COMMUNICABLE DISEASE TOOLKIT

LIBERIA

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The named authors alone are responsible for the view expressed in this publication.
ACKNOWLEDGEMENTS

This Communicable Disease Toolkit for Liberia was compiled and edited by: Dr Michelle Gayer, Dr Monica Guardo, Dr Katja Schemionek and Dr Máire Connolly of the Programme on Communicable Diseases in Complex Emergencies at WHO/CDS.

The Communicable Disease Profile for Liberia is a collaboration between the Communicable Disease Working Group on Emergencies (CD-WGE) at WHO/HQ, the Division of Communicable Disease Prevention and Control at the WHO Regional Office for Africa and the Office of the WHO Representative for Liberia. The CD-WGE provides technical and operational support on communicable disease issues to WHO regional and country offices, ministries of health, other United Nations agencies, and nongovernmental and international organizations. The Working Group includes the Departments of Control, Prevention and Eradication (CPE), Surveillance and Response (CSR) in Communicable Diseases (CDS), Roll Back Malaria (RBM), Stop TB (STB) and HIV/AIDS (HIV) in HTM; and the Departments of Child and Adolescent Health and Development (CAH), Immunizations, Vaccines and Biologicals (IVB) and Health and Action in Crisis (HAC).

The documents Health Surveillance Forms, Surveillance System Guidelines and Alert Thresholds, Case Definitions and Emergency Phase Surveillance Data Flow were developed in Monrovia in collaboration with WHO-Liberia, Ministry of Health representatives, NGOs and other partners. The documents Guidelines for Outbreak Control, Case Management of Epidemic-Prone Diseases, Guidelines for Collection of Specimens for Laboratory Testing, Outbreak Investigation Kit were developed by CD-WGE at WHO/HQ.

The following people were involved in the development and review of the toolkit and their contribution is gratefully acknowledged:

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We would like thank the Government of Ireland and the Office of Foreign Disaster Assistance (OFDA) of the US Agency for International Development for their support in the development of this document.
PREFACE

The purpose of the *Communicable Disease Toolkit* is to provide health professionals in United Nations agencies, nongovernmental organizations, donor agencies and local authorities working in Liberia with up-to-date guidelines and standards for controlling communicable diseases.

The *Communicable Disease Profile for Liberia* aims to provide up-to-date information on the major communicable disease threats faced by the population. The list of endemic and epidemic diseases has been selected on the basis of the burden of morbidity and mortality and includes acute lower respiratory tract infections, African trypanosomiasis, cholera, bacillary dysentery, HIV/AIDS, lassa fever, malaria, measles, tuberculosis and yellow fever. The *Profile* has been updated to include one additional disease – monkey pox - and an annex on internally displaced persons and refugee populations. Diseases for which there are global eradication or elimination goals are also included. The document outlines the burden of communicable diseases in Liberia for which data are available, provides data on recent outbreaks in the country, and presents disease-specific guidelines on the prevention and control of these diseases.

The *Surveillance Forms* and *Case Definitions* have been developed to provide early warning of epidemics but will also monitor acute lower respiratory tract infections, tuberculosis, sexually transmitted infections, injuries/trauma and malnutrition.

The *Guidelines for Outbreak Control*, *Case Management of Epidemic-Prone Diseases*, *Collection of Specimens for Laboratory Testing*, and *Outbreak Investigation Kit* are aimed at facilitating outbