th>Y</th>
<th>N</th>
<th>Date</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sexual contact within the past 3 wks?</th>
<th>Y</th>
<th>N</th>
<th>Date</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Has the patient had multiple partners?</th>
<th>Y</th>
<th>N</th>
<th>Date</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### 4. Laboratory data

<table>
<thead>
<tr>
<th>Specimen</th>
<th>Date collected</th>
<th>Date rec’d</th>
<th>Condition</th>
<th>Test</th>
<th>Result</th>
<th>Date sent</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smear</td>
<td></td>
<td></td>
<td>Gram stain</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Dark-field</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>FA</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exudate, Ulcer swab</td>
<td></td>
<td></td>
<td>Culture</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blood</td>
<td></td>
<td></td>
<td>FTA</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>FA / TPHA</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### 5. Final case classification

<table>
<thead>
<tr>
<th>Clinically confirmed</th>
<th>Laboratory confirmed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date reported:</td>
<td>To whom:</td>
</tr>
<tr>
<td></td>
<td>Route:</td>
</tr>
<tr>
<td></td>
<td>Signature:</td>
</tr>
</tbody>
</table>
3.28 Shigellosis

Internationally notifiable: No
Reporting interval: Weekly
Report to (country level): National Epidemiologist
Report to (regional level): CAREC’s Epidemiology Division

3.28.1 INTRODUCTION

An acute bacterial disease resulting from infection with *Shigella* species. These organisms are transmitted either directly or indirectly via the faecal-oral route. The disease involves the large and distal small intestine, and is characterized by watery diarrhoea accompanied by fever, nausea and vomiting, abdominal cramps and tenesmus and sometimes toxaemia.

Mild and asymptomatic infections are common and the disease is often self-limited, but occasionally severe illnesses may occur especially with infections of *Shigella dysenteriae*, in which the stools contain blood and mucus. Humans provide the only significant reservoir of infection.

3.28.2 CASE DEFINITION

a) Suspected case

An acute illness with diarrhoea with one or more of the following:

- Fever
- Nausea and/or vomiting
- Tenesmus
- Abdominal pain/cramps

b) Probable case

A suspected case that is epidemiologically linked to a confirmed case through ingestion of contaminated food.

c) Confirmed case

Laboratory confirmed case

A suspected or probable case or any other individual from whose stools *Shigellae* has been isolated.
3.28.3 REPORTING AND INVESTIGATIVE PROCEDURES

a) Level 1

- Reports a suspected or confirmed case immediately to Level 2.
- Initiates investigation to discover source of infection and possible other cases.
- Determines whether or not an outbreak has occurred.
- Continues case finding and reports other cases weekly by line-listing to Level 2.
- Advises relevant household members/heads and staff of institutions to report all cases of diarrhoea occurring within 1 week of last seen case.

b) Level 2

- Makes contact with health care providers and reinforces protocol of procedures for enteric precautions.
- Arranges for advice to be given to patients on handwashing and other sanitary practices.
- Continues investigation to determine if a common food source of infection exists/existed, or if indirect person-to-person transmission is/was occurring. In outbreaks, childcare centres and institutions are especially important.
- Arranges for appropriate advice/education to be given to households or institutions in which cases were found.
- Liaises with the laboratory in obtaining antibiograms of isolated strains where possible and in passing these over to the appropriate level of personnel responsible for the clinical management of cases.
- Reports in numbers weekly to Level 3 as applicable.

Note: This disease would have been reported as syndrome 4 (See Section 1.2.5)
### SHIGELLOSIS CASE INVESTIGATION FORM

**SHIGELLOSIS CASE INVESTIGATION FORM**

<table>
<thead>
<tr>
<th>Reporting Centre:</th>
<th>Date of report / /</th>
</tr>
</thead>
</table>

#### 1. Patient information

<table>
<thead>
<tr>
<th>Name</th>
<th>Age (yrs)</th>
<th>Sex</th>
<th>M</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Address</td>
<td>Phone</td>
<td>Occupation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Food-handling activities</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### 2. Clinical data

| Date of onset / / | 
| --- | --- |

<table>
<thead>
<tr>
<th>Symptom/sign</th>
<th>Y</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fever</td>
<td>Bloody stool</td>
<td></td>
</tr>
<tr>
<td>Nausea/vomiting</td>
<td>Pus/mucus in stool</td>
<td></td>
</tr>
<tr>
<td>Watery diarrhoea</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tenesmus</td>
<td>Toxaemia</td>
<td></td>
</tr>
<tr>
<td>Is/was this patient hospitalised?</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>Outcome of illness</td>
<td>Survived</td>
<td>Died</td>
</tr>
</tbody>
</table>

#### 3. Exposure history

| Contact of a case | Y | N | Date | Details |
| Contaminated food/drink | |
| Shared residence/institution with case | |
| Attending childcare centre | |

#### 4. Laboratory data

<table>
<thead>
<tr>
<th>Specimen</th>
<th>Date collected</th>
<th>Date rec’d</th>
<th>Condition</th>
<th>Test</th>
<th>Result</th>
<th>Date sent</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stool</td>
<td></td>
<td></td>
<td></td>
<td>Shigella isolation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rectal swab</td>
<td></td>
<td></td>
<td></td>
<td>Shigella isolation</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### 5. Final case classification

| Laboratory confirmed | Discarded |
| Date reported: | To whom: |
| Route: | Signature: |
3.28.5 Specimen Collection and Transport

a) Stool samples

Stool is the specimen of choice and should be placed in a clean container for transport to the laboratory.

b) Rectal swabs

Where stools are not practical, properly taken rectal swabs should be sent to the laboratory in Cary Blair Transport medium.

All specimens should be transported to the laboratory at 4°C within 2 hours of collection. 
*Shigella* species are fragile.

Alternatively, if a delay is anticipated place approximately 1 gram of stool specimen into Cary Blair transport medium and then send to the laboratory within 24 hours.

3.28.6 Laboratory Diagnosis

Diagnosis is made on the basis of isolation of *Shigella* sp from a clinical specimen using selective media.

Serotyping augments epidemiologic investigations in identifying the source/s of infection.

3.28.7 Control and Prevention

- Observe enteric precautions during acute illness, including disposal of faeces and terminal cleaning.

- Administer adequate antimicrobial therapy in terms of choice of drug, dose and duration.

- Patients with known *Shigella* infections should be excluded from food handling and the employment in the provision of child or patient care until 2 successive faecal samples or rectal swabs (collected ³ 24 hours apart, but not sooner than 48 hours following discontinuation of antimicrobials) are found to be free of *Shigella*.

- Ill contacts of shigellosis patients should be excluded from food handling and the care of children or patients until diarrhoea stops, and 2 successive negative stool cultures are obtained 1 month apart.

- Educate persons engaged in commercial food-handling as well as the general public in safe food-handling practices.
- Ensure that knowledge of safe food-handling procedures is part-requirement for the issue of food handlers' badges.

3.28.8 Technical Notes

Mass prophylaxis or prophylaxis of household members is not recommended as a control measure.

Multidrug resistance is not uncommon, and the antibiogram of the isolated strain or local antimicrobial susceptibility patterns as provided by the laboratory will increase the efficacy of antimicrobial treatment.
3.29 Tetanus and Neonatal Tetanus

### INTERNATIONALLY NOTIFIABLE
No

### REPORTING INTERVAL
Immediately

### REPORT TO (COUNTRY LEVEL)
National Epidemiologist

### REPORT TO (REGIONAL LEVEL)
CAREC’s Epidemiology Division
EPI Regional Advisor (Neonatal Tetanus)

#### 3.29.1 INTRODUCTION

Tetanus in adults and newborns is caused by infection with the bacterium *Clostridium tetani* which inhabits the intestines of many animals. Its spores are widely distributed in nature and will grow anaerobically at the site of an injury, producing a toxin whose action results in painful muscle spasms and rigidity.

The injury in adults may be a deep wound contaminated with soil containing the bacterial spores or intramuscular use of unsterile needles. Newborns are infected by cutting of the umbilical cord with unsterile instruments or dressing with spore containing materials.

The incubation period is 3 to 28 days (average 6 days) and the case fatality can be as high as 80% in babies.

Full immunization with tetanus toxoid lasts for 10 years and a fully immunised mother confers protection on her baby against neonatal tetanus.

Neonatal tetanus is targeted by WHO for elimination and the focus of surveillance is the identification of high risk areas and population groups where unsafe delivery practices and low maternal immunization coverage result in a high incidence of disease.

#### 3.29.2 CASE DEFINITION

1. **Adult tetanus**
   a) **Suspected case**
      - Painful contraction of the muscles of chewing and the neck muscles.
      - Contractions of the abdominal muscles producing rigidity
   b) **Confirmed case**
      - Typical facial expression
      - History of exposure
2. Neonatal tetanus

Any neonatal death between 3 and 28 days of age should be investigated.

a) Suspected case

Any neonate reported as having suffered from neonatal tetanus between 3 and 28 days of age and not investigated

b) Confirmed case

A neonate with normal ability to suck and cry during the first 2 days of life, and inability to suck normally developing between 3 and 28 days, and with one or more of the following:

- Facial grimace
- Stiffness of body, arching of back
- Generalised spasms or convulsions

3.29.3 Reporting and Investigative Procedures

a) Level 1

- Detects and reports suspected case to level 2 within 24 hours

b) Level 2

- Conducts case investigation and field investigation
- Confirms or discards case
- Reports confirmed case to the national authorities within 48 hours
- Reports collective data on subsequent cases to national level (monthly)

c) Level 3

- Sends monthly national data to CAREC’s Epidemiology Division

Note: This disease would have been reported as Syndrome 7 (See section 1.2.5)
### 3.29.4 Tetanus and Neonatal Tetanus Case Investigation Form

<table>
<thead>
<tr>
<th>TETANUS AND NEONATAL TETANUS CASE INVESTIGATION FORM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reporting Centre:</td>
</tr>
<tr>
<td>Date of report / /</td>
</tr>
</tbody>
</table>

#### 1. Patient information

<table>
<thead>
<tr>
<th>Name:</th>
<th>Age (yrs)</th>
<th>Age (days)</th>
<th>Sex</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>M</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>F</td>
</tr>
</tbody>
</table>

Name of mother (if NNT)

<table>
<thead>
<tr>
<th>Address</th>
<th>Phone #</th>
<th>Case #</th>
<th>Occupation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### 2. Clinical data

Date of onset of illness / /

<table>
<thead>
<tr>
<th>Immunization history</th>
</tr>
</thead>
<tbody>
<tr>
<td>Symptom</td>
</tr>
<tr>
<td>----------</td>
</tr>
<tr>
<td>Contraction of chewing and neck muscles</td>
</tr>
<tr>
<td>Contraction of abdominal muscles</td>
</tr>
<tr>
<td>Inability to suck developing 3-28 days after birth</td>
</tr>
<tr>
<td>Muscular spasms or convulsions</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Y</th>
<th>N</th>
<th>Date(s)</th>
<th>Outcome of illness</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Survived</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Died</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Date / /</td>
</tr>
</tbody>
</table>

#### 3. Exposure history

<table>
<thead>
<tr>
<th>Puncture wound within past 28 days?</th>
<th>Y</th>
<th>N</th>
<th>Date</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intramuscular/subcutaneous drug use</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contact with animal excreta (eg farm)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recent circumcision</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baby delivered at home</td>
<td></td>
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</tr>
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#### 4. Laboratory data

Specimen collection un-necessary

<table>
<thead>
<tr>
<th>Final case classification</th>
<th>Clinically confirmed NNT</th>
<th>Clinically confirmed tetanus</th>
<th>Date reported:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>To whom:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Route:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Signature:</td>
</tr>
</tbody>
</table>
3.29.5 **SPECIMEN COLLECTION AND TRANSPORTATION**

Bacteriological culture is not necessary for the diagnosis of Tetanus

3.29.6 **LABORATORY DIAGNOSIS**

Clinical criteria are used for case confirmation

3.29.7 **TETANUS CONTROL AND PREVENTION**

a) Tetanus in adults

- Clean wounds thoroughly with soap and water, followed by appropriate medical wound management
- Give tetanus immune globulin intramuscularly 3,000-6,000 IU
- Educate the public on the hazards of punctate wounds.
- Immunize the population with adsorbed tetanus toxziod, paying special attention to high risk groups such as the military, farm workers and veterinarians.
- Offer Td boosters after 10 years.

b) Neonatal tetanus

- Immunize all women of child-bearing age and ensure that pregnant women are fully immunised (Dose 1 on contact; Dose 2, 2-4 weeks later; Dose 3, 6-12 months later plus 2 annual boosters).
- Investigate every suspected case to identify and correct risk behaviors
- Institute clean delivery programmes in hospitals and in communities
3.30 Tuberculosis

Internationally notifiable: No
Reporting interval: Monthly/Quarterly
Report to (country level): National Epidemiologist
Report to (regional level): CAREC’s Epidemiology Division

3.30.1 INTRODUCTION

Tuberculosis (TB) is a chronic bacterial disease due to infection with *Mycobacterium* species and characterized pathologically by the formation of granulomas. The lungs are most commonly affected, but lesions may also occur in the kidneys, bones, lymph nodes, or meninges or be disseminated throughout the body.

The infection may cause disease either shortly after inoculation or after a period of months or decades of dormancy.

Transmission occurs through exposure to tubercle bacilli in airborne droplet nuclei produced by persons with pulmonary or laryngeal tuberculosis. Prolonged close exposure to an infectious case may lead to infection of contacts. Except for rare situations where there is a draining sinus, extrapulmonary tuberculosis (other than laryngeal) is generally not communicable.

Initial infection often produces no significant clinical illness. With progressive disease (pulmonary or extra-pulmonary) the general symptoms are weight loss, malaise, fatigue, fever and night sweats. Pulmonary tuberculosis also includes persistent productive cough over long periods (3 weeks or more) with or without blood-stained sputum.

The symptoms of extra-pulmonary disease depend on the part of the body that is affected.

Persons infected with the Human Immunodeficiency Virus (HIV), with or without AIDS are at increased risk of developing TB.

After a progressive decline of TB among CAREC member countries during the first half of the 1980’s, a tendency to plateau was observed during the period 1988/89. Since then, there has been a gradual but distinctly notable increase in some member countries. Upward trend in HIV infections/AIDS is among the factors contributing to this rising pattern in some member countries.

The control of TB continues to be a major public health concern, and it has been shown that the most cost-effective way of achieving the goals of early diagnosis, treatment and control is through a National Tuberculosis Programme (NTP). To this end, the First Edition of “Tuberculosis – Manual of Prevention & Control Procedures” was published by CAREC in 1997, in which all of the essential elements of a NTP are presented in working detail.
3.30.2A  **Case Definition (WHO)**

The four (4) determinants of Tuberculosis case definitions are:

- Site of TB disease
- Severity of TB disease
- Bacteriology (result of sputum smear)
- History of previous treatment of TB

1. **Site of TB disease: pulmonary or extra-pulmonary**

Pulmonary TB refers to disease involving the lung parenchyma. Tuberculosis intrathoracic lymphadenopathy (mediastinal and/or hilar) or tuberculous pleural effusion, without radiographic abnormalities in the lungs, therefore constitute a case of extra-pulmonary TB.

- A patient with both pulmonary and extra-pulmonary TB constitutes a case of pulmonary TB.

- The case definition of an extra-pulmonary case with several sites affected depends on the site representing the most severe form of disease.

2. **Severity of TB**

Bacillary load, extent of disease and anatomical site are considerations in determining TB disease severity and therefore the appropriate treatment.

The following forms of extra-pulmonary TB are classified as severe: meningitis, miliary, pericarditis, peritonitis, bilateral or extensive pleural effusion, spinal, intestinal, genito-urinary.

The following forms of extra-pulmonary TB are classified as less severe: lymph node, pleural effusion (unilateral), bone (excluding spine), peripheral joint, skin.

3. (a) **Smear-positive pulmonary TB**

*Either:* a patient with at least two (2) sputum specimens positive for acid-fast bacilli by microscopy,

*or:* a patient with at least one (1) sputum specimen positive for acid-fast bacilli by microscopy and radiographic abnormalities consistent with pulmonary TB; and a decision by a physician to treat with a full curative course of anti-TB chemotherapy;

*or:* a patient with at least one (1) sputum specimen positive for acid-fast bacilli by microscopy, which is culture positive for *M. tuberculosis*. 
3. (b) Smear-negative pulmonary TB

Either: a patient who fulfills all the following criteria:

- Two (2) sets (taken at least 2 weeks apart) of at least two (2) sputum specimens negative for acid-fast bacilli on microscopy;
- Radiographic abnormalities consistent with pulmonary TB and a lack of clinical response despite one (1) week of a broad-spectrum antibiotic;
- A decision by a physician to treat with a full curative course of anti-TB chemotherapy;

Or: a patient who fulfills all the following criteria:

- Severely ill;
- At least two (2) sputum specimens negative for acid-fast bacilli by microscopy;
- Radiographic abnormalities consistent with extensive pulmonary TB (interstitial or miliary);
- A decision by a physician to treat with a full curative course of anti-TB chemotherapy;

Or: a patient whose initial sputum smears were negative, who had sputum sent for culture initially, and whose subsequent culture result is positive.

**Note:** It is apparent from the above definitions that in the absence of culture, standard chest radiography is necessary to document cases of smear-negative pulmonary TB.

Fluoroscopy examination results are not acceptable as documented evidence of pulmonary TB.

4. History of previous treatment: treatment after interruption (default) treatment failure, relapse

It is important for the following purposes to define a case according to whether or not the patient has previously received anti-TB treatment:

- The identification of patients at increased risk of acquired drug resistance and the prescription of appropriate treatment;
- Epidemiological monitoring.
Case definitions for reporting purposes:

a) **New Case**
A patient who has never had treatment for TB or who has taken anti-tuberculosis drugs for less than four (4) weeks.

b) **Relapse**
A patient who has been declared cured of any form of TB in the past by a physician, after one full course of chemotherapy, and has become sputum smear-positive.

c) **Treatment Failure**
A patient who, while on treatment, remained or became again smear-positive five (5) months or later after commencing treatment. It is also a patient who was initially smear-negative before starting treatment and became smear-positive after the second month of treatment.

d) **Treatment after interruption (TAI) (previously known as return after default)**
A patient who interrupts treatment for two (2) months or more, and returns to the health service with smear-positive sputum (sometimes smear-negative but still with active TB as judged on clinical and radiological assessment).

e) **Chronic Case**
A patient who remained or became again smear-positive after completing a fully supervised re-treatment regimen.

Note: Although smear-negative pulmonary cases and extra-pulmonary cases may also be treatment failures, relapses or chronic cases, this should be a rare event (supported by pathological or bacteriological evidence).

3.30.2b **CASE DEFINITIONS FOR SURVEILLANCE PURPOSES**

a) **Suspected Case**

- Anyone with symptoms of TB must be suspected of having TB and evaluated for the disease. In addition, anyone found to have a positive tuberculin skin test reaction must be evaluated for TB disease.
- Clinicians must think of the possibility of TB when they see a patient with symptoms of the disease or abnormal chest X-ray findings.
Symptoms of pulmonary tuberculosis disease include:

- Persistent productive cough for three weeks or more, and sometimes
- Chest pain when coughing or breathing
- Bloodstained sputum or haemoptysis

The general symptoms of tuberculosis disease (pulmonary or extrapulmonary) include:

- Weight loss
- Malaise
- Fatigue
- Fever
- Night sweats

The symptoms of extrapulmonary tuberculosis disease depend on the part of the body that is affected by the disease.

b) Confirmed case

A confirmed case is a suspected or probable case with Laboratory confirmation:

- Detection of acid fast bacilli on sputum smear.

or

- Isolation of *Mycobacterium tuberculosis*, *M. bovis* or *M. africanum* from sputum.

### 3.30.3 Reporting and Investigative Procedures

There will be variations in the details of reporting and investigative procedures depending on the type of TB control programme in place.

Basic needs are:

- A designated programme manager (or national coordinator) at central level with responsibility for planning, coordinating and evaluating activities of the programme. This should be a Senior Medical Officer, preferably with specialisation in infectious diseases, epidemiology or public health. The programme manager works in close liaison with the National Epidemiologist and reports directly to the Chief Medical Officer of the Ministry of Health.

- Field coordinator at regional, parish, county or district level, depending upon the administrative structure for the delivery of community health services at the peripheral level. This is necessary to facilitate the integration of the national programme into the existing health services as opposed to a vertical programme. This establishes a continuum of linkage to the national level of coordination.
Laboratory services to provide a minimum of microscopic examination for *acid fast bacilli* (AFB), and where possible for the culture and identification of *M. tuberculosis*.

Regular and adequate drug supplies required for use in multi-drug regimen of treatment to effect cure and prevent the development of drug resistance.

A standardized system for recording, reporting and maintaining tuberculosis registers.

The provision of suitable training for health workers. The extent and level of this training would vary with the level of available staff, which can extend from medical officers, through trained nurses, nursing aides, low level health aides which may exist in remote rural areas, whose role may be no more than to recognize suspicious cases of illness or at risk persons and arrange for referral to the appropriate level.

Referral facility/facilities to which suspected cases can be referred by health care providers in the public or private sector for investigation, treatment and other relevant follow-up action.

**Reporting should take place at 3 levels.**

**Level 1**

- Reports suspected cases to Level 2
- Refers suspected cases to the local referral facilities for investigation.

**Level 2**

- Ensures that suspected cases are investigated and evaluated
- Ensures that appropriate specimens are reported to the laboratory
- Reports confirmed cases monthly to the National Programme Manager
- Submits quarterly reports to the National Programme Manager
  
  a) Quarterly Tuberculosis Case Notification Report
  
  b) Quarterly report on the results of treatment of tuberculosis patients notified in the quarter ending 15 months earlier.

**Level 3**

- Analyses quarterly reports
- Collates data and submits to the Chief Medical Officer and to CAREC
The following records are also maintained at peripheral units:

- Tuberculosis treatment card
- Tuberculosis unit Register
- Contact tracing log book
- Annual Tuberculosis Register
- Laboratory Register

Samples of a standardized format of these reports and records are included in this manual. These are reproduced from the Tuberculosis Manual published by CAREC.

Quarterly and Annual review and analysis of these assist in the evaluation of the national programme.
### 3.30.4 Tuberculosis Case Investigation Form

<table>
<thead>
<tr>
<th>TUBERCULOSIS CASE INVESTIGATION FORM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient’s Name:</td>
</tr>
<tr>
<td>Patient’s Address (home):</td>
</tr>
<tr>
<td>Telephone:</td>
</tr>
<tr>
<td>Patient’s Address (work):</td>
</tr>
<tr>
<td>Telephone:</td>
</tr>
<tr>
<td>Name of Referring Physician/Clinic/Hospital:</td>
</tr>
<tr>
<td>Age: years</td>
</tr>
<tr>
<td>Occupation:</td>
</tr>
<tr>
<td>Duration of Residence in Country:</td>
</tr>
<tr>
<td>Case Classification:</td>
</tr>
<tr>
<td>Suspected: Y / N</td>
</tr>
<tr>
<td>Probable: Y / N</td>
</tr>
<tr>
<td>Confirmed: Y / N</td>
</tr>
<tr>
<td>Case Status:</td>
</tr>
<tr>
<td>Primary: Y / N</td>
</tr>
<tr>
<td>Reactivated: Y / N</td>
</tr>
<tr>
<td>Disease Site:</td>
</tr>
<tr>
<td>Pulmonary: Y / N</td>
</tr>
<tr>
<td>Extrapulmonary: Y / N</td>
</tr>
<tr>
<td>Date of Onset of Illness:</td>
</tr>
<tr>
<td>(dd/mm/yy)</td>
</tr>
<tr>
<td>Presenting Signs and Symptoms:</td>
</tr>
<tr>
<td>Duration of Symptoms</td>
</tr>
<tr>
<td>Fever: Y / N</td>
</tr>
<tr>
<td>Haemoptysis: Y / N</td>
</tr>
<tr>
<td>Chest Pain: Y / N</td>
</tr>
<tr>
<td>Cough: Y / N</td>
</tr>
<tr>
<td>Night Sweats: Y / N</td>
</tr>
<tr>
<td>Weight Loss: Y / N</td>
</tr>
<tr>
<td>HIV Status: Positive [ ]</td>
</tr>
<tr>
<td>Negative [ ]</td>
</tr>
<tr>
<td>Unknown [ ]</td>
</tr>
</tbody>
</table>
### 3.30.4 TUBERCULOSIS CASE INVESTIGATION FORM (cont’d)

<table>
<thead>
<tr>
<th>Diagnostic Criteria</th>
<th>Date of Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>AFB Positive by microscopy</td>
<td>Y / N</td>
</tr>
<tr>
<td>MTB Positive by culture</td>
<td>Y / N</td>
</tr>
<tr>
<td>X-Ray findings positive, compatible</td>
<td>Y / N</td>
</tr>
<tr>
<td>MANTOUX tuberculin test positive</td>
<td>Y / N</td>
</tr>
<tr>
<td>Size of induration: (mm)</td>
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</tbody>
</table>

Date Treatment or Prophylaxis Commenced:  

Treatment or Prophylactic Regimen used:  

<table>
<thead>
<tr>
<th>Initiation Phase:</th>
<th></th>
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<tbody>
<tr>
<td>Continuation Phase:</td>
<td></td>
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</tbody>
</table>

Date Treatment or Prophylaxis Completed:  

<table>
<thead>
<tr>
<th>Follow-up Microbiologic Status</th>
<th>AFB POS/NEG</th>
<th>Culture POS/NEG</th>
</tr>
</thead>
<tbody>
<tr>
<td>At end of 2 months</td>
<td></td>
<td></td>
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<tr>
<td>At end of 6 months</td>
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<td></td>
</tr>
</tbody>
</table>

Contacts traced (Household members and close extrahousehold contacts)  

<table>
<thead>
<tr>
<th>Name</th>
<th>Relationship to Index Case</th>
<th>Address</th>
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</tbody>
</table>
3.30.5 **SPECIMEN COLLECTION AND TRANSPORT**

a) 3 sputum specimens are collected (within 24 hours where possible).

b) Explain to the patient that spit or saliva is not suitable. Patients should be requested to rinse their mouths out first with water, if they have been chewing food immediately before sputum collection.

c) Ask the patient to cough deeply, clear the back of the throat and produce about 5 – 10ml of sputum in the container. Repeat the process until a sufficient amount of sputum is obtained.

d) After collecting the sputum, place the lid on the container and close firmly. **Use a clean, leakproof, screw-capped plastic or glass container (do not use wax container).**

Sputum for isolation should be stored and transported to the laboratory within 24 hours.

Sputum for smear microscopy may be transported at room temperature.

e) Sputum should be transported in sealable plastic bags with a separate pouch for completed request forms.

3.30.6 **LABORATORY DIAGNOSIS**

Laboratory confirmation is by:

- The detection of *acid fast bacilli* on smear examination, or

- Isolation of *M. tuberculosis*, *M.bovis*, or *M. africanum* from sputum on culture.

3.30.7 **CONTROL AND PREVENTION**

- Control and prevention depends upon early case finding and administration of adequate treatment to achieve cure.

- Establish case-finding and treatment facilities for infectious cases to reduce transmission.

- Make available medical, laboratory and x-ray facilities for prompt examination of patients, contacts and suspects; facilities for early treatment of cases and people at high risk of infection; and beds for those needing hospitalization.
- Educate the public in mode of spread and methods of control and the importance of early diagnosis and treatment. Education should include the risk associated with overcrowding.
- TB prevention and control programmes should be established in all institutional settings at which health care is provided and/or HIV-infected persons may be congregated.
- Initiate early and appropriate treatment utilizing multi-drug regime and take steps to avoid the development of drug resistance, usually caused by the use of inadequate/inappropriate drug regimes.
- Implement the Directly Observed Therapy Short-course (DOTS) approach to treatment, especially in the initial phase.
- Provide outreach services where possible for direct supervision of patient therapy to ensure drug compliance. Innovative methods should be pursued towards this end as supervision by formally trained health staff is impractical to cover all cases where this is required.
- BCG should be given as a routine to all infants preferably at birth (with the exception of those with AIDS or who are otherwise immuno-compromised)
- Rationalize the use of Mantoux tuberculin skin testing and chemoprophylaxis where indicated.
- Maintain evaluation of programmes to ensure maximum effectiveness possible.

Note: Active case-finding is not recommended for CMCs, as this is expensive and sometimes requires population surveys. However it must be applied to the follow-up of close contacts of smear positive patients and for high risk groups such as health care workers, prison inmates, elderly in long stay institutions etc.

Passive case-finding is recommended. It is based on self-referral of symptomatic individuals who seek medical attention at a health care facility in the public or private sector.
Ministry of Health, National TB Programme

**QUARTERLY REPORT ON THE RESULTS OF TREATMENT OF TUBERCULOSIS PATIENTS NOTIFIED IN THE QUARTER ENDING 15 MONTHS EARLIER**

District: __________________________ District code: __________________________

Patients notified during quarter _____ of _______ Name of District/Region/Parish: ___________________

Date: __________________________ Signature: __________________________

<table>
<thead>
<tr>
<th>Type of patient</th>
<th>Cured (smear negative)</th>
<th>Treatment completed (smear not done)</th>
<th>Failure (smear positive)</th>
<th>Died</th>
<th>Out of Control</th>
<th>Transfer out</th>
<th>T</th>
</tr>
</thead>
<tbody>
<tr>
<td>New smear positive</td>
<td></td>
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<td></td>
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<tr>
<td>New smear negative and extra-pulmonary</td>
<td></td>
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<tr>
<td>All new</td>
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</table>

<table>
<thead>
<tr>
<th>Type of patient</th>
<th>Cured (smear negative)</th>
<th>Treatment completed (smear not done)</th>
<th>Failure (smear positive)</th>
<th>Died</th>
<th>Out of Control</th>
<th>Transfer out</th>
<th>T</th>
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</thead>
<tbody>
<tr>
<td>Relapse</td>
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<tr>
<td>Failure/Return/Other</td>
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<tr>
<td>All retreatment</td>
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* No. excluded from report __________________________ because __________________________
**QUARTERLY TUBERCULOSIS CASE NOTIFICATION REPORT**

Ministry of Health, National Tuberculosis Programme

**Quarterly case notification of report of tuberculosis**

**District:** __________________________  **District code:** _______________________________

**Patients notified during quarter _____ of _______**  **Name of District/Region/Parish:** ________________

**Date:** ______________________  **Signature:** ___________________________________

---

All cases registered during the quarter

<table>
<thead>
<tr>
<th></th>
<th>AFB+</th>
<th>AFB-</th>
<th>Extra –pulm.</th>
<th>Total new</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>New</strong></td>
<td></td>
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<td></td>
</tr>
<tr>
<td><strong>Relapse</strong></td>
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<tr>
<td><strong>Failure/Other</strong></td>
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</tbody>
</table>

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**New AFB positive cases only**

<table>
<thead>
<tr>
<th>Age group (years)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 14</td>
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<tr>
<td>15 - 24</td>
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<tr>
<td>25 – 34</td>
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<td>35 - 44</td>
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<td>45 - 54</td>
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<td>55 - 64</td>
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<tr>
<td>65+</td>
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<th>M</th>
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<th>M</th>
<th>F</th>
<th>M</th>
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<th>M</th>
<th>F</th>
<th>M</th>
<th>F</th>
<th>M</th>
<th>F</th>
<th>Total</th>
</tr>
</thead>
</table>

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**New AFB negative only**

<table>
<thead>
<tr>
<th>Age group (years)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 – 14</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td></td>
</tr>
</tbody>
</table>

---

**Definitions**

- **New**: patient with tuberculosis is never treated before for longer than 4 weeks
- **Relapse**: patient with smear + pulmonary tuberculosis previously declared cured/treatment completed
- **Failure**: patient with positive smear at 5 months or later while on treatment
- **Return**: patient returning to treatment with positive smear after having interrupted treatment for two months or more and who has been on treatment 4 weeks or more
- **Other**: patient not fitting in any category, but excludes patients transferred in

---

**Enrollment on regimen during the quarter**

- **2EHRZ/6TH**
- **2ETH/10TH**
- **2SEHRZ/1EHRZ/5H3R**
- **2EHRZ/6EH**
- **12EH**
**TUBERCULOSIS TREATMENT CARD**

District registration number__________________________

Name:______________________________________________

Address:____________________________________________

<table>
<thead>
<tr>
<th>Sex</th>
<th>M</th>
<th>F</th>
<th>Age</th>
</tr>
</thead>
</table>

| BCG:   | no scar | scar seen | scar dubious |

**Pulmonary**

- New
- Relapse
- Transfer in
- Treatment after default
- Failure
- Other

**INITIAL INTENSIVE PHASE**

<table>
<thead>
<tr>
<th>New case AFB+</th>
<th>New Case AFB-</th>
<th>Retreatment</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Smear</th>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
</tr>
</thead>
<tbody>
<tr>
<td>Month</td>
<td>Date</td>
<td>Result</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
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<td></td>
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<tr>
<td>5</td>
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<td>7</td>
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<td>&gt;7</td>
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</table>

Indicate daily the number of tablets or dosage S
## CONTINUATION OF TREATMENT CARD

### CONTINUATION PHASE

| Month/Day | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
|-----------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
|           |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
|           |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
|           |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
|           |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
|           |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
|           |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |

Enter X on days of directly observed drug administration, or when drugs are collected for monthly self-administration.
Whenever drugs are collected for self-administration draw a horizontal line to indicate the number of days supply given.

Remarks: ____________________________________________________________
__________________________________________________________________
__________________________________________________________________
__________________________________________________________________
__________________________________________________________________
LABORATORY REGISTER

Ministry of Health, National Tuberculosis programme

<table>
<thead>
<tr>
<th>Lab Serial Number</th>
<th>Date of exam</th>
<th>Name in Full</th>
<th>Sex M/F</th>
<th>Age</th>
<th>Name of treatment unit</th>
<th>Address</th>
<th>Sputum from</th>
<th>Results Sputum</th>
<th>Signature</th>
<th>Remarks Distri TB num</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Diagnosis *</td>
<td>Follow up **</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

* these are diagnosed new or relapsed cases

** these are patients on chemotherapy
### TUBERCULOSIS UNIT REGISTER

**Ministry of Health, National Tuberculosis Programme**

<table>
<thead>
<tr>
<th>Date of Register</th>
<th>District TB number</th>
<th>Name in Full</th>
<th>Sex M/F</th>
<th>Age</th>
<th>Full Address</th>
<th>Name treatment unit</th>
<th>Date start R/and regimen</th>
<th>Disease Classif. P/EP</th>
<th>New (N)</th>
<th>Relapse (R)</th>
<th>Transfer in (T)</th>
<th>Treatment after default (Treat)</th>
<th>I</th>
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</table>

**ETH** standard New case (N): patient who has never previously had treatment for tuberculosis

**EHRZ** short course Relapse (R): patient previously treated and considered cured but who now has the disease again

**EHRZS** retreatment Transfer in (T): patient transferred into the district from another from another region

**F** Failure (F): patient having a positive smear 5 month or more after start treatment

**Other (O):** situations different from the ones mentioned above
### TUBERCULOSIS PROGRAMME

<table>
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<th>Name in full</th>
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<th>Address in full</th>
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<th>Treatment Start Date</th>
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<th>Disease site/Regimen</th>
<th>Category of patient**</th>
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<td>Transfer in</td>
<td>Transfer in</td>
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</tbody>
</table>

**New cases: HZRE = 8-month; STH = 12-month**

**New: never previously treated for as much as 1 month**

**Failure:** positive smear 5 or more months after starting treatment, put on treatment

**Relapse:** previously treated and declared cured, returns smear positive

**RAD:** return after default

**Transfer in:** registered and started treatment in another district
<table>
<thead>
<tr>
<th>Year</th>
<th>Result of smear examination according to duration of treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre-treatment 2 months</td>
</tr>
<tr>
<td></td>
<td>Result Lab No.</td>
</tr>
<tr>
<td>FO</td>
<td>Remarks</td>
</tr>
</tbody>
</table>

**Remarks**

- **smear negative**: negative smear at end of treatment and on one previous occasion
- **died**: died from any cause during treatment
- **smear not done**: only one or no smears at end of treatment
- **defaulled**: failed to collect medications for more than 2 months after date last seen
- **smear positive**: positive smear at 5 months or later during treatment
- **transferred**: sent to another district for continuation of treatment

(continuation of register of overleaf)
<table>
<thead>
<tr>
<th>Index case</th>
<th>Sex</th>
<th>Age</th>
<th>First Name</th>
<th>Last name</th>
<th>Age</th>
<th>Sex</th>
<th>Date Investigation</th>
<th>TB signs or symptoms</th>
<th>Mantoux Test</th>
<th>Conclusions</th>
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Health Unit: __________
3.31 Typhoid Fever

<table>
<thead>
<tr>
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<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reporting interval:</td>
<td>Weekly</td>
</tr>
<tr>
<td>Report to (country level):</td>
<td>National Epidemiologist</td>
</tr>
<tr>
<td>Report to (regional level):</td>
<td>CAREC's Epidemiology Division</td>
</tr>
</tbody>
</table>

3.31.1 Introduction

A systemic illness caused by infection with *Salmonella typhi*. Often characterised by insidious onset of sustained fever, headache, anorexia, malaise, relative bradycardia, constipation or diarrhoea, nonproductive cough. Many mild and atypical infections occur.

Carrier state may be prolonged, with healthy carriers being reservoirs of infection.

Although the carrier state is reported to be more common following infection in middle age, especially females, both male and female carriers under 10 years of age have been identified in the Caribbean. Age/sex by itself therefore, cannot be reliably used to exclude chronic carriers, and post-treatment surveillance of all cases is important.

Since it is a disease only of humans, the primary source of infection must be human, transmission occurring by the faecal–oral route through contaminated food or water.

3.31.2 Case Definition

a) Suspected case

An illness with 3 or more of the following symptoms:

- Fever
- Headache
- Malaise
- Anorexia
- Constipation or diarrhoea
- Non-productive cough

b) Probable case

- A suspected case which is epidemiologically linked to a confirmed case in an outbreak.

c) Confirmed case

A Suspected or Probable case with Laboratory confirmation:

- Isolation of *Salmonella typhi* from blood, stool, or other clinical specimen.
3.31.3 **REPORTING AND INVESTIGATIVE PROCEDURES**

a) **Level 1**

- Reports a *suspected* case to level 2 within 48 hours.
- Initiates case investigation noting any special risk factor for transmission, e.g. whether the person is engaged in food-handling.
- Carries out investigations to identify possible source of contaminated food or drink items which may have been the vehicle of transmission.
- Collects blood and stool specimens and refer to the laboratory with relevant information.
- Searches for other cases.

b) **Level 2**

- Collects reports of preliminary investigations from level 1.
- Continues case investigations, and where other cases have occurred identifies common epidemiologic factors.
- Searches for the case or carrier who is the source of infection and for the vehicle (food or water) through which transmission occurred.
- Co-ordinates measures (isolation, chemotherapy etc.) appropriate to the case or carrier to avert continuing spread of infection from that source.
- Identifies and eliminates/embargoes suspected contaminated food until safety is ensured.
- Reports confirmed cases weekly by numbers to level 3.

**Note:** This disease would have been reported as syndrome 1  (See Section 1.2.5)
### 3.31.4a Typhoid Fever Case Investigation Form

**Typhoid Fever Case Investigation Form**

<table>
<thead>
<tr>
<th>Reporting Centre:</th>
<th>Date of report / /</th>
</tr>
</thead>
</table>

**1. Patient information**

<table>
<thead>
<tr>
<th>Name</th>
<th>Age (yrs)</th>
<th>Sex</th>
<th>M</th>
<th>F</th>
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<table>
<thead>
<tr>
<th>Home Address:</th>
<th>Work Address:</th>
<th>Phone</th>
<th>Occupation</th>
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</table>

<table>
<thead>
<tr>
<th>Nature of Duties:</th>
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</table>

**2. Clinical data**

<table>
<thead>
<tr>
<th>Date of onset / /</th>
<th>Immunization history</th>
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</table>

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Y</th>
<th>N</th>
<th>Symptom</th>
<th>Y</th>
<th>N</th>
<th>Symptom</th>
<th>Y</th>
<th>N</th>
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<td>Cough</td>
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<td>Malaise</td>
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<thead>
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<td>Died</td>
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<td>Date:</td>
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</table>

**3. Exposure history**

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<thead>
<tr>
<th>Known case</th>
<th>Y</th>
<th>N</th>
<th>Date</th>
<th>Details</th>
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</table>

| Food      |   |   |      |         |
| Water     |   |   |      |         |
| Carrier   |   |   |      |         |

**In 4 weeks prior to onset:**
- Travelling/visiting if considered risk
- Change of work environment
- Bathing in rivers/pools

**4. Laboratory data**

<table>
<thead>
<tr>
<th>Specimen</th>
<th>Date collected</th>
<th>Date rec’d</th>
<th>Condition</th>
<th>Test</th>
<th>Result</th>
<th>Date sent</th>
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<tr>
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<td>Stool</td>
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<td>Culture</td>
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**5. Final case classification**

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<td>Route:</td>
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<td>Signature:</td>
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Phage type:
### LINE LISTING FOR CONTACT INFORMATION

#### FAMILY AND IMMEDIATE CONTACTS:

<table>
<thead>
<tr>
<th>No.</th>
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<th>Relationship To Case or Carrier</th>
<th>Sex</th>
<th>Age</th>
<th>Contact Period</th>
<th>History of Typhoid Fever (Date)</th>
<th>History of Typhoid Vaccination (Date)</th>
<th>Result of Blood, Stool or Urine Cultures</th>
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Additional Information/Action taken:
3.31.5 Specimen Collection and Transport

a) Blood specimens should be collected as early possible after the onset of illness. (Clotted blood may be used for culture of clot) Transport at room temperature to reach the laboratory within 1 hour.

b) Stool — collect early and transport in a sterile screw cap container.

c) Rectal swabs should be transported in Cary Blair medium.

d) Midstream specimen of urine — transport in a sterile Universal container.

Specimens of stool, urine and rectal swabs should be transported at 4°C and should be received at the laboratory within 24 hours of collection.

3.31.6 Laboratory Diagnosis

Laboratory confirmation is made on the isolation of *S. typhi* from blood, or other clinical specimen.

3.31.7 Control and Prevention

Routine Measures

- Observe enteric precautions while ill. Release from supervision by health authority should be based on no less than 3 consecutive negative stool cultures taken at least 24 hours apart and at least 48 hours after any antibiotic, and not earlier than 1 month following onset of illness.

- Carry out concurrent disinfection of faeces and urine and of articles soiled by these. Where adequate sewage systems exist, faeces and urine may be discharged directly into the system.

- Vaccine protection of household and other contacts is of limited value and application of this measure should be evaluated in individual situations.

- Investigate contacts to uncover other infections and use epidemiologic approaches to determine the actual or likely source(s) of infection. These would include search for unreported cases, carriers, or contaminated food, water, milk or shellfish. Apply appropriate measures to deal with existing contaminations and to protect against recurrence of these.

- Exclude household and close contacts of cases from employment in sensitive occupations (e.g. food handlers) until at least 2 specimens of faeces and urine taken at least 24 hours apart are negative on culture for *S. typhi*. 
• Maintain Typhoid Registers at Local and National levels and keep these regularly updated. (Their usefulness should be assessed in terms of their practical application as a surveillance tool; in the control of outbreaks; and the prevention of disease transmission related to high-risk occupations of carriers and excreters.)

• Institute continuing surveillance of all known cases for at least 6 months and preferably for 12 months after initial treatment, as feasibility permits. The purpose is to ascertain their post-illness status, i.e. whether an excreter or carrier.

A suggested protocol is as follows:

(i) the collection of a stool sample once monthly for an initial period of 3 months.

(ii) the collection of a stool specimen once every 3 months over the succeeding 9 months.

This procedure may facilitate the identification of excreters or carriers.

Epidemic measures:

• Search for the case or carrier who is the source of infection and for the vehicle (water or food) by which infection was transmitted.

• Selectively eliminate suspected contaminated food.

• Exclude milk supplies, unless pasteurized or boiled, as well as other foods suspected to be contaminated on epidemiologic evidence, until safety of supplies is ensured. Chlorinate suspected or incriminated water supplies adequately or avoid their use until safety is assured.

• Chlorinate or boil all water used for drinking or ice-making before use. (Note: Since boiled water has no residual chlorine protection, special care should be taken to avoid contamination of water supplies which are stored over a period of time.)

• Routine use of vaccine is not recommended.

3.31.8 TECHNICAL NOTES

Blood culture is usually positive in the first week of illness. The rate of positivity declines thereafter, but blood cultures may be positive up to the third week in patients who have not yet been placed on antimicrobial therapy.

Serologic tests are not acceptable as diagnostic criteria for the detection of a case or carrier of the disease. Phage typing however, can be a useful tool in tracing/confirming source(s) of infection and its application is intervention-related.

Vi agglutination testing can be a useful tool for preliminary screening in outbreaks.
Excreter – an asymptomatic individual who continues to excrete pathogenic organisms in their faeces for less than 12 months. Such a person may be a “recovered case” (sometimes termed a “convalescent carrier”), or someone who has had a symptomless infection (sometimes termed a “temporary carrier”).

Carrier (sometimes termed “chronic carrier”) – a person without symptoms but excreting pathogenic organisms in faeces or urine, either continuously or intermittently for more than 12 months.

Disaster implications: With disruption of usual water supply and sewage disposal facilities, and of controls on food and water, transmission of typhoid fever may occur if active cases or carriers are among the displaced population. Of high priority should be measures taken to restore safe drinking water supplies and sewage disposal systems. Improved vaccines are now available and vaccine administration to selected population groups may be helpful.

Travel: Immunization is recommended for international travellers to endemic areas, especially if travel is likely to involve exposure to unsafe food and water, or close contact in rural areas and indigenous populations.
3.32 Viral Hepatitis A

<table>
<thead>
<tr>
<th>Internationally notifiable:</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reporting interval:</td>
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<td>National epidemiologist</td>
</tr>
<tr>
<td>Report to (regional level):</td>
<td>CAREC’s Epidemiology Division</td>
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</tbody>
</table>

3.32.1 INTRODUCTION

Viral Hepatitis A is an acute, self limited inflammation of the liver caused by infection with the Hepatitis A virus (HAV). It is transmitted by the faecal oral route. Vehicles for the virus are water, food contaminated during preparation, and raw shellfish, including conch. Person-to-person spread is common among children who frequently have asymptomatic infections.

The period of maximum transmissability is at the end of the incubation period which ranges from 15 to 50 days (average 28–30 days). The symptomatic period is one to two weeks, with rare instances of disease lasting more than one month. Clinical diagnosis is unreliable, and laboratory tests are available to distinguish Hepatitis A from B, C, and E.

The main purpose of surveillance is the detection of outbreaks which may have a common source or may indicate a micro-environment of very poor hygiene, e.g. an institution or housing settlement.

3.32.2 CASE DEFINITION

Abrupt onset of fever with jaundice within one week, **and with one or more** of the following:

- Anorexia
- Malaise
- Fatigue
- Nausea
- Abdominal discomfort

a) Suspected case

- A person who meets the clinical case definition above.
- A symptomatic person without jaundice but with a history of close contact with a confirmed case within the past 2 weeks.
b) **Confirmed case**

- A suspected case with a positive laboratory result for Hepatitis A (anti-HAV IgM).

### 3.32.3 Reporting and Investigative Procedures

#### a) Level 1

- Reports a suspected case to level 2 within 48 hours.
- Initiates the case investigation, noting especially any risk factor for transmission, e.g. whether the person is a food handler or day care worker.

#### b) Level 2

- Collates level 1 reports noting any common factors or clusters.
- Collects blood samples and forward to the laboratory
- Continues case investigations, with emphasis on epidemiological factors.
- Forwards a weekly collective report to the national level, including any available laboratory results.

*Note: This disease would have been reported as Syndrome 5 (See section 1.2.5)*
### 3.32.4 Viral Hepatitis Case Investigation Form

#### VIRAL HEPATITIS CASE INVESTIGATION FORM

<table>
<thead>
<tr>
<th>Reporting Centre:</th>
<th>Date of report</th>
<th>/</th>
<th>/</th>
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</thead>
</table>

### 1. Patient information

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<th>M</th>
<th>F</th>
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<table>
<thead>
<tr>
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<th>Phone</th>
<th>Occupation</th>
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</thead>
</table>

### 2. Clinical data

<table>
<thead>
<tr>
<th>Date of onset of illness</th>
<th>/</th>
<th>/</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Y</th>
<th>N</th>
<th>Symptom</th>
<th>Y</th>
<th>N</th>
<th>Symptom</th>
<th>Y</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fever</td>
<td></td>
<td></td>
<td>Nausea</td>
<td></td>
<td></td>
<td>Vomiting</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anorexia</td>
<td></td>
<td></td>
<td>Itching</td>
<td></td>
<td></td>
<td>Jaundice</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Malaise</td>
<td></td>
<td></td>
<td>Arthralgia</td>
<td></td>
<td></td>
<td>Palpable liver</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fatigue / Lethargy</td>
<td></td>
<td></td>
<td>Abd. pain or discomfort</td>
<td></td>
<td></td>
<td>Dark urine, pale stools</td>
<td>/</td>
<td>/</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Is / was this patient hospitalised?</th>
<th>Y</th>
<th>N</th>
<th>Date(s)</th>
<th>Outcome of illness</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Survived</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Died</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Date</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>/</td>
</tr>
</tbody>
</table>

### 3. Exposure history

<table>
<thead>
<tr>
<th>Y</th>
<th>N</th>
<th>Dates</th>
<th>Details</th>
</tr>
</thead>
</table>

| Sexual contact with Hepatitis case? |
| Raw shellfish eaten in the past 2 mths? |
| Attends a day-care centre? |
| Resident of an institution? |
| Blood transfusion in past 6 months? |
| Haemodialysis?, injections? |
| Hospitalised in the past 6 months? |
| Tatooing, ear piercing, acupuncture? |

### 4. Laboratory data

<table>
<thead>
<tr>
<th>Specimen</th>
<th>Date collected</th>
<th>Date rec'd</th>
<th>Condition</th>
<th>Test</th>
<th>Result</th>
<th>Date sent</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blood</td>
<td></td>
<td></td>
<td>anti-HAV IgM</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blood</td>
<td></td>
<td></td>
<td>HBsAg</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blood</td>
<td></td>
<td></td>
<td>anti-HBe IgM</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blood</td>
<td></td>
<td></td>
<td>HBeAg</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 5. Final case classification:

<table>
<thead>
<tr>
<th>Hepatitis indeterminate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hepatitis A laboratory confirmed</td>
</tr>
<tr>
<td>Hepatitis B laboratory confirmed</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Date reported:</th>
<th>To whom:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Route:</td>
</tr>
<tr>
<td></td>
<td>Signature:</td>
</tr>
</tbody>
</table>
3.32.5 Specimen Collection and Transport

Blood sample.

a) As soon as the patient presents, collect 5 to 10 ml of blood into a sterile tube. Forward to the laboratory on ice within 24 hours, accompanied by whatever patient data is then available.

b) If immediate shipment is not possible, centrifuge the blood and transfer serum to a sterile tube with a secure cap. Store at –20°C and ship frozen.

c) Include patient, clinical and exposure data.

3.32.6 Laboratory Diagnosis

Demonstration of specific IgM antibody to Hepatitis A virus (anti-HAV IgM) is diagnostic. ELISA kits are commercially available and are most frequently used.

3.32.7 Hepatitis A Control and Prevention

a) Hepatitis A outbreak

- Determine the common cause of the outbreak by epidemiological investigation, and remove or correct.

- If the outbreak is traced to an individual (e.g. a food handler), counseling on personal hygiene (disposal of faeces and hand washing) should be given and enteric precautions advised for one week after the onset of jaundice.

- Immune globulin should be offered to contacts within 3 days of exposure, or, in an outbreak situation, within 2 weeks of exposure.

- If a day care centre is involved, emphasis should be placed on hand washing after diaper change and supervision of the children’s hygiene. Enteric precautions should be enforced for 2 to 3 weeks.

b) Increased incidence of Hepatitis A in a district

- Investigate and improve water supply and quality
- Correct environmental problems (sewage disposal, drainage)
- Educate the public on good sanitation and personal hygiene

Note: A hepatitis A vaccine is available for use in humans.
3.33 Viral Hepatitis B

3.33.1 Introduction

Viral Hepatitis B is a disease of insidious onset caused by the Hepatitis B virus. The incubation period is usually 45 to 160 days, with an average of 60–90 days.

It is worldwide in distribution and of moderate prevalence in the Caribbean. Infection in early childhood is usually asymptomatic but results in a high rate of development of the permanent carrier state. A high percentage of adult infections are symptomatic but the rate of resolution and antibody development are also high.

The long term sequellae of type B viral Hepatitis are chronic liver disease, cirrhosis, and primary liver cancer.

Hepatitis is transmitted by parenteral exposure to blood or blood products, by sexual contact and by infected mother to child in utero or perinatally. Donors of blood for transfusion are screened by interview and all blood and blood products are tested for the virus. Those at special risk are health care workers, dialysis patients and those requiring blood products, patients in mental institutions and drug users who share needles. These are also at special risk for Hepatitis C.

The objective of surveillance for Hepatitis B is to assess the impact of this disease on the population and to select and implement the most appropriate control strategies.

3.33.2 Case Definition

a) Suspected Hepatitis B case

A person presenting with jaundice, and a history of insidious onset of at least 3 of the following:

- Malaise
- Anorexia
- Lethargy
- Right upper quadrant tenderness
- Itching
- Rash
- Arthralgia
- Dark urine, pale stools.
b) **Confirmed Hepatitis B case**

- A suspected case with a positive diagnostic laboratory test (See 3.33.6).

### 3.33.3 REPORTING AND INVESTIGATIVE PROCEDURES

**Level 1**

- Reports suspected case within 24 hours to level 2
- Initiates the case investigation
- Collects a blood sample and send to the laboratory with patient and clinical data

**Level 2**

- Completes the case investigation
- Collates clinical, epidemiological and laboratory data and report the first confirmed case to the national level within 48 hours
- Reports subsequent cases by weekly line-listing to the national level

**Level 3**

- Reports the aggregated data of confirmed cases from national reports monthly to CAREC’s Epidemiology Division.

**Note:** This disease would have been reported as Syndrome 5 (See section 1.2.5)
3.33.4 Case Investigation Form

See 3.32.4.

3.33.5 Specimen Collection and Transport

Blood sample.

- As soon as the patient presents, collect 5 to 10 ml of blood into a sterile tube. Forward to the laboratory on ice within 24 hours, accompanied by whatever patient data are then available.

- If immediate shipment is not possible, centrifuge the blood and transfer serum to a sterile tube with a secure cap. Store at –20°C and ship frozen.

- Include patient, clinical and exposure date

3.33.6 Laboratory Diagnosis

Commercial kits are used to test for antigen and antibody to Hepatitis B virus.

**HBsAg** (Hepatitis B surface Antigen) is present in high titre in the serum during acute disease, and in the carrier state. If symptoms are present, a positive HBsAg test is accepted as diagnostic.

**IgM anti-Hbc** (IgM antibody to the core antigen of the Hepatitis B virus). The presence of IgM specific for the Hepatitis B virus is diagnostic.

**HBeAg** The presence of Hepatitis ‘e’ antigen in an infected person indicates a high level of infectivity and is important in the management of pregnant women whose babies are at risk of contracting hepatitis and becoming permanent carriers.

3.33.7 Control and Prevention

Note: Hepatitis B is targeted by WHO for reduced incidence/prevalence, and WHO has recommended the addition of hepatitis B vaccine in the immunization programs for routine infant and/or adolescent immunization in all countries.

- Enforce strict discipline in blood banks, rejecting high risk donors

- Offer personal counseling to patients on behaviors likely to transmit the virus.

- Attempt to trace sexual contacts and counsel. Hepatitis B immune globulin may be offered
• Determine, by analysis of surveillance data, the incidence of acute disease in the population and the prevalence of the chronic sequellae

• Improve vaccine coverage of high risk groups e.g. health care workers

• If necessary, implement a programme of infant vaccination, to prevent development of the carrier state

• Launch a public awareness programme aimed at reducing high-risk behavior
3.34 Yellow Fever

Internationally notifiable: Yes
Reporting interval: Immediately
Report to (country level): National Epidemiologist
Report to (regional level): CAREC’s Epidemiology Division

Report to World Health Organization/Pan American Health Organization in accordance with the International Health Regulations

3.34.1 INTRODUCTION

Yellow Fever is an acute viral haemorrhagic fever transmitted to man by mosquitoes infected with the yellow fever virus. It is endemic in parts of Africa, South America and occasionally enzootic in Trinidad.

The virus exists in two cycles - jungle yellow fever transmitted between monkeys and forest-dwelling mosquito species such as *Haemagogus sp.* and urban yellow fever transmitted between man and the *Aedes aegypti* mosquito. Susceptible humans can become infected if they enter the forest when the virus is active and are bitten by infected forest mosquitoes.

The incubation period of yellow fever is 3 to 7 days and the illness is characterised by an acute phase lasting 4 to 5 days followed by a short period of remission and a toxic phase of 3 to 5 days with a very high fatality rate.

Confirmation of yellow fever rests on laboratory diagnosis since the disease, in its wide range of clinical severity, can resemble many others. The differential diagnoses include influenza, dengue fever, malaria, hepatitis, leptospirosis and other viral haemorrhagic fevers.

Surveillance for yellow fever permits rapid identification and laboratory confirmation of cases leading to prompt outbreak control through immunization and vector reduction.

3.34.2 CASE DEFINITION

a) Suspected case

A suspected case of yellow fever is a person with an illness characterised by:

- Acute onset of fever followed by **two or more** of the following symptoms:
  - Headaches or backaches
  - Muscle pain
  - Nausea and/or vomiting
• Fatigue/lethargy
and at least one of the following:

• Jaundice
• Reduced amounts of urine production
• Bleeding from nose, gums or skin
• Blood in vomit, stool or urine

a) Probable case

A probable case of yellow fever is a suspected case fulfilling one or more of the following criteria:

• Living/working in an area where yellow fever is enzootic or endemic
• Presence in the neighborhood or village, within the last two weeks, of a person ill with fever and jaundice

c) Confirmed case

A confirmed case of yellow fever is a suspected case with positive laboratory test results (See 3.27.6)

See technical notes 3.34.8

3.34.3 Reporting and Investigative Procedures

a) Level 1

• Reports suspected cases of yellow fever (See 3.27.2) on the basis of a symptomatic case definition to level 2 within 24 hours
• Starts case investigation (patient data, basic clinical information)

b) Level 2

• Responds to report from level 1 by continuing case investigation
• Collects and forward specimens to the laboratory
• Classifies case as “probable yellow fever” on the basis of epidemiological or preliminary laboratory data
• Reports probable case to the National level within 24 hours (In an outbreak situation send line listing weekly)
• Alerts other health facilities in the area of the possibility of yellow fever

c) Laboratory

• Acknowledges receipt of specimens and condition (suitable/unsuitable)
● Reports results of laboratory tests as they become available to Level 2 and to the National authorities.

d) Level 3

● Classifies case as “confirmed yellow fever” or “discarded” on the basis of laboratory results
● Reports confirmed cases regionally to CAREC and to PAHO/WHO
● Notifies all districts, Veterinary Public Health, Vector Control Division, Port Health

Note: This disease would have been reported as Syndrome 6 (See section 1.2.5)

3.34.4 Case Investigation Form

A standard case investigation form is needed for consistent and comparable data collection and ease of analysis. This should be available at the peripheral and district levels, especially in districts at risk for yellow fever.
### 3.34.4 Yellow Fever Case Investigation Form

#### YELLOW FEVER CASE INVESTIGATION FORM

<table>
<thead>
<tr>
<th>Reporting Centre:</th>
<th>Date of report: / /</th>
</tr>
</thead>
</table>

#### 1. Patient information:

<table>
<thead>
<tr>
<th>Name</th>
<th>Age(yrs)</th>
<th>Sex</th>
<th>Address</th>
<th>Phone</th>
<th>Occupation</th>
</tr>
</thead>
</table>

#### 2. Clinical data

**Date of onset of illness:** / /  

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Y N</th>
<th>Symptom</th>
<th>Y N</th>
<th>Symptom</th>
<th>Y N</th>
<th>Number of doses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fever</td>
<td></td>
<td>Nausea</td>
<td></td>
<td>Reduced volume urine</td>
<td></td>
<td>Yellow Fever vaccine</td>
</tr>
<tr>
<td>Headache</td>
<td></td>
<td>Vomiting</td>
<td></td>
<td>Bleeding gums, nose</td>
<td></td>
<td>Date of last dose</td>
</tr>
<tr>
<td>Backache</td>
<td></td>
<td>Lethargy</td>
<td></td>
<td>Blood in vomit, stool</td>
<td></td>
<td>/ /</td>
</tr>
<tr>
<td>Muscle pain</td>
<td></td>
<td>Jaundice</td>
<td></td>
<td>Rapid pulse, shock</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Is / was the patient hospitalised?</th>
<th>Y N</th>
<th>Date(s)</th>
<th>Outcome of illness</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Survived</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Died</td>
</tr>
</tbody>
</table>

#### 3. Exposure history

<table>
<thead>
<tr>
<th>Does the patient live in a YF endemic area?</th>
<th>Y N</th>
<th>Duration of contact</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Has the patient travelled to an endemic/epizootic area in the past 2 weeks?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Has there been in the neighborhood/village within the past 2 weeks a person with fever and jaundice?</td>
</tr>
</tbody>
</table>

#### 4. Laboratory data

<table>
<thead>
<tr>
<th>Specimen</th>
<th>Date Collected</th>
<th>Date rec’d in lab</th>
<th>Condition</th>
<th>Test done</th>
<th>Result</th>
<th>Date result sent</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute blood</td>
<td></td>
<td></td>
<td></td>
<td>YF IgM</td>
<td>Virus isolation</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>PCR</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Convalescent blood</td>
<td></td>
<td></td>
<td></td>
<td>YF antibody</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Liver</td>
<td></td>
<td></td>
<td></td>
<td>Virus isolation</td>
<td>Histopathology</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>PCR</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### 5. Final case classification:

<table>
<thead>
<tr>
<th>Clinically confirmed</th>
<th>Laboratory confirmed</th>
<th>Discarded</th>
<th>Date reported:</th>
<th>To whom:</th>
<th>Route:</th>
<th>Signature:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
3.34.5 **Specimen Collection and Transport**

a) **Acute blood sample**
   - Draw a 5 to 10 ml blood sample from each suspected case and place in a sterile tube.
   - Send to the laboratory immediately in a cold box.
   - If shipment is not possible within 24 hours, centrifuge the blood and transfer the serum to a sterile vial.
   - Store at –20°C and ship with frozen icepacks.
   - Label all tubes and vials with patient name, specimen and date of collection.

b) **Convalescent blood sample**
   - If requested by the laboratory draw a 5ml convalescent blood sample 2 to 3 weeks after the first.
   - Store and ship as above.

c) **Autopsy specimens**
   - **Blood.** Place a 10 ml sample of heart blood into a sterile vial, label and ship to the laboratory within 24 hours. If prompt shipment is not possible store and ship as in (a) above.
   - **Liver.** Place a section of liver at least one cm\(^3\) into a sterile jar with viral transport medium or buffered saline. Store and ship at 4°C

OR

Place liver specimen in formol saline and ship at ambient temperature.

All specimens must be accompanied by patient identification, clinical data and recent YF immunization history.

3.34.6 **Laboratory Diagnosis**

a) **Criteria for case confirmation.**

A case is laboratory confirmed as yellow fever if one of the following criteria are met.
• Yellow fever-specific IgM antibodies are detected in the serum and there is no history of recent immunization.

• Yellow fever virus is isolated from blood or liver.

• Paired sera show a four-fold or greater increase in yellow fever specific antibody level in the absence of recent vaccination.

• Yellow fever viral antigen or genome is detected in blood or tissue.

• Characteristic liver histopathology is seen at autopsy.

b) Expected turn-around time

Results of IgM ELISA tests can be reported within 3 days of receipt of the specimen in the laboratory.

Virus isolation attempts may take 3 or more weeks depending on the concentration of virus in the sample.

Results on paired sera are available within 3 days of receipt of the convalescent sample.

c) Other laboratory examinations

Laboratory tests for some of the other possible aetiologic agents should be conducted if the capability exists. These might include Malaria blood film, Hepatitis A and B serology, Dengue IgM or virus isolation, Leptospirosis agglutination test, and immunofluorescence for selected viral haemorrhagic fevers.

3.34.7 YELLOW FEVER CONTROL AND PREVENTION

a) Outbreak control

Upon confirmation of a case of yellow fever, action can be initiated at the district level which will reduce the severity of, or even abort, the threatened epidemic.

Appropriate measures are:

• Conduct emergency immunization in the district. (More extensive immunization must be planned at the national level.)

• Intensify surveillance to identify additional cases

• Alert nearby districts or counties to the possibility of yellow fever virus circulation
• Coordinate with vector control authorities to reduce *Aedes* density within a six-mile radius of the case and around hospitals.

• Inform and involve the community in elimination of mosquito breeding sites

• Set up a mapping system for suspected and confirmed cases

• Strengthen clinical management of yellow fever in health facilities

b)  **Outbreak prevention**

Having brought the emergency situation under control attention can be focused on long-term activities which will prevent the recurrence of epidemic yellow fever.

The following are appropriate activities:

• Conduct a thorough epidemiological analysis of the recent outbreak

• Immunise populations identified by this analysis to be at risk e.g. newly developed peri-sylvatic communities whose residents may not have been immunised, or urban communities potentially exposed.

• Improve YF vaccine coverage in the EPI. This is a long-term strategy to ensure protection of each birth cohort

• Reinforce routine surveillance. Identify areas of weakness in awareness, training, designation of responsibility

• Collaborate with vector control to set up a mosquito monitoring and control programme

• Strengthen the early warning system for epizootic yellow fever.

### 3.34.8  **Technical Notes**

This case definition differs from that suggested by the WHO, but is considered to be more suitable for our Region.

Serologic cross-reactions occur with other flaviviruses (i.e. dengue), in the HI test.

YF vaccine must be approved by WHO and administered by approved persons. An international certificate of vaccination should be filled out, dated, signed and validated. Vaccination is valid after 10 days and for 10 years.
4.0 Investigation, Management and Control of Communicable Disease Outbreaks/Epidemics

The words ‘Outbreak’ and ‘Epidemic’ are used interchangeably throughout this chapter, as they have the same meaning, i.e. the occurrence of a health event in excess of normal expectancy.

One purpose of a routine communicable disease surveillance system is to detect cases and outbreaks of disease in a population.

Effective outbreak control and management depend on a sensitive surveillance system providing accurate information on the occurrence and behavior patterns of diseases in a community.

The epidemic potential of a communicable disease agent is determined by many factors including its pathogenicity and infectivity, its mode of transmission and the risk factors present in a particular environment. For some diseases, it is more practical to count clusters of cases, rather than individual cases of disease, for example, common diseases that have epidemic potential such as dengue fever.

An outbreak may be defined as the occurrence of more than the usual number of cases. The detection of one case of a highly pathogenic disease (e.g. yellow fever), or one case of a disease that has been eliminated or eradicated from an area (e.g. indigenous polio in the Americas) would be considered an epidemic.

4.1 Principles of epidemic investigation

The district/county/parish level (Level 2 of the surveillance structure) constantly receives and analyses data from several level 1 sites and is in the best position to detect unusual events that may signal the start of an epidemic. However, level 1 workers, with their intimate knowledge of the local situation, are frequently able to identify an epidemic in the district.

Level 2 completes individual case investigations and plays a lead role in epidemic investigation. However, should the outbreak be of national or international importance, the national epidemiologist at level 3 would be responsible for in-country coordination and international action.

The steps to be taken have been described in the “Ten Commandments” of epidemic investigation which are outlined below. Prior to embarking on the investigation, a team should be set up including clerical and other support staff, and the necessary equipment (computer, vehicle) identified.
During the exercise, coordination should be maintained by regular meetings and debriefings, and clear assignment of responsibilities. It may be necessary to identify staff to cover the routine functions of those on the investigation team.

1. **Confirm the fact that an epidemic does exist**

   An outbreak is verified by comparison with the previous occurrence of similar cases. Consistently reported data from the routine surveillance system are invaluable in determining that an outbreak is occurring. In the absence of surveillance data, investigators may have to rely on the knowledge of local public health staff.

2. **Verify the diagnosis**

   This may require only a brief review of the clinical findings, or may necessitate laboratory confirmation. Since some laboratory tests may be complex and lengthy, outbreak investigation and some control measures may be undertaken prior to receipt of laboratory results.

3. **Make a quick assessment of the patients**

   Formulate a case definition and state the criteria for inclusion in the list as suspect or confirmed cases.

4. **Relate the cases in some way – (who, when, where)**

   In seeking a common cause, cases are studied in relation to the **time** of onset (including trends and periodic changes), the **place** of exposure (including travel history), and characteristics of the **person** (age, sex, occupation).

5. **Formulate a tentative hypothesis**

   This should be as precise as possible and act as a guide to the outbreak investigation which focuses on proving or disproving the hypothesis. The hypothesis should incorporate all the clinical, laboratory and epidemiological facts of the investigation to date, and known facts about the disease process.

6. **Plan and conduct a detailed epidemiological investigation**

   This is made easier if standard investigation forms are used for the initial collection of information. Use should be made of existing guidelines, and special forms devised if necessary. The use of one or more control groups for comparison with cases may help in separating out which variables are important etiologic factors.

7. **Analyse the data**

   Analyse detailed data derived from case investigation as rapidly as the data can be collected, comparing the attack rate among various pertinent groupings.
8. **Formulate a conclusion**

Base conclusions upon all pertinent evidence, not relying upon any single distribution or circumstance by itself.

9. **Put control measures into operation**

Implement immediately practical measures which can be done at the district level. Motivation of the community, or of specific groups, will generate a better response if done while the effect of the epidemic is still to be observed.

10. **Write up a report**

The report should be clear and in a format that can readily be used by the supervisor, but also comprehensible to other decision makers who may not have a technical background. This report should include feasible short and long term recommendations.

---

**Note:** The steps outlined above are guidelines, and the sequence need not be rigidly adhered to. Different aspects may be occurring at the same time, in particular control measures should start with the information available.

### 4.2 Methodologies of outbreak management

Management of a threatened or ongoing outbreak is based on the data collected in the investigative phase and involves several linked operations.

**Resource assessment**

Management (and control) activities represent a balance between the ideal and the achievable.

Those in charge of the operation must have a clear knowledge of the available resources. If this is not so, a rapid assessment should be done early in the course of the outbreak.

The assessment should include:

- The number and location of health centres, hospitals, sentinel physicians
- The number and categories of health workers
- The location, capability and capacity of laboratories
- Availability of vaccines, antibiotics and other medical supplies
- The capacity and supply status of vector control units

**Establishment of communication channels**

The importance of communication, including dealing with the media, cannot be over emphasised. “Hot line” reporting channels should be established and clear instructions
given to designated responsible persons. All staff involved should appreciate the emergency nature of the operation and understand the line of command. There should be one official reporting source.

**Emergency activities are designed to achieve four goals:**

1. **Containment**

Breaking the chain of transmission and preventing further spread of the infection from those affected.

**Specific activities might include:**

- Isolation of cases, prevention of school attendance by close contacts
- Barrier nursing, sanitary treatment of excreta, blood contaminated items
- Screening of beds
- Mosquito control on hospital compounds

2. **Protection of susceptibles**

Identification of risk factors and populations in danger of contracting the disease will suggest methods of preventing new foci of infection.

**Specific activities might include:**

- Emergency immunization in the district
- Vector control in the area of exposure of the case
- Closing of food establishments, swimming pools etc
- Enlistment of the community in appropriate preventive activities

3. **Active search for new cases**

This is needed to monitor the development of the outbreak and assess the effectiveness of the measures being implemented. Active search involves

- Wide dissemination of the case definition to all categories of health workers
- Daily or weekly telephone surveillance to all sentinel sites
- Visits to hospitals to examine medical records

4. **Case management.**

This is aimed at ameliorating the effects of the disease and reducing mortality or the incidence of severe outcomes.

**Specific activities might include:**

- Distribution of oral rehydration salts
- Provision of instructions and IV solutions for management of DHF
- Prompt treatment of cases with appropriate antibiotics.
- Treatment with immune globulin or anti-virals.

Monitoring the outbreak

The course of the outbreak should be monitored in terms of new cases and new districts affected. This is facilitated by line-listing of all cases and case mapping with colour coding for suspected and confirmed cases. There should be on-going review of the data with updates to all participants. An epidemic curve should be constructed, and when the incidence falls to endemic levels or when no further cases are detected, the emergency mode should be terminated, data analysed and feedback given to all participants and to the public.

4.3 Approaches to outbreak control

Plans for long term outbreak control should follow immediately before the effects of the recent one are forgotten. An epidemic prevention committee should be established to follow through on the recommended measures most of which cannot be immediately implemented. This committee will be charged with

- Describing the epidemiology of the disease
- Recommending long term measures for its control and prevention
- Formulating detailed budgeted plans for implementing the recommendations.

Reports of those responsible for epidemic investigation and management are important in clarifying the underlying causes of the outbreak. These may be environmental (weather conditions or human activities causing an increase in vectors); socioeconomic (the development of slum conditions with poor sanitary facilities); societal (increase in sexual promiscuity); managerial (a decline in immunization services and increase in the susceptible population).

Interventions are assessed in terms of potential effectiveness, practicability and affordability. Possible control measures are:

- Intensification of vector control programmes
- Surveillance of at risk communities and the provision of health services
- Improved regulations for the inspection and control of food preparation
- Public health education for personal protection
- Community education and participation in sanitation and vector control programmes
- Immunization campaigns and improved routine coverage

For each intervention phased action plans are needed with sources of funds and personnel identified
5.0 Post Disaster Surveillance

Introduction

Disasters may be natural or man made. Although type-related effects vary in nature and magnitude, public health implications are common to all. Natural disasters are most commonly experienced in the Caribbean and include hurricanes, tropical storms, floods, earthquakes and volcanic eruptions. Although strides have been made by CAREC Member Countries as regards immunization advances against communicable diseases (especially those covered by the EPI), sizeable population groups that are susceptible to these diseases may still exist. In addition, there are communicable diseases which are not immunizable and for which a disruption in public utilities and changes in environmental conditions favour spread. The risk is further compounded by factors related to relocation of populations at emergency evacuation centres.

The potential for spread of communicable disease is therefore increased in post disaster situations and an intensified surveillance system is essential to the implementation of prevention and control measures. To cover certain diseases, this system should extend beyond the immediate post disaster period.

Throughout the surveillance process, it is important to note that a pathogen or communicable disease non-existent in a country before a disaster, will not appear or occur in that country unless introduced by importation.

5.1 Epidemiologic review of pre-disaster status

Usually the risk of a communicable disease in a community affected by a disaster is proportional to the endemic level of that disease. The accuracy and representativeness of this information depends upon the quality of reporting within the routine surveillance system in operation during pre-disaster and inter-disaster periods. This pre-existing surveillance data provide some measure of baseline information useful in post-disaster surveillance activities. Care should be exercised however in applying data reported from the national level to data collected from a local geographic area affected by a disaster. Data used for comparisons should be that collected from the local level such as county, parish, or district, and even in such cases caution must be applied because of variables peculiar to disease reporting during post-disaster surveillance.

In any pre-disaster status review, there are a number of key areas which must be visited. The purpose is to identify, document, disseminate, test and modify where necessary, the various elements of existing disaster preparedness plans. In undertaking such a review, it cannot be over-emphasized that all plans must be based on the assumption of interruption of normal communications, transportation and other systems, isolation of personnel etc. Contingencies to cater for these must be addressed as far as possible during planning in pre-disaster periods.
The establishment of clearly defined relationships and links between the health sector and the National Co-ordinating Agency for Disaster preparedness is of importance, since many activities which relate to public health action in disaster situations require the support and assistance of other sectors, both governmental as well as non-governmental. This close co-ordination is essential to the implementation of many activities which impact upon the effectiveness of public health action and also serves in maximizing resources. A country’s capability for disaster response is to a large extent a function of its state of disaster preparedness.

Public Health action cannot be undertaken in isolation and a review of pre-disaster status should include the following activities:

- Review of the National Disaster Preparedness Plan and the Health Sector Plan in relation to it.

- Detail review, and updating where indicated, of the Health Sector Plan including lines of communication and command.

- Circulation to all relevant personnel, taking steps to ensure that all members of the health team are familiar with the plan, including their role and the need for flexibility to cater for contingencies.

- Simulation exercises should be conducted to test the plan and better prepare personnel to function under emergency conditions.

With specific reference to guiding and evaluating Public Health action, baseline data covering a number of areas are of special importance. Included among these are:

- Pre-disaster status of endemic communicable disease. This is based on data collected from routine surveillance reporting, and refers not only to levels of disease but also to their geographical distribution. This data should be recorded graphically both in the form of charts as well as spot maps.

- Location and capability of health care facilities.

- List of key personnel in the health sector with responsibility for co-ordinating various services such as medical and nursing care, drugs and other medical supplies, laboratory services, dietary services, ambulance and other transport services etc.

- List of key personnel designated by other Ministries/Services e.g. with responsibility for public utilities and other essential services.

- List and contact mechanisms for obtaining assistance from NGOs including local private sector resources.
• List of identified potential evacuation centres to mobilize provision of staff and equipment as may be necessary, at short notice. Alternatives must always be a consideration since some designated centres may themselves be affected by the disaster.
• Immunization levels and other special factors affecting susceptibility of the population or special community groups should be identified and addressed as part of ongoing public health programmes.

As a general rule the capability for disaster response by the health sector is dependent upon the quantum and quality of services which existed before the event.

Continual review and strengthening of identified weaknesses, particularly in the public health sector, will help to increase the effectiveness of response in the event of disasters occurring. Additionally, the value of training gained through periodic workshops and planned simulation exercises can be augmented by practical application to “mini-disaster” situations encountered from time to time.

5.2 Assessment of damage and subsequent disease potential

Damage caused by disasters vary both in nature and degree depending on the type, severity and duration of the disaster. Among the resulting effects are: loss of or damage to human or animal lives; disruption of routine community services; destruction of or damage to physical infrastructure including both public and private property; disruption of normal activities with its attendant social and economic effects; and spread of communicable disease.

Damage assessment should not await the receipt of detailed reports on individual localities. An initial rapid assessment should provide an overview of the general situation upon which early action can be initiated. As far as possible the information should be graphically displayed on maps and updated as new information is received. Visual displays should reflect information on the extent of the disaster e.g. areas flooded; current status of damaged area e.g. no longer flooded or extent of present flooding; current status of water supplies – inoperative, supply restored but not treated, fully operational etc. Critical information also includes the status of main sewerage systems; location of evacuation centres in emergency use and the access status in terms of passable/impassable roads.

At local levels, a rapid assessment of the extent of damage should place special emphasis on:

• Communications
• Roads including state of bridges
• Telephone links
• Health facilities
• Areas flooded
• Water supply systems
Post Disaster Surveillance

- Sewerage systems
- Solid Waste disposal systems

Epidemiologic factors which influence the potential risk of communicable disease transmission after a disaster include:

- Changes in pre-existent levels of disease
- Ecological changes resulting from the disaster
- Population displacement
- Changes in population density
- Disruption of public utilities
- Interruption of basic public health services.

Most prominent are the influences on the modes of transmission of communicable diseases. For example:

- Crowding in evacuation centres can increase the transmission of diseases caused by person-to-person spread.

- Tropical depressions and hurricanes can create floods, thereby increasing the water-contact for the affected population. If environmental conditions are suitable for leptospiroa survival in water, a leptospirosis epidemic might follow.

- Flooding can damage water treatment and pumping stations, distribution mains, so that public water systems are disrupted. Using contaminated water supplies or alternatively untreated unprotected sources such as rivers when the public water system fails, increases the risk of gastroenteritis and other water borne diseases.

- Stagnant water, following floods, provides suitable breeding places for several vector-mosquitoes. This can have a multiplier effect resulting for example in a dengue epidemic six weeks or so later.

Practical experiences in the Caribbean and elsewhere show that the influence on modes of transmission is the most important way in which disasters can change the epidemiology of communicable diseases. There are however, other factors which can influence the post-disaster potential of communicable disease epidemics, to which reference has already been made above in summary form. Some illustrative examples follow:

- The pre-existent level of disease is based on information obtained through a reporting system (public health surveillance) and it cannot necessarily be assumed that diseases do not persist in remote communities or in populations because they have never been reported. Reporting itself may be of poor quality, or disease conditions may not have been diagnosed because of lack of access to public health diagnostic laboratories. An unidentified human reservoir can thus unknowingly be the potential source of an outbreak of an infectious disease in an evacuation centre setting.
Post Disaster Surveillance

- An infectious disease agent may be brought into an affected area by relief workers.
- Vectors and agents of communicable disease can be introduced by transport vehicles or in relief supplies.
- Communities with a high level of susceptibles, e.g. individuals from dispersed communities who are less likely to have received routine childhood immunization, being relocated to areas of high exposure risk.
- Breakdown in acceptable standards of sanitation and personal hygiene because of deficiencies in water supply, waste disposal etc. facilitating spread of diseases associated with these risk factors.
- Inadequacies in refrigeration facilities, together with bulk storage, preparation and handling of food can provide the potential for outbreaks of foodborne illnesses.

5.3 Identification of surveillance needs and resources

Disease surveillance essentially concerns gathering information that is critical for rationally planning, operating and evaluating public health activities. In disaster situations data collected also assist in determining the order of health relief activities. Because of the flood of relief supplies and volunteer personnel, well intentioned but not always in response to requests based on needs, coordination of efforts, especially in the immediate post disaster period, is of paramount importance. National disaster management authorities should be included in these efforts, but the responsibility for coordinating health activities should always be that of the Health Ministry or the principal health provider of normal times. Mention is made of this as some confusion and duplication of efforts can occur, especially when external assistance is obtained and a tendency to separate routine and emergency surveillance inadvertently occurs. The fundamental objective should be to better use those health surveillance systems and resources already available in the affected country with minimum essential modification.

A basic need therefore is to assign specific responsibility for coordination of surveillance activities to a suitable person from the health sector. This will include reporting to the coordinator with overall responsibility for health related activities.

While surveillance of those relocated to relief centres have a high priority because of the potential for disease spread among captive populations in close contact, active efforts must be made to ensure: (a) that vigilance include populations in affected areas who have not been relocated, and (b) that lapses do not occur in routine national surveillance of populations in non-affected areas. It is important to maintain baseline data on disease occurrence as non-disaster related outbreaks may be occurring elsewhere. In addition, persons from affected areas who may have acquired an infection e.g. a water-borne disease, may have migrated on their own to other areas of shelter providing reservoirs for further spread.
Surveillance is not an end in itself, but a means of obtaining data for optimizing appropriate public health action. Information other than disease occurrence is therefore pertinent to follow up action, especially in disaster situations.

While special needs may be peculiar to certain types of disasters, both in terms of surveillance activities and public health action, there are common basic areas which must be addressed:

- The existence of a health sector plan for disaster preparedness is assumed. This should be reviewed and updated annually and should address any deficiencies identified in the event that it had been activated in the interim, either during simulation exercises or in an actual disaster situation.

- The designation of a coordinator for surveillance activities with established lines of communication and command.

- Provisions to allow ready access to baseline and other data including the use of reference maps. (see 5.1)

- Clear guidelines of what to report and how. This should include the handling of reports received from non-traditional sources.

- Guidelines and resources for the appropriate analysis of the collected surveillance data.

- Mechanisms for feeding field information to the command centre with provisions to cater for breakdown in normal communication systems. Appropriate feedback provisions.

- Backup laboratory services, the use of which should be rationalized.

- Suitable field equipment for monitoring and recording essential surveillance data, as well as for the collection and transport of clinical and environmental specimens.

- Inputs from epidemiologists at both the planning and field operations stages.

- Suitable mechanism for disseminating information and advice to the public.

For ease of reference a checklist of essential needs and resources should be compiled and kept updated, using practical experiences as one source of input. Such ready reference would provide a useful contribution to the state of disaster preparedness.

### 5.4 Plan of action for surveillance response

Implementation of an immediately effective Post-disaster Surveillance System can be facilitated by resources drawn from an already established National system providing
total coverage of a country, as well as maintaining surveillance data on local areas such
as a region, parish, or county. Such a system will also have a cadre of personnel with
training in procedures for collection, collation, analysis and dissemination of data.
However, useful as these resources may be, traditional forms of national surveillance
systems may not be effectively transposed to an affected area during the immediate post-
disaster period.

Considerations which need to be addressed in the establishment of post-disaster
surveillance:

a) Establishing a Post-disaster surveillance centre

The location of the centre will depend upon:

- Extent of the disaster, local or nationwide.
- Pre-disaster organization of the health services e.g. administered through regional,
  parish, or county administrations.
- Communication facilities with special emphasis on telephone or radio links with
  national co-ordinating agency and field reporting units. Computer links could be
  especially helpful, where these exist and are not interrupted by the disaster itself. It
  is important to maintain rapid two-way flow of information between peripheral and
  the central level, at which critical and urgent decisions will have to be made from
time to time.

b) Reporting system

Reporting is a key element of surveillance, and emphasis should be placed on the
sensitivity of the system to be able to detect minor changes in disease occurrence so that
analysis and appropriate action can be taken immediately. This usually necessitates
limiting the number of diseases under surveillance, becoming more flexible in regard to
diagnostic criteria in laboratory work, and relying on the reporting of symptom
complexes (syndrome reporting).

Daily information is required on the number of persons residing in an evacuation centre
or seeking attention at a health facility, who present the following:

- Fever
- Fever with cough
- Fever with diarrhoea
- Fever with rash
- Vomiting and/or diarrhoea

Specific diagnosis will be made by epidemiologic investigation if this is indicated by
unusual reports of any of these symptom complexes to detect any epidemic at an early
stage.
Depending on the epidemiological situation, this general monitoring can also be extended to include data collection for specific communicable diseases. In such an extension of reporting there must be sound and practical criteria for diagnosis, in order to reduce mistaken diagnoses and allow comparison between reporting units.

Use of case definitions and symptom complexes must be standardized throughout the surveillance period. (see examples of post-disaster surveillance forms which follow).

Timeliness of reporting is important. Since the situation is changing daily, daily reporting is necessary. Collection of reporting forms should be organized on a daily basis. If daily collection is not possible, the information should be relayed by other means e.g by telephone, radio, etc. A firm deadline should be established by the epidemiology unit for the receipt of reports before the daily and weekly tabulations are compiled.

Completeness of data may not be necessary nor feasible in disaster situations. What is required is data that can be interpreted as an overall indicator on which appropriate and effective public health interventions can be based. The importance of negative reporting should be stressed.

It is also important that information, reports and “rumours” arising from non-organized channels should not be ignored. Action should be taken to verify the source and reliability of the information to confirm veracity and institute necessary measures where indicated.

Monitoring activities should extend beyond disease occurrence to include other conditions which have public health implications e.g. information on the status of water supplies. Where disrupted treatment systems have been restored testing for free and residual levels of chlorine should be done, and if access to laboratory facilities is available bacteriological testing should be carried out as well.

Since the lead time between an acute disaster and secondary epidemics of communicable disease can be weeks or months, surveillance should take into consideration all the epidemiological factors associated with the disaster.

c) Feedback

Data from investigations exercises should be analyzed and the findings should be published in an official daily or weekly report. It should also contain tables and charts from the daily reports.

Conclusions on detection or absence of epidemics, control measures taken, and advice to the public should be included and clearly understandable for all readers.

The circulation should be wide – reporting sources, Ministry of Health officials, officials of other collaborating Ministries, Government officials in charge of Disaster Relief, health care providers and the media.
Suitable information should also be provided to other Governments, N.G.O.’s such as the Red Cross and International Agencies such as PAHO, as may be deemed appropriate.

Besides an official bulletin, a daily consultation should be held between the national epidemiologist and the official in charge of health services and the information exchanged reported daily as a brief summary to the overall disaster relief coordinator.

**In Summary:**

A post-disaster surveillance system is an essential element of communicable disease control following natural disasters.

Its purpose is to collect daily information on a number of indicators, and to draw conclusions as regards the pattern of communicable diseases in the community or affected parts of the community.

Risk factors are identified and measures for disease prevention and control of transmission are implemented.

A special sense of urgency permeates the system because of the peculiarity of a disaster situation.

All information collected has to result in decisions to investigate or not. Based on collected information and results of investigations, appropriate measures can be taken by authorities in charge of disaster relief.

Co-ordination between various government agencies is essential and will be enhanced by pre-disaster planning, including simulation exercises.
**POST-DISASTER SURVEILLANCE (Part 1)**

Daily Report by ____________________________ For ____________________________

Name of Reporter Date

From:  
- ☐ Evacuation Centre
- ☐ Hospital OPD
- ☐ Health Centre
- ☐ Clinic
- ☐ Other

Specify: ____________________________ Phone No.

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<th>TOTAL</th>
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<tr>
<td>Fever and Cough</td>
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<td>Fever and Diarrhoea</td>
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<td>Fever and Rash</td>
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<td>Other new medical problems</td>
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<td>Specify</td>
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**COMMENTS:**

COMPLETE FOR EVACUATION CENTRES ONLY

No. of persons accommodated today ____________________________

Report significant changes in Sanitation/Food Supply Situation

**NOTE:** Please complete and send report each day

(Complete Part 2 of the form for first report only)
POST-DISASTER SURVEILLANCE (Part 2)

EVACUATION CENTRE — BASELINE SANITATION ASSESSMENT

TO BE COMPLETED ON FIRST REPORT ONLY

No of persons accommodated _______________

0 — 4 yrs  _______
5 — 14 yrs  _______
15 yrs & over  _______

GENERAL CONDITION AND ADEQUACY OF BUILDING:

WATER SUPPLY:

SEWAGE DISPOSAL:

SOLID WASTE DISPOSAL:

HAND WASHING:

BATHING:

CLOTHES WASHING:

FOOD STORAGE / PREPARATION / SERVING DISH / PAN WASHING FACILITIES:

FOOD SUPPLY:
## REPRESENTATIVE FORM FOR WEEKLY SUMMARY OF CENTRAL EPIDEMIOLOGICAL SURVEILLANCE

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<th>Fever and Diarrhoea</th>
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<th>Fever and Rash</th>
<th>Other New Medical Problems Specify .....</th>
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**COMMENTS**

Weekly Report by ____________________________  
*Name of Reporter*

For ____________________________

Date ____________________________

Locating Address ____________________________

Phone No. ____________________________
5.5 Monitoring mechanisms in relation to disasters

Natural disasters are those most commonly experienced in the Caribbean. Monitoring mechanisms in relation to disasters may be reviewed in three different phases – before, during and after a disaster.

Some disasters are not predictable. Explosions, fires and major accidents occur without warning. In some cases, such as in those related to meterological, seismic and topographical factors, monitoring activities may provide some measure of early warning of impending or high risk potential for a disaster. Early warnings however, are not predictions, even when a threat such as that of a hurricane or volcanic eruption seems imminent, limited accuracy can be attributed to forecasts of time, geographical location, gravity, or duration of the expected disaster and its effects.

The value of having monitoring activities in operation during non-disaster periods is mainly to augment the state of pre-disaster preparedness and facilitate early mobilization of resources required for implementation of the disaster plan.

During a disaster, the scope of activities is limited by factors associated with the disaster itself. Field action is mainly ad hoc, and is largely oriented towards protection and rescue measures as may be indicated and feasible. Activities also include monitoring the course of events and compiling information which will be of value in making decisions on priorities of action, including responding to health needs in the immediate and post-disaster period.

In the immediate and subsequent post-disaster period it is essential to obtain early and as accurate as possible information on the situation in the disaster area. Such information would include:

- The geographical area/s and population/s affected by the disaster
- The extent and nature of damage
- Status of environmental infrastructure which impact on public health
- Number and severity of casualties
- Displaced persons for whom alternative accommodation would be needed
- Status of roads and communication systems.

Among the mechanisms for obtaining relevant information are:

- Communication with the Medical Officer with responsibility for the Region, Parish, or County affected
- Liaison with the National Agency for disaster preparedness and the health co-ordinator of this agency
- By aerial observation
- By the activation of reporting systems according to pre-arranged schedules
- By reports from surveys
- By epidemiological surveillance activities already outlined, in respect of monitoring the status of communicable disease.
- media sources.
- reports from the population/s affected by the disaster.

## 5.6 Diseases prevalent in the past

Following disasters, changes may be seen in the pattern of diseases prevalent in the past. Some of these patterns may represent true changes in disease prevalence while in some cases the changes in pattern may be a reflection of better case finding and reporting. There are classically four main categories of communicable diseases potentially associated with disasters. They are:

(a) Water and/or foodborne diseases, e.g. typhoid, salmonellosis, leptospirosis;

(b) Diseases transmitted by person to person spread, either by contact e.g. scabies, or through airborne spread e.g. influenza, tuberculosis;

(c) Vector-borne diseases, e.g. dengue, malaria; and

(d) Wound complications, e.g. tetanus, other bacterial infections.

The diseases given above are only examples of the various categories and do not represent data on actual disease occurrence during past disasters. Immunization against tetanus for example will give ample protection against the disease, and where indigenous malaria has been eliminated, the parasite can only be transmitted if imported, despite the presence of the vector.

In disaster situations, several factors are present which can result in increased prevalence of communicable diseases in the post-disaster period.

Associated with population movement can be the exposure of large group of susceptibles to diseases for which they may become reservoirs following infection.

Contaminated water supplies may result in enteric infections e.g typhoid from which a number of those who recover may become carriers. Diseases transmitted by person to person spread may develop into epidemics in emergency shelter situations. Persons, still in infective stages of diseases, may return to their respective communities where further spread may occur.

Persons suffering from chronic infectious diseases such as tuberculosis or leprosy may lapse into lack of compliance with essential therapy (especially that normally taken under supervision) and may revert to infectious stages of the disease, again resulting in spread which would not have otherwise occurred.

Environmental conditions may favour the increase of vectors, which in the presence of infected hosts, can result in disease spread several weeks or months after the initial stages of the disaster have passed.
On the other hand, surveillance levels which were intensified during the disaster may drop during the ensuing months and lower levels of diseases than really exist may be reported.

In order to have comparable data representative of trends over time, a surveillance system suited to long-term trend analysis must be instituted, and maintained on an ongoing basis.
6.0 Quarantine and Port Health

The basic principles and purpose of Quarantine Services are common to all CAREC Member Countries. Individual countries have their own Quarantine Acts which provide the legal authority for taking definitive action relevant to peculiar situations. In addition, countries are guided by the International Health Regulations (1969). The stated purpose of the International Health Regulations (IHR) is to ensure the maximum security against the international spread of diseases with minimum interference with international trade and travel.

The main purpose of quarantine legislation is to prevent the introduction of communicable diseases into a country through measures applied in respect of both sea going vessels and aircraft arriving in that country. These are particular areas which need special attention and regulations are made under the Act to provide a legal basis for the application of the required measures. Provisions which are usually included in these regulatory measures deal with a number of issues related to quarantine and port health, some of which are covered by the IHR as well as others which do not directly fall under the purview of the IHR.

Quarantine Acts usually provide for the establishment of a Quarantine Authority with powers to undertake whatever measures are necessary for the implementation of regulations made under the Act. Authority may be delegated to various categories of officers appointed under the Act who would be responsible for the day to day activities required at ports of entry. Such duties would include for example, the granting of pratique, the inspection of ships and the issue of deratisation certificates, the examination of health declaration documents and taking of action as may be applicable with respect to passengers or crew who may be ill.

Illness may be due to one of the internationally quarantinable diseases: yellow fever, cholera, or plague for which measures in respect of both the ill person as well as of the vessel or aircraft should be taken in accordance with the requirements of the IHR. The recommended measures set out in the articles of the IHR are based upon epidemiologic considerations such as incubation period, mode of transmission, viability of the causative agent in the environment etc. and are adequate to control the international spread of the diseases subject to the regulations. A recurrent problem however, has been that sanctions in excess of the Regulations are sometimes imposed upon countries listed in the Weekly Epidemiological Report (WER) as being infected, sometimes being extended to an entire country in which only infected areas were reported. This affects prompt reporting of outbreaks of disease occurrence to WHO, and the resulting lack of timely information by member countries can in turn have implications for the international spread of disease.

Provisions in respect of other communicable diseases are usually covered by national legislation.
Revision of the International Health Regulations

The International Health Regulations are being revised in accordance with a resolution adopted by the Forty-eighth World Health Assembly in 1995. (WHA 48.7) The purpose is to develop Regulations which are adapted to the present volume of international traffic and trade, taking into account current trends in the epidemiology of communicable diseases, including increased emergence of new diseases and resurgence of old ones.

The revised IHR will provide a mechanism for immediate notification of all disease epidemics of urgent international importance. Some of the key points of the system are as follows:

- The disease epidemic will be characterized initially by clinical syndrome rather than by specific diagnosis. This will expedite notification.

- An epidemic will be notifiable under the IHR only if both of the following conditions are met:
  
  (a) it corresponds to the case definition of one of the specified syndromes, and
  
  (b) it represents an event of urgent international importance.

- Following notification to WHO, a decision to report the outbreak publicly will be taken on the basis of consultation between WHO and the Member State concerned.

- If further investigation indicates that an epidemic is not of international significance, a statement to this effect will also be published.

- Routine occurrence of endemic diseases will not be notifiable under the revised IHR.

For the purpose of notification to WHO, the following five syndromes are deemed to be of potential international public health importance:

- Acute haemorrhagic fever syndrome
- Acute respiratory syndrome
- Acute gastrointestinal syndrome, including acute diarrhoeal syndrome and acute jaundice syndrome
- Acute neurological syndrome
- Other notifiable syndromes

Suggestions on the use of syndromic reporting are outlined in 1.2.5 for consideration by CAREC member countries. The listing presented includes the syndromes for notification under the revised IHR together with others of public health interest in the Caribbean. Syndromic reporting is not meant to supercede or replace, but rather to augment existing national surveillance systems in the interest of expediting action orientated notification.

There are other areas of activities related to seaports and airports which have health implications for travellers and which are of Port Health concern. Health and sanitation
aspects of international travel are important to disease prevention. These include environmental conditions in and around ports and airports, quality control of food and water supplies and safe waste disposal practices.

Ports should be kept free of the mosquito vector of yellow fever. Ovitrap monitoring should be a routine for all ports, and inspection of inter-island schooners for sources of *Aedes aegypti* breeding and appropriate treatment is important in dealing with the importation of this vector.

To keep the perimeter of an airport free from *Aedes aegypti* and other vectors in their larval and adult stages, it is necessary to maintain active anti-mosquito measures within a protective area extending for a distance of at least 400 metres outside the perimeter.

### 6.1 Travellers’ Health

International air travel which is now taking place on an unprecedented scale gives rise to many medical problems. This factor is aggravated by the speed of air travel whereby persons who may be infected with diseases of a short incubation period arrive in countries great distances away within this incubation period. Unlike sea travel, in which infected persons would have developed illness on board ship allowing measures to be taken to control spread, air travellers may arrive feeling quite well, often reducing the effectiveness of surveillance and other precautions taken at ports of arrival.

On the other hand travellers may arrive in countries in which diseases to which they are susceptible may be endemic. While immunization offers protection against some communicable diseases and chemoprophylaxis may offer protection against others, there are some health hazards which may only be addressed by taking informed precautions. Health problems are further compounded by emerging diseases about which information may be limited, and not always readily available.

Information on measures to be taken by travellers vary in their details as they relate to countries to which travel is intended depending on existing endemic disease patterns, the existence of epidemics which may be occurring at the time of visit, the intended period of stay, any other high risk factors which may exist, and any special requirements or recommendations as advised by the health authorities of the country to be visited.

The following are broad guidelines to which attention should be directed:

**NOTE** – These guidelines presuppose that a system is in place for obtaining, documenting (including graphic representation on global maps), disease status reports on countries around the world. The WHO publication “International Travel and Health” is useful for this purpose and the information provided can be kept current by reference to the WER as well as to information obtained via the electronic media.
• **Vaccination requirements** – a valid yellow fever vaccination certificate should now be the only certificate required in international travel, and then only for a limited number of travellers. However, some countries require a certificate from all entering travellers although there is no epidemiological justification. The vaccine offers a high efficacy of protection. Other vaccines such as those against typhoid fever, rabies, hepatitis B, or tetanus, and the administration of prophylactic immunoglobulins may be considered in individual cases under special circumstances.

• **Chemoprophylaxis** – travellers to countries where malaria is endemic should be provided with chemoprophylaxis. Drug resistance must be taken into account in determining the drug of choice and clear instructions must be given as to the dose, frequency and duration of the regime to be followed. (lapses of drug compliance immediately after leaving malaria infected areas are not uncommon)

• **Environmental hazards** – these vary with factors related to geographical location, ecology, levels of general sanitation, urban/rural areas visited and the types of activities in which the traveller engages. Advice should include information on risks associated with parasitic infections, arthropod and other vector borne diseases (associated for example with rodent and wildlife contact), swimming or wading in fresh water with possible exposure to parasitic infections e.g., schistosomiasis etc., and the appropriate precautions to be taken.

• **Risks from food and drink** – few travellers understand the implications of indiscriminate practices often associated with this aspect of travel. There is a common tendency among travellers, especially in tour situations, to sample indigenous dishes served at roadside outlets often under very unsanitary conditions. Diarrhoea caused by the ingestion of contaminated food and drink is one of the commonest illnesses arising from this practice. Apart from those causing diarrhoea, a wide range of diseases may be acquired by the ingestion of contaminated food and water as a result of infection caused by bacteria, viruses, protozoa and helminths.

The main personal precaution is to consider unpasteurized milk, non-bottled drinks and uncooked food, apart from fruit and vegetables that can be peeled or shelled, as likely to be contaminated and therefore possibly unsafe. Even with cooked food, the traveller should try to ensure as far as possible that it has been thoroughly and freshly cooked, i.e., that it is piping hot when served.

There are other communicable diseases for which the risk of transmission and measures for preventing them are the same whether the individual is travelling abroad or not. The same applies to some of the diseases to which reference is made above.

It would be unrealistic to expect that travellers’ knowledge of the potential hazards associated with travel in certain circumstances would obviate undesirable consequences of such travel. Non-compliance with chemoprophylaxis in the case of malaria risk is one such example. This should not however, negate the value of maintaining liaison with
and providing information to travel agencies, airline representatives, tour operators etc., preferably in circular or newsletter form. Co-operation could be enlisted in obtaining advance information on planned tours or other group travel, on the basis of which recommended precautions could be made available for the information of prospective travellers. While no blueprint would suit every country or situation, nor can the expected returns be assessed, this approach should not be dismissed without some attempt being made to reduce the effects of those health hazards which are avoidable.

6.2 Importation of Communicable Diseases

The importation of a communicable disease into a country, including the mechanism through which importation occurs, is affected by several factors and the effect of disease importation can vary in terms of eventual outcome.

Human travel is by far the most common, but by no means the only route, by which communicable diseases can be imported into a country. Factors to be considered include:

- Diseases endemic in the country/areas of the country visited;
- The presence of any epidemic present during the period of visit;
- The exposure risk attributable to the activities of the traveller;
- The susceptibility or vaccine protected status in the case of diseases preventable by immunization;
- Chemoprophylactic protection where applicable;
- Protection against vectors as may be practicable; and
- The extent to which other appropriate precautions are observed, for example with respect to food and drink in relation to diseases such as cholera and other foodborne illnesses.

In short, the development of disease in the traveller is dependent upon the interaction of the Agent–Host–Environment triad.

Persons returning home from travel abroad, whether these be from short vacation trips or following extended stay in other countries constitute one potential source of disease importation. This potential also extends to other travellers arriving in a country on vacation, on business, on job contracts, for special occasions such as international or regional events, or as migrants.

When a communicable disease is imported by means of a person entering into a country, one of several situations may arise. The disease may be self limited with no secondary transmission occurring e.g., as may happen in the case of one of the foodborne illnesses. In a situation in which vector transmission is involved, e.g., in the case of dengue or malaria, one of two outcomes may follow depending on the presence or absence of the arthropod vector. Where an intermediate host is required, e.g., in the case of schistosomiasis, the disease may be imported but the causative parasite cannot persist in a country in which the appropriate snail host is absent. On the other hand, where
conditions are favourable to spread, importation of a disease such as cholera can lead to a widespread epidemic in the absence of early detection and control.

Mention should be made of another category of travellers whose operations in the Caribbean pose special problems in relation to the importation of communicable diseases. This category of travellers refers to those involved in the “suitcase” and other illegal trades, the latter entering through illegal ports of entry. Apart from illicit drugs, animals and birds are also brought into a country and monkey reservoirs of the yellow fever virus and psittacine birds can be sources of infection which can enter a country undetected by this route.

Other mechanisms of importation of disease agents can be through cargo infected by organisms which can survive under environmental conditions associated with shipping. These could include items intended for human consumption. Rodents and other vectors can also be sources of infection related to this route of disease importation.

Areas of activities related to the importation of communicable disease to which attention should be directed include those of information, environmental control, and most importantly surveillance.

The importance of obtaining data from patients on recent travel history cannot be overemphasised. The potential exists for the importation of diseases such as ebola, Arenaviral haemorrhagic ferver or Arthropod borne encephalitides, the management of which may prove a challenge to national health system.

It is therefore essential to formulate a plan of action for the detection, reporting and investigation of such cases. Where feasible, active surveillance of selected groups may be undertaken, prior to the development of symptomatic disease, in order to detect rapidly infection with an exotic agent.

(Such active surveillance has resulted in the detection of wild poliovirus in the stools of children arriving from a country in which an epidemic was occurring.)

It is important for current information to be maintained on the occurrence and distribution of diseases in countries around the world. This is of value in providing advice as to recommended measures such as vaccination, chemoprophylaxis and other precautions as they relate to any special risks which may be identified. It is also useful in providing information for surveillance purposes in respect of passengers arriving from affected countries. Such information will help to maximize the use of laboratory resources in cases of syndromic reporting and facilitate more timely interventions to control spread. Appropriate information and advice could be disseminated to targeted groups such as travel agencies, airlines, tour operators etc., for the guidance of intended travellers. Relevant information should be routinely available at all ports of entry.

Environmental measures at all ports should include the routine use of ovitrap monitoring as part of vector control activities. In areas of high vector density, it may be advisable to carry out cyclical residual spraying of all port buildings. Adequate rodent control measures should be in place. There should be close supervision of all waste and sewage disposal activities.
Surveillance of incoming passengers begins on arrival at the port of entry. Close cooperation between the health, immigration and customs divisions is necessary.

Health declaration information should provide the basis for guiding appropriate action in respect of any ill persons on board.

Quarantine stations as such are not necessary since most infectious diseases can be cared for at hospitals as long as appropriate isolation measures are applied where indicated. What is required is a contingency plan should an occasion arise when quarantine measures become necessary.

Availability of a health presence should be maintained at all ports of entry whether it deals with passengers individually or on referral from another port agency such as immigration. The use of the traditional health desk to which all passengers reported on arrival have been discontinued at most international airports. Their surveillance value should be re-assessed by individual countries in which they still exist.

There are two surveillance aids which may be explored. One is the use of ‘Health Alert’ cards and the other is information provided by the traveller on countries in which time was spent.

The Health Alert card advises the traveller of the possibility of having acquired a disease which is not usually present in his/her country of residence. In the case of illness occurring within a recommended time frame, the traveller is advised to present the card to his physician to whom a history of travel is given. The card provides the physician with guidelines for reporting, should this be indicated.

Countries visited (for example during the 6-week period prior to arrival) could be listed in a space provided for this purpose on the immigration landing card. Selective surveillance could be based on this information.

However, since the value of these two aids depends upon compliance and the accuracy of information provided by the traveller, their effectiveness as surveillance aids will need to be assessed on the basis of returns.

While some measures may contribute to a reduction in the importation of communicable diseases, total elimination of this problem would be an unrealistic expectation. The strength and effectiveness of a national surveillance system remain a key element in achieving acceptable levels of disease prevention and control.

It is strongly recommended that member countries undertake a review of their existing surveillance systems and initiate steps to accommodate a smooth transition to the new syndromic reporting system to be introduced under the revised International Health Regulations.

Efforts should also be directed towards integrating syndrome reporting into systems operating at national level.
Recommended Manuals for Field Use


References


A Glossary of Epidemiology Terms and Acronyms

A

Aetiology
(The study of) the causes of disease.

Acquired immunity
See immunity.

Antibody
A protein produced in the blood of vertebrates following exposure to an antigen. The antibody binds specifically to the antigen and thus stimulates its inactivation by other parts of the immune system.

Antigen
A protein, typically foreign, that elicits a specific immune response.

Arbovirus
A virus which uses Arthropods as vectors and is transmitted in their saliva to the definitive host. For example, yellow fever. (From Arthropod borne virus.)

C

CAREC: Caribbean Epidemiology Centre

Carrier
An individual who is infected but has no symptoms of disease.

Asymptomatic
Carriage in an individual in whom the infection is inapparent (such as during incubation period or convalescence or infection remains subclinical.

Latent
Carriers in whom infection persists in the host without symptoms and often without demonstrable presence in blood or body tissue.

Chemoprophylaxis
Drug treatment designed to prevent future occurrences of disease. Treatment may be chemotherapeutic for the individual, but chemoprophylactic for the population.

Cohort
A subsection of a population with a common feature.

Birth cohort
All individuals, born in specific time-period in a specific geographic location.
Glossary

Contact
A person or animal that has been in an association with an infected person, animal, or contaminated environmental source that might provide an opportunity to acquire the infective agent.

CRS: Congenital rubella syndrome.

CSR: CAREC Surveillance Report

Disease
The debilitating effects on a host of infection by an infectious agent.

ELISA: Enzyme Linked ImmunoSorbent Assay.
Technique, using the antigen binding properties of antibodies to detect specific antigens or antibodies. Visualisation is typically made possible by enzyme induced colour formation.

Endemic
A level of infection in a defined population and geographic area such that, wide fluctuations of incidence of infection through time are not observed. The constant presence of a disease or infectious agent within a given geographic area or population group; or, the usual prevalence of a given disease within a defined area or population.

Holoendemic
An infection whose prevalence is fairly uniform throughout a region, country or continent (often used in reference to malaria).

Hyperendemic
An infection where more than one strain of the infecting agent is present at endemic levels (often used in reference to dengue fever).

Hypoendemic
An area with little transmission of infection (often used in reference to malaria).

Epidemic
Cases of infection in a community or region in excess of normal expectancy. Often associated with a rapid increase in the levels of an infection but varies depending on the agent, population host characteristics (e.g., level of immunity), population size, etc. The term epidemic is synonymous with “outbreak”, but is often reserved for situations where the local capacity to cope is exceeded and outside assistance is needed.

Common Source
An epidemic due to exposure of a group of persons to a source of infection that is common to all individuals in the group.
Continuous Source
A common source outbreak in which the period of exposure is extended so that cases develop over more than one incubation period of the disease.

Point Source
A common source outbreak in which the period of exposure is brief and essentially instantaneous so that cases develop within one incubation period of the disease.

Epizootic
An epidemic in an animal host population. (But see Nature, 368, 284, (1994))

These very different viruses all cause the liver disease hepatitis. Hepatitis B and C are blood borne, while Hepatitis A is an enterovirus which is faeco-orally transmitted. Other known hepatitis viruses include Hepatitis D and Hepatitis E.

HI test: Haemagglutination inhibition test
A serological test used to detect antibodies specific to a particular family of viruses which possess the ability to agglutinate red blood cells e.g. measles, rubella and influenza.

HIB: Haemophilus influenzae B.

HIV: Human immunodeficiency virus
The cause of Acquired Immuno Deficiency Syndrome (AIDS).

Host
The animal reservoir where the infectious agent multiplies to cause infection.

HPV: Human papillomavirus
A group of DNA viruses which cause genital warts and genital cancers.

HSV: Herpes simplex virus.
Types one and two, HSV-I and HSV-II, are among the causes of cold sores and genital ulcers.

Immunity
A state in which a host is not susceptible to infection or disease.

Acquired
Immunity conferred after contact with a disease.

Artificial
Immunity after a successful vaccination.

Cellular immunity
Acting via the direct involvement of T cells.
**Humoral immunity**
Involving antibodies and B cells.

**Natural or innate**
Immunity genetically inherited or acquired through maternal antibody.

**Passive**
Immunity acquired through the transfer of maternal or other antibodies. Passive immunization does not induce immunological memory.

**Maternal immunity**
Immunity for a neonate provided by IgG antibody generated by a mother and passed across the placenta to the unborn offspring. This provides short-lived protection (typical half life of 3-6 months).

**Immunosuppression**
A reduction in the capacity of the immune system. Caused by infection (eg HIV), drug treatment, pregnancy and malnutrition among others.

**Immunosuppressed**
Individuals are commonly referred to as immunocompromised.

**Immunization**
Protection of susceptible individuals from infection by the immunogenic material from the infectious agent.

**Active**
Immunization whereby the host produces specific antibodies by inducing an immunological response to an antigen that is an immunogenic component of a specific agent.

**Passive**
Immunization in which concentrated specific antibodies are used therapeutically to abrogate an ongoing infection or to provide short-term protection (of the order of months). Passive immunization does not induce immunological memory.

**Incubation period**
The time interval between infection and the appearance of symptoms of a disease.

**Infection**
The presence of an agent within a host where it may or may not cause disease.

**Infected**
A host who has an infection.

**Infectious period**
The time-period during which an infectious host or vector is able to transmit an infection to any susceptible host or vector they contact. The infectious period may not necessarily be associated with symptoms of the disease.
Intermediate host (see vector)

M
Morbidity
State of ill-health produced by a disease.

Mortality rate
The per capita death rate in a population. The mortality rate is the reciprocal of the population life expectancy.

Multiple infection
An infection in which an individual is infected by agents of more than one species.

N
Notifiable disease
Diseases, usually of an infectious nature, whose occurrence is required by law to be made known to a health officer or local government authority.

O
Outbreak (See epidemic)
Synonymous with “epidemic”, the term outbreak is often preferred locally to avoid the panic and sensationalism associated with the term “epidemic”.

P
PAHO: Pan American Health Organization

Pandemic
An epidemic that is widely distributed geographically.

Parasite
1) Any disease causing organism.
2) An organism exhibiting an obligatory dependence on another organism, its host, which is detrimental to the host.

Pathogen
An infectious agent with disease-causing potential.

Pathogenicity
The degree to which a pathogen debilitates its host.
PCR: Polymerase Chain Reaction
A nucleic acid amplification technique that results in exponential amplification of the target DNA by repeated cycles of denaturation, primer annealing and primer extension.

R
Rate
The number of events in a defined population that occur during a specified time-period.

\[
\frac{n}{N} \times 10^x
\]

\(n\) = the number of events and \(N\) = the average population, during the specified time-period; \(x\) is the power of 10 used to multiply the fraction.

Incidence
The rate at which new cases of infection arise in a population.

Attack Rate
The incidence rate for a particular group observed for a limited time-period, usually during the period of an epidemic.

Attack Rate Ratio (ARR)
The comparison of attack rates between 2-groups with different exposures, usually an exposed and an unexposed group.

Prevalence
The proportion of the host population infected (or exhibiting some marker of past or present infection) at a particular point in time.

Recrudescence
Reappearance of disease in a host whose infection has been quiescent.

Resistance
1) The reduction, due to genetic selection, of susceptibility of an infectious agent or its vector to chemotherapy.
2) The ability of a host to resist a pathogen.

S
Sensitivity
The ability of a test to give a positive finding when the person tested truly has the disease. It is expressed as a percentage:

\[
\frac{\text{persons with the disease detected by screening test}}{\text{total number of persons tested with the disease}} \times 100
\]

It may seem that sensitivity alone is all one would demand of a test. It if can correctly identify all those with the disease surely that is sufficient. However, it is necessary that it include as positives only those with the disease. From this restraint stems the concept of specificity.
Specificity is the ability of the test to give a negative finding when the persons tested are free of the disease under study. It is also expressed as a percentage:

\[
\text{Specificity} = \frac{\text{Persons without the disease who are negative}}{\text{total number of persons tested without the disease}} \times 100
\]

Sensitivity and specificity of a screening test can be understood more easily by using an example like glaucoma, a disease in which pressure in the eyeball has increased.

**Serology**

The study of antigen-antibody reactions. More generally, the use of serotype data to infer an individual’s history of infection.

**Seropositive**

An individual whose serotype suggests that they have experienced infection in the past.

**Seroprevalence**

The proportion of a population who are seropositive.

**Serotype**

The range of antibodies which an individual possesses, usually based on sampling from blood serum or saliva. Different strains of a pathogen can sometimes be distinguished by the different antibodies they induce in a host, or with which they can be made to react in vitro; thus the word serotype has also come to be applied to a particular strain.

**Specificity**

The ability of a test to correctly identify as negative, persons who did not have a true infection or disease. More precisely TN/(TN+FP), where TN is the number of true negatives and FP is the number of false positives.

**Subclinical infection**

An infection in which symptoms are sufficiently mild or inapparent to escape diagnosis other than by positive confirmation of the ability to transmit the infection or serologically.

**STD**: Sexually transmitted disease.

**Surveillance of Disease (Public Health Surveillance)**

The on-going and systematic collection, collation, analysis, correlation and interpretation of the data about the occurrence of a disease, and the timely dissemination of the information to those responsible for disease prevention and control, intended to effect appropriate public health action, such as the planning, implementation, and evaluation of public health practice.
**Active**
The required periodic, (often weekly) collection of disease data from reporting sites (physician, hospitals, laboratories) by solicitation.

**Passive**
The routine collection of disease data, based on the expected submission of disease reports by the reporting sites.

**Sentinel**
A sensitive method of obtaining early warning of, or prompt information on, a limited number of diseases through selection of sites which have a high probability of detecting cases and the ability to rapidly and accurately report through designated channels.

**Syndromic disease**
A means of rapidly detecting disease events that may cause significant international public health problems by the reporting of clusters of symptoms that represent potential differential diagnoses, rather than specific disease entities. *Syndromic* notification will be followed by disease-specific information as soon as it becomes available.

**Susceptible**
An individual accessible to or liable to infection by a pathogen.

**Symptom**
A condition of the body reported by an individual when suffering from a disease; here used more loosely to include signs: any evidence used in diagnosis or identification of infected individuals.

**Transmission of infection**
The process by which a pathogen passes from a source of infection to a new host.

**Direct transmission**
Transmission occurring when there is essentially immediate transfer of an infectious agent to a receptive portal of entry.

**Direct contact**
Transmission of infectious material due to direct contact between the source and the host, e.g. kissing, sexual intercourse and vertical transmission.

**Droplet infection**
Transmission of infection due to sneezing or coughing by an infectious source onto the mucous membranes of a host.

**Horizontal transmission**
Transmission occurring generally within a population, but not including vertical transmission.

**Indirect transmission**
Transmission of an agent through an indirect pathway, e.g. transmission occurring via animate or inanimate objects or through the air.
Air-borne
Transmission of infected material as aerosolized particles via a suitable portal of entry, usually the respiratory tract.

Vector-borne
Transmission of the infectious agent to a susceptible host via an intermediate host.

Vehicle-borne
Transmission of an infectious agent to a susceptible host via contaminated materials or objects that serve as an intermediate means of transport. Examples include water, food, milk, blood products, soiled bedding, toys, handkerchiefs, etc.

Secondary transmission
Transmission of infection from a case to a contact.

Vertical transmission
Direct transmission of infection that occurs when a parent conveys the infection to its unborn offspring.

Perinatal infection
Vertical transmission of an infectious agent around the time of birth often due to passage through an infected birth canal.

Transplacental
Transmission of the infectious agent from an infected pregnant woman to her embryo or fetus.

V

Vaccine
A drug used to induce active artificial immunity against a pathogen. Vaccines may be live or dead. Live vaccines are usually attenuated versions of the wild-type pathogen. Typically, live vaccines are given as a single dose to induce a full immunological response, inducing specific memory. Dead vaccines are either killed whole agent, or a highly immunogenic fraction of the agent, as in toxoid vaccines. Killed vaccines and toxoids do not multiply in the host and must usually be administered in multiple doses to induce full immunological response.

Vaccination (see immunization)

Vector
1) The intermediate hosts of parasites with indirect life cycles.
2) Anything which transmits parasites.

Viraemia
The presence of virus in the blood.

Virulence
(1) The case mortality rate of an infection.
(2) The extent to which a pathogen harms its host. These are different usages: what they have in common is that they refer to the effect on an already infected host, not to the degree of transmissibility to a subsequent susceptible.
VZV: Varicella-zoster virus
A herpes virus which causes chickenpox (varicella) and shingles (herpes-zoster).

W
WER: Weekly Epidemiological Record
WHO: World Health Organization

Z
Zoonosis
An infectious agent naturally transmitted between man and other vertebrate species. Swabs should be placed immediately into special transport medium. Slides may be prepared at the same time by rolling a swab over 2 to 3 cm of the slide surface, labeling and air-drying. Vesicle fluid: Using a tuberculin syringe with a 26g needle, aspirate the contents of a fresh vesicle and place into viral transport medium. A cotton swab may then be used to sample the base of the lesion. Lesion exudates: Syphilitic lesions may be sampled on glass slides for microscopic examination. Using
ANNEX

COLLECTION OF CLINICAL SPECIMENS
FOR
MICROBIOLOGICAL EXAMINATION

"We can have the highest-skilled technologists using the most sensitive and sophisticated assays, but we can’t make up for a poor specimen"
Wallace H. Green, Ph.D., ABMM

1. Blood specimens

Have available:
Disposable syringes and needles, 18 - 23 gauge.
Red top vacutainer tubes, Tourniquet, alcohol swab. Sterile gauze pad, Band Aid
Safety box for disposal of used syringes and needles

Procedure:
Apply tourniquet 4-5 inches above elbow. Select venipuncture site, sterilize selected area of skin
with alcohol swab and allow to dry. Insert needle and withdraw 5 to 10 ml of blood, release
the tourniquet, remove needle, and apply pressure with the sterile gauze pad. Place blood in a
vacutainer tube and place syringe and needle in the disposal box without recapping the needle.
Cover the puncture site with a band aid. Label the tube with patient name, specimen and date of
collection and place at the appropriate temperature.

Eye swabs (conjunctival swabs)

Have available sterile cotton or calcium alginate swabs, vial if sterile broth, vial of
transport medium, microscope slides.
Moisten a swab with sterile broth and rub firmly over the inferior tarsal conjunctiva and
fornix of the infected eye. Place in transport medium An additional swab for microscopy
is taken. This is rolled over the surface of the slide. Label both tube and slide with
patient name, exact site of specimen and date.
Throat swabs

Have available Dacron, calcium alginate (bacteriology) or cotton swabs and transport medium. Using a tongue depressor, carefully but firmly rub the swab on both tonsillar fosae and on the posterior pharynx. Withdraw without touching any other area of the buccal cavity and place in transport medium.

Nasal swabs

Have available sterile cotton swabs and appropriate transport medium. Insert the swab at least 1cm into the nares. Firmly rotate it against the membrane, leave in place for 10 to 15 seconds then withdraw and insert into the transport container.

Nasopharyngeal swabs

Have available nasopharyngeal swabs and transport medium. Remove excess secretions from the anterior nares. Gently pass the swab through the nose and into the nasopharynx. Rotate the swab on the nasopharyngeal membrane and allow it to remain in place for 10 to 15 seconds. Carefully remove and place in transport medium. Alternatively, bend the wire at an angle, insert into the throat, then move upward into the nasopharyngeal space. Remove without touching any area of the buccal cavity.
Nasopharyngeal washings

Have available a one-ounce rubber suction bulb or a 10ml syringe fitted with a small piece of plastic tubing; a sterile screw-capped container, and phosphate buffered saline or viral transport medium.

Fill the bulb or syringe with 3 to 5ml fluid. Tilt the patient’s head back at a 70° angle and introduce tube into the nasopharynx. Squeeze and release bulb once. Place aspirated fluid into the sterile tube, label and send immediately to the laboratory.

7. Stool specimens

Stool specimens should not be collected from the water in a toilet, nor should they be contaminated by urine.

The patient should be instructed to use a sterile dry bedpan, large waxed cardboard or plastic cup, plastic wrap or waxed paper. 10 - 20 gm should be removed with a spoon or spatula and placed in a screw-capped stool container for transport to the laboratory. Label the container with patient name, specimen, date and time of collection.
Genital specimens

**Cervical or endocervical swabs:** Collect using a cervical speculum moistened with warm water. First remove mucous from the cervix, compress with the blades of the speculum and collect the discharge with non-toxic cotton or calcium alginate swabs.

**Urethral exudate:** Express exudate and collect on a swab, or insert a urethrogenital swab 2cm into the urethra, rotate gently and remove. Swabs should be placed immediately into special transport medium.

Slides may be prepared at the same time by rolling a swab over 2 to 3 cm of the slide surface, labeling and air-drying.

**Vesicle fluid:** Using a tuberculin syringe with a 26g needle, aspirate the contents of a fresh vesicle and place into viral transport medium. A cotton swab may then be used to sample the base of the lesion.

**Lesion exudates:** Syphilitic lesions may be sampled on glass slides for microscopic examination. Using dry gauze carefully abrade the lesion until serous fluid appears. Do not cause bleeding. Place a drop of fluid on a slide and send immediately to the laboratory.

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**Urine**

Have available a sterile screw-capped container and materials for washing. A mid-stream urine specimen represents the bladder flora. Care should be taken to instruct the patient on the importance of thorough external cleaning to avoid contamination of the specimen.

The external vaginal area and the glans of the penis must be washed with soap and water. A small amount of urine should be passed into the toilet and then enough caught into the container to half fill it. The container is capped and labeled and either refrigerated or sent to the laboratory within 30 minutes.
Director’s Foreword

As the countries of the Caribbean enter the 21st Century, they face a myriad of complex health and developmental challenges. Environmental, demographic, behavioural and socio-economic factors interact to create a health situation in which chronic non-communicable diseases and injuries are the main contributors to overall mortality. At the same time, even as we celebrate the elimination of poliomyelitis and measles and work assiduously to add rubella to that list of diseases past, new and re-emerging infectious diseases such as Acquired Immunodeficiency Syndrome (AIDS) have surfaced, with considerable human and inordinate economic impact. One consequence of the AIDS epidemic is that mortality from communicable diseases has been rising since the early 1990s.

The collective response of the Caribbean region to improve the health of its peoples is embodied in the Caribbean Cooperation in Health (CCH) for which health promotion is the agreed strategy. While CAREC contributes to the CCH objectives in several of the priority areas, it has been assigned particular responsibility for the coordination of the priority area on the Prevention and Control of Communicable Diseases. In 1997, the national epidemiologists and laboratory directors of the region unanimously expressed the need for a Caribbean Communicable Disease Surveillance Manual and pursuant to this request, the manual was developed by CAREC. It is intended to be one of the foundation pieces in an enhanced Caribbean Surveillance System (CARISURV).

The manual demonstrates the Centre’s commitment to assist countries with public health capacity building by providing appropriate information, tools and procedures for communicable disease surveillance. It integrates a range of information on the investigation and reporting of diseases of public health importance in the Caribbean. Guidelines for the management of outbreaks are included to facilitate their investigation and control. Post disaster surveillance is also included, given the hurricane and volcano prone nature of the Caribbean.

Surveillance works! The use of epidemiologic surveillance to detect problems and to guide and evaluate interventions has been demonstrated many times over and in many different places. I am therefore personally delighted to introduce this manual and do hope that it will be the first in a series of surveillance manuals to help member countries to develop surveillance systems that are truly responsive to the changing health situation. The Centre is committed to train country staff in the application of this manual as a tool for public health action and to support its periodic updating and revision, while making it accessible to member countries on our website, www.carec.org.

In closing, I wish to recognise the work of the authors and editors in CAREC and from our member countries who have made the manual a reality.

C. James Hospedales MB BS, MSc, FFPHM
Director
Preface

The *Caribbean Communicable Disease Public Health Surveillance Manual for Action* has been developed, inter alia, to be a reference document to enhance member countries’ capacity to undertake communicable disease surveillance and outbreak investigations at various levels of the health system; to introduce new concepts and approaches for the conduct of disease surveillance in CAREC member countries; to provide regional standards for communicable disease surveillance in CAREC member countries and serve as a basis from which national standards could be established.

This manual is presented in a loose-leafed, modular format to facilitate periodic updates and use of individual sections. For ease of reference, the diseases have been reviewed in alphabetical order in the Section on *Selected Diseases Under Surveillance* rather than in the usually recognised categories, such as, for example, Diseases of the Expanded Programme on Immunisation. This manual has been specifically developed for a target audience which includes epidemiologists and ALL members of the surveillance team inclusive of physicians, laboratorians, statistical officers, public health nurses, public health inspectors, environmental health officers, hospital infection control nurses and all other interested parties.

While during the preparation of this manual, case definitions were reviewed from a variety of sources including the World Health Organization (WHO), the final configuration takes cognisance of Caribbean realities of laboratory diagnostic capabilities and epidemiologic situations. For example, the case definition for yellow fever contained in this manual is more clinically inclusive than that suggested in the WHO Communicable Disease Surveillance Kit. It was felt that because many yellow fever virus infections are anicteric, viral circulation may be occurring but be missed, if jaundice onset within two weeks of fever was the alert required to elicit a surveillance response. [Refer to Technical Notes contained in Section 3.34.8].

Diagnostic laboratory issues have been framed within the context of known capabilities that exist both at the national level in our member countries and at the regional CAREC level. It further takes cognisance of the fact that while most of CAREC’s laboratories are involved in diagnostic reference work, in the area of virology, its predominant function is primary service.

A limited glossary of relevant terms used in the manual has been provided. The authors would like to emphasise that this document is not an epidemiology manual and therefore cannot be expected to satisfy all of the epidemiologic needs of the public health team.

We do hope that this manual will form the foundation of a strong surveillance platform upon which all of the specialised infectious disease surveillance initiatives to be used in the twenty-first century could be supported.

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To Dr. Roderick Doug-Deen, and Dr. Barbara Hull we owe a special debt of gratitude for agreeing to give birth to this manual and for nurturing its growth into a completed document. We greatly appreciated being able to capture the expertise and extensive knowledge of Dr. Hull as a Virologist and of Dr. Doug-Deen, as a former National Epidemiologist and Chief Medical Officer of one of our member countries.

We wish to graciously acknowledge the sterling contribution of Dr. Clive Brown, PAHO Short Term Consultant Medical Epidemiologist, in providing technical guidance to the framing and developmental processes.

We are extremely grateful to the numerous persons from our member countries, from CAREC and from some extra-regional institutions, who took the time and energy to review the manual and provide us with constructive and critical comments. We wish to acknowledge the input of the support staff of the Epidemiology Division, the technical staff of the Laboratory Division, CAREC’s Information Specialist and support team, without which the final product would not have been possible.
**Table of Contents**

Director’s Foreword

Preface

Acknowledgements

1.0 Public Health Surveillance

1.1 Overview

1.2 Essential Components and Requirements of a General Communicable Disease Surveillance System

1.2.1 Communicable Disease Surveillance System: Organisational Structure

1.2.2 Communicable Disease Surveillance System: Functional Framework

1.2.3 Communicable Disease Surveillance System: Operational Steps

1.2.4 Sentinel Surveillance

1.2.5 Reporting of Disease Syndromes

1.2.6 Requirements of a Specialised Surveillance System

1.3 Essential Attributes of a Surveillance System

2.0 Diseases and Conditions Under Surveillance

2.1 Categories of diseases under surveillance

2.2 Reporting classes of selected diseases

2.3 List of diseases and conditions under surveillance

3.0 Selected Diseases under Surveillance

3.1 Acquired Immunodeficiency Syndrome (AIDS)

3.1.1 Introduction

3.1.2 Adults and Adolescents (aged 13 years and older)

3.1.3 Infants and Children (less than 13 years of age)

3.1.4 Technical Notes
3.2 Brucellosis (in humans) ................................................................. 39
  3.2.1 INTRODUCTION ........................................................................ 39
  3.2.2 CASE DEFINITION ................................................................. 39
  3.2.3 REPORTING AND INVESTIGATIVE PROCEDURES ..................... 40
  3.2.4 BRUCELLOSIS (IN HUMANS) CASE INVESTIGATION FORM ....... 41
  3.2.5 SPECIMEN COLLECTION AND TRANSPORT ............................ 42
  3.2.6 LABORATORY DIAGNOSIS ...................................................... 42
  3.2.7 CONTROL AND PREVENTION ................................................. 42

3.3 Cholera .......................................................... 45
  3.3.1 INTRODUCTION ........................................................................ 45
  3.3.2 CASE DEFINITION ................................................................. 45
  3.3.3 REPORTING AND INVESTIGATIVE PROCEDURES ..................... 46
  3.3.4 CHOLERA CASE INVESTIGATION FORM .................................. 48
  3.3.5 SPECIMEN COLLECTION AND TRANSPORT ............................ 49
  3.3.6 LABORATORY DIAGNOSIS ...................................................... 49
  3.3.7 CONTROL AND PREVENTION ................................................. 49
  3.3.8 TECHNICAL NOTES ............................................................... 50

3.4 Dengue Fever ............................................................. 51
  3.4.1 INTRODUCTION ........................................................................ 51
  3.4.2 CASE DEFINITION ................................................................. 51
  3.4.3 REPORTING AND INVESTIGATIVE PROCEDURES ..................... 52
  3.4.4 DENGUE FEVER CASE INVESTIGATION FORM ......................... 54
  3.4.5 SPECIMEN COLLECTION AND TRANSPORT ............................ 55
  3.4.6 LABORATORY DIAGNOSIS ...................................................... 55
  3.4.7 DENGUE CONTROL AND PREVENTION .................................. 55

3.5 Dengue Haemorrhagic Fever and Dengue Shock Syndrome ........ 57
  3.5.1 INTRODUCTION ........................................................................ 57
  3.5.2 CASE DEFINITION ................................................................. 57
  3.5.3 REPORTING AND INVESTIGATIVE PROCEDURES ..................... 59
  3.5.4 DENGUE HAEMORRHAGIC FEVER/SHOCK SYNDROME CASE INVESTIGATION FORM .................................................. 60
  3.5.5 SPECIMEN COLLECTION AND TRANSPORT ............................ 61
  3.5.6 LABORATORY DIAGNOSIS ...................................................... 61
  3.5.7 PREVENTION AND CONTROL OF DHF/DSS ............................ 61

3.6 Diphtheria .............................................................. 63
  3.6.1 INTRODUCTION ........................................................................ 63
3.6.2 CASE DEFINITION ................................................................. 63
3.6.3 REPORTING AND INVESTIGATIVE PROCEDURES ............... 64
3.6.4 DIPHTHERIA CASE INVESTIGATION FORM ......................... 65
3.6.5 SPECIMEN COLLECTION AND TRANSPORT ....................... 66
3.6.6 LABORATORY DIAGNOSIS .................................................... 66
3.6.7 CONTROL AND PREVENTION ............................................. 66
3.6.8 TECHNICAL NOTES ............................................................. 66

3.6.9 Foodborne Illness (Epidemic) .................................................. 67
3.6.10 INTRODUCTION ................................................................. 67
3.6.11 CASE DEFINITION ............................................................. 67
3.6.12 REPORTING AND INVESTIGATIVE PROCEDURES .............. 68
3.6.13 SUSPECT FOODBORNE ILLNESS CASE HISTORY FORM ....... 70
3.6.14 SPECIMEN COLLECTION AND TRANSPORT ..................... 74
3.6.15 LABORATORY DIAGNOSIS .................................................. 74
3.6.16 CONTROL AND PREVENTION ............................................ 74
3.6.17 TECHNICAL NOTES ........................................................... 74

3.7 Gastroenteritis (Acute Watery Diarrhoea)
(in children less than 5 years) ...................................................... 77
3.7.1 INTRODUCTION ................................................................. 77
3.7.2 CASE DEFINITION ............................................................. 77
3.7.3 REPORTING AND INVESTIGATIVE PROCEDURES .............. 77
3.7.4 GASTROENTERITIS CASE INVESTIGATION FORM ............... 79
3.7.5 SPECIMEN COLLECTION AND TRANSPORT ..................... 80
3.7.6 LABORATORY DIAGNOSIS .................................................. 80
3.7.7 CONTROL AND PREVENTION ............................................ 80
3.7.8 TECHNICAL NOTES ........................................................... 80

3.9 Hantavirus Pulmonary Syndrome .............................................. 83
3.9.1 INTRODUCTION ................................................................. 83
3.9.2 CASE DEFINITION ............................................................. 83
3.9.3 REPORTING AND INVESTIGATIVE PROCEDURES .............. 84
3.9.4 HANTAVIRUS PULMONARY SYNDROME CASE INVESTIGATION FORM ................................................................. 85
3.9.5 SPECIMEN COLLECTION AND TRANSPORT ..................... 86
3.9.6 LABORATORY DIAGNOSIS .................................................. 86
3.9.7 PREVENTION AND CONTROL OF HANTAVIRUS PULMONARY SYNDROME ................................................................. 86
3.9.8 TECHNICAL NOTES ........................................................... 87

3.10 Influenza .................................................................................... 89
3.10.1 INTRODUCTION ................................................................................. 89
3.10.2 CASE DEFINITION ............................................................................. 89
3.10.3 REPORTING AND INVESTIGATIVE PROCEDURES ........................................... 90
3.10.4 INFLUENZA CASE INVESTIGATION FORM ........................................... 91
3.10.5 SPECIMEN COLLECTION AND TRANSPORT ........................................ 92
3.10.6 LABORATORY DIAGNOSIS ............................................................... 92
3.10.7 CONTROL AND PREVENTION OF INFLUENZA ................................. 92

3.11 Legionnaires’ Disease ............................................................................... 95
3.11.1 INTRODUCTION ................................................................................. 95
3.11.2 CASE DEFINITION ............................................................................. 95
3.11.3 REPORTING AND INVESTIGATIVE PROCEDURES ........................................... 95
3.11.4 LEGIONNAIRES’ DISEASE CASE INVESTIGATION FORM ..................... 97
3.11.5 SPECIMEN COLLECTION AND TRANSPORT ........................................ 98
3.11.6 LABORATORY DIAGNOSIS ............................................................... 98
3.11.7 CONTROL AND PREVENTION ........................................................... 98

3.12 Leprosy (Hansen’s Disease) .................................................................. 101
3.12.1 INTRODUCTION ............................................................................... 101
3.12.2 CASE DEFINITION ........................................................................... 102
3.12.3 REPORTING AND INVESTIGATIVE PROCEDURES ........................................... 102
3.12.4 LEPROSY (HANSEN’S DISEASE) CASE INVESTIGATION FORM .......... 103
3.12.5 SPECIMEN COLLECTION AND TRANSPORT ....................................... 104
3.12.6 LABORATORY DIAGNOSIS ............................................................... 104
3.12.7 CONTROL AND PREVENTION ........................................................... 104
3.12.8 TECHNICAL NOTES ......................................................................... 109

3.13 Leptospirosis ............................................................................................ 105
3.13.1 INTRODUCTION ............................................................................... 105
3.13.2 CASE DEFINITION ........................................................................... 105
3.13.3 REPORTING AND INVESTIGATIVE PROCEDURES ........................................... 106
3.13.4 LEPTOSPIROSIS CASE INVESTIGATION FORM ..................................... 107
3.13.5 SPECIMEN COLLECTION AND TRANSPORT ....................................... 108
3.13.6 LABORATORY DIAGNOSIS ............................................................... 108
3.13.7 CONTROL AND PREVENTION ........................................................... 109
3.13.8 TECHNICAL NOTES ......................................................................... 109

3.14 Malaria ....................................................................................................... 111
3.14.1 INTRODUCTION ............................................................................... 111
3.14.2 CASE DEFINITION ........................................................................... 111
3.14.3 REPORTING AND INVESTIGATIVE PROCEDURES ........................................... 112
<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.14.4</td>
<td>Malaria case investigation form</td>
<td>114</td>
</tr>
<tr>
<td>3.14.5</td>
<td>Specimen collection and transport</td>
<td>115</td>
</tr>
<tr>
<td>3.14.6</td>
<td>Laboratory diagnosis</td>
<td>115</td>
</tr>
<tr>
<td>3.14.7</td>
<td>Control and prevention</td>
<td>116</td>
</tr>
<tr>
<td>3.14.8</td>
<td>Technical notes</td>
<td>117</td>
</tr>
<tr>
<td>3.15</td>
<td>Measles</td>
<td>119</td>
</tr>
<tr>
<td>3.15.1</td>
<td>Introduction</td>
<td>119</td>
</tr>
<tr>
<td>3.15.2</td>
<td>Case definition</td>
<td>120</td>
</tr>
<tr>
<td>3.15.3</td>
<td>Reporting and investigative procedures</td>
<td>121</td>
</tr>
<tr>
<td>3.15.4</td>
<td>Flowchart for measles/rubella surveillance</td>
<td>122</td>
</tr>
<tr>
<td>3.15.5</td>
<td>Suspected measles/rubella case investigation form</td>
<td>123</td>
</tr>
<tr>
<td>3.15.6</td>
<td>Specimen collection and transport</td>
<td>124</td>
</tr>
<tr>
<td>3.15.7</td>
<td>Laboratory diagnosis</td>
<td>124</td>
</tr>
<tr>
<td>3.15.8</td>
<td>Technical notes</td>
<td>125</td>
</tr>
<tr>
<td>3.16</td>
<td>Meningitis (due to Haemophilus influenzae)</td>
<td>127</td>
</tr>
<tr>
<td>3.16.1</td>
<td>Introduction</td>
<td>127</td>
</tr>
<tr>
<td>3.16.2</td>
<td>Case definition</td>
<td>127</td>
</tr>
<tr>
<td>3.16.3</td>
<td>Reporting and investigative procedures</td>
<td>128</td>
</tr>
<tr>
<td>3.16.4</td>
<td>Meningitis (due to Haemophilus influenzae)</td>
<td>129</td>
</tr>
<tr>
<td>3.16.5</td>
<td>Specimen collection and transport</td>
<td>130</td>
</tr>
<tr>
<td>3.16.6</td>
<td>Laboratory diagnosis</td>
<td>130</td>
</tr>
<tr>
<td>3.16.7</td>
<td>Control and prevention</td>
<td>130</td>
</tr>
<tr>
<td>3.16.8</td>
<td>Technical notes</td>
<td>130</td>
</tr>
<tr>
<td>3.17</td>
<td>Meningitis/encephalitis (viral)</td>
<td>131</td>
</tr>
<tr>
<td>3.17.1</td>
<td>Introduction</td>
<td>131</td>
</tr>
<tr>
<td>3.17.2</td>
<td>Case definition</td>
<td>131</td>
</tr>
<tr>
<td>3.17.3</td>
<td>Reporting and investigative procedures</td>
<td>132</td>
</tr>
<tr>
<td>3.17.4</td>
<td>Viral meningitis/encephalitis case investigation form</td>
<td>134</td>
</tr>
<tr>
<td>3.17.5</td>
<td>Specimen collection and transport</td>
<td>135</td>
</tr>
<tr>
<td>3.17.6</td>
<td>Laboratory diagnosis</td>
<td>135</td>
</tr>
<tr>
<td>3.17.7</td>
<td>Control and prevention</td>
<td>135</td>
</tr>
<tr>
<td>3.17.8</td>
<td>Technical notes</td>
<td>136</td>
</tr>
<tr>
<td>3.18</td>
<td>Meningococcal infection (due to Neisseria meningitidis)</td>
<td>137</td>
</tr>
<tr>
<td>3.18.1</td>
<td>Introduction</td>
<td>137</td>
</tr>
<tr>
<td>Section</td>
<td>Title</td>
<td>Pages</td>
</tr>
<tr>
<td>---------</td>
<td>-------</td>
<td>-------</td>
</tr>
<tr>
<td>3.18.2</td>
<td>Case Definition</td>
<td>137</td>
</tr>
<tr>
<td>3.18.3</td>
<td>Reporting and Investigative Procedures</td>
<td>138</td>
</tr>
<tr>
<td>3.18.4</td>
<td>Meningococcal Meningitis (due to Neisseria meningitidis) Case Investigation Form</td>
<td>139</td>
</tr>
<tr>
<td>3.18.5</td>
<td>Specimen Collection and Transport</td>
<td>140</td>
</tr>
<tr>
<td>3.18.6</td>
<td>Laboratory Diagnosis</td>
<td>140</td>
</tr>
<tr>
<td>3.18.7</td>
<td>Control and Prevention</td>
<td>140</td>
</tr>
<tr>
<td>3.19</td>
<td>Mumps</td>
<td>143</td>
</tr>
<tr>
<td>3.19.1</td>
<td>Introduction</td>
<td>143</td>
</tr>
<tr>
<td>3.19.2</td>
<td>Case Definition</td>
<td>143</td>
</tr>
<tr>
<td>3.19.3</td>
<td>Reporting and Investigative Procedures</td>
<td>143</td>
</tr>
<tr>
<td>3.19.4</td>
<td>Mumps Case Investigation Form</td>
<td>145</td>
</tr>
<tr>
<td>3.19.5</td>
<td>Specimen Collection and Transport</td>
<td>146</td>
</tr>
<tr>
<td>3.19.6</td>
<td>Laboratory Diagnosis</td>
<td>146</td>
</tr>
<tr>
<td>3.19.7</td>
<td>Control and Prevention</td>
<td>146</td>
</tr>
<tr>
<td>3.20</td>
<td>Pertussis</td>
<td>147</td>
</tr>
<tr>
<td>3.20.1</td>
<td>Introduction</td>
<td>147</td>
</tr>
<tr>
<td>3.20.2</td>
<td>Case Definition</td>
<td>147</td>
</tr>
<tr>
<td>3.20.3</td>
<td>Reporting and Investigative Procedures</td>
<td>148</td>
</tr>
<tr>
<td>3.20.4</td>
<td>Pertussis Case Investigation Form</td>
<td>149</td>
</tr>
<tr>
<td>3.20.5</td>
<td>Specimen Collection and Transport</td>
<td>150</td>
</tr>
<tr>
<td>3.20.6</td>
<td>Laboratory Diagnosis</td>
<td>150</td>
</tr>
<tr>
<td>3.20.7</td>
<td>Control and Prevention</td>
<td>150</td>
</tr>
<tr>
<td>3.21</td>
<td>Plague</td>
<td>151</td>
</tr>
<tr>
<td>3.21.1</td>
<td>Introduction</td>
<td>151</td>
</tr>
<tr>
<td>3.21.2</td>
<td>Case Definition</td>
<td>151</td>
</tr>
<tr>
<td>3.21.3</td>
<td>Reporting and Investigative Procedures</td>
<td>152</td>
</tr>
<tr>
<td>3.21.4</td>
<td>Plague Case Investigation Form</td>
<td>154</td>
</tr>
<tr>
<td>3.21.5</td>
<td>Specimen Collection and Transport</td>
<td>155</td>
</tr>
<tr>
<td>3.21.6</td>
<td>Laboratory Diagnosis</td>
<td>155</td>
</tr>
<tr>
<td>3.21.7</td>
<td>Control and Prevention</td>
<td>155</td>
</tr>
<tr>
<td>3.22</td>
<td>Pneumococcal Infection (Invasive)</td>
<td>157</td>
</tr>
<tr>
<td>3.22.1</td>
<td>Introduction</td>
<td>157</td>
</tr>
<tr>
<td>3.22.2</td>
<td>Case Definition</td>
<td>157</td>
</tr>
<tr>
<td>3.22.3</td>
<td>Reporting and Investigative Procedures</td>
<td>158</td>
</tr>
<tr>
<td>3.22.4</td>
<td>Pneumococcal Infection (Invasive) Case Investigation Form</td>
<td>159</td>
</tr>
</tbody>
</table>
3.22.5 Collection and Transport of Specimen ............................................. 160
3.22.6 Laboratory Diagnosis ......................................................................... 160
3.22.7 Control and Prevention ..................................................................... 160
3.22.8 Technical Notes .................................................................................. 160

3.23 Poliomyelitis ......................................................................................... 161
3.23.1 Introduction ....................................................................................... 161
3.23.2 Case Definition .................................................................................. 161
3.23.3 Reporting and Investigative Procedures ............................................ 162
3.23.4 Poliomyelitis Case Investigation Form .............................................. 164
3.23.5 Specimen Collection and Transport .................................................. 165
3.23.6 Laboratory Diagnosis ........................................................................ 166
3.23.7 Control and Prevention ..................................................................... 166
3.23.8 Performance Indicators of Surveillance Quality ................................. 166

3.24 Rabies ................................................................................................... 169
3.24.1 Introduction ....................................................................................... 169
3.24.2 Case Definition .................................................................................. 169
3.24.3 Reporting and Investigative Procedures ............................................ 170
3.24.4 Rabies Case Investigation Form ....................................................... 172
3.24.5 Specimen Collection and Transport .................................................. 173
3.24.6 Laboratory Diagnosis ........................................................................ 173
3.24.7 Rabies Control and Prevention ........................................................ 173

3.25 Rubella and Congenital Rubella Syndrome .......................................... 175
3.25.1 Introduction ....................................................................................... 175
3.25.2A Case Definition, Rubella ................................................................. 175
3.25.2B Case Definition, Congenital Rubella Syndrome (CRS) ................... 176
3.25.3A Reporting and Investigative Procedures - Rubella ......................... 177
3.25.3B Reporting and Investigative Procedures – CRS ............................... 177
3.25.4A Suspected Measles/Rubella Case Investigation Form ...................... 178
3.25.4B Congenital Rubella Syndrome Case Investigation Form ............... 179
3.25.4C Flowchart for Measles/Rubella Surveillance ................................... 180
3.25.5 Specimen Collection and Transport .................................................. 181
3.25.6 Laboratory Diagnosis ........................................................................ 181
3.25.7 Prevention and Control of Rubella and CRS .................................... 182
3.25.8 Technical Notes .................................................................................. 182

3.26 Salmonellosis ....................................................................................... 183
3.26.1 Introduction ....................................................................................... 183
3.29.7  Tetanus Control and Prevention .......................................................... 209

3.30  Tuberculosis .............................................................................................. 211

3.30.1  Introduction .......................................................................................... 211
3.30.2a  Case Definition (WHO) ................................................................. 212
3.30.2b  Case Definitions for Surveillance Purposes .............................. 214
3.30.3  Reporting and Investigative Procedures ................................. 215
3.30.4  Tuberculosis Case Investigation Form ........................................ 218
3.30.4a  Tuberculosis Case Investigation Form (cont’d) ....................... 219
3.30.5  Specimen Collection and Transport ............................................ 220
3.30.6  Laboratory Diagnosis ................................................................. 220
3.30.7  Control and Prevention ................................................................. 220

3.31  Typhoid Fever .......................................................................................... 231

3.31.1  Introduction ........................................................................................ 231
3.31.2  Case Definition ............................................................................... 231
3.31.3  Reporting and Investigative Procedures ................................. 232
3.31.4a  Typhoid Fever Case Investigation Form .................................. 233
3.31.5  Specimen Collection and Transport ............................................ 235
3.31.6  Laboratory Diagnosis ................................................................. 235
3.31.7  Control and Prevention ................................................................. 235
3.31.8  Technical Notes ......................................................................... 236

3.32  Viral Hepatitis A ..................................................................................... 239

3.32.1  Introduction ........................................................................................ 239
3.32.2  Case Definition ............................................................................... 239
3.32.3  Reporting and Investigative Procedures ................................. 240
3.32.4  Viral Hepatitis Case Investigation Form .................................. 241
3.32.5  Specimen Collection and Transport ............................................ 242
3.32.6  Laboratory Diagnosis ................................................................. 242
3.32.7  Hepatitis A Control and Prevention ......................................... 242

3.33  Viral Hepatitis B ..................................................................................... 243

3.33.1  Introduction ........................................................................................ 243
3.33.2  Case Definition ............................................................................... 243
3.33.3  Reporting and Investigative Procedures ................................. 244
3.33.4  Case Investigation Form ............................................................... 245
3.33.5  Specimen Collection and Transport ............................................ 245
3.33.6  Laboratory Diagnosis ................................................................. 245
3.33.7  Control and Prevention ................................................................. 245
3.34 Yellow Fever

3.34.1 Introduction ........................................................................................................ 247
3.34.2 Case Definition .................................................................................................. 247
3.34.3 Reporting and Investigative Procedures ............................................................. 248
3.34.4 Case Investigation Form ..................................................................................... 249
3.34.4 Yellow Fever Case Investigation Form ............................................................... 250
3.34.5 Specimen Collection and Transport ................................................................... 251
3.34.6 Laboratory Diagnosis ........................................................................................ 251
3.34.7 Yellow Fever Control and Prevention ............................................................... 252
3.34.8 Technical Notes ................................................................................................. 253

4.0 Investigation, Management and Control of Communicable Disease Outbreaks/Epidemics .......................................................................................................................... 255

4.1 Principles of epidemic investigation ....................................................................... 255
4.2 Methodologies of outbreak management ................................................................. 257
4.3 Approaches to outbreak control ............................................................................... 259

5.0 Post Disaster Surveillance ...................................................................................... 261

5.1 Epidemiologic review of pre-disaster status .......................................................... 261
5.2 Assessment of damage and subsequent disease potential ...................................... 263
5.3 Identification of surveillance needs and resources .................................................. 265
5.4 Plan of action for surveillance response .................................................................. 266
5.5 Monitoring mechanisms in relation to disasters ..................................................... 273
5.6 Diseases prevalent in the past ................................................................................ 274

6.0 Quarantine and Port Health .................................................................................... 277

6.1 Travellers’ Health .................................................................................................... 279
6.2 Importation of Communicable Diseases .................................................................. 281

Recommended Manuals for Field Use ...................................................................... 285

References .................................................................................................................... 287

A Glossary of Epidemiology Terms and Acronyms ..................................................... 289

Figure 1 .......................................................................................................................... 3
Figure 2 .......................................................................................................................... 3
Figure 3 .......................................................................................................................... 4
Figure 4 .......................................................................................................................... 4
Figure 5 .......................................................................................................................... 5
Figure 6 .......................................................................................................................... 5
TABLE 1: SYNDROMIC CHARACTERISTICS AND SPECIFIC DISEASES ASSOCIATED .......... 18
TABLE 2: CLINICAL ASPECTS OF SOME FOODBORNE ILLNESSES ................................. 69
APPENDIX 1 KNOWN CAUSES OF REDUCED RESISTANCE
       OTHER THAN HIV DISEASE ........................................................................ 36
APPENDIX 2 DIAGNOSTIC METHODS FOR INDICATOR DISEASES OF AIDS ........... 37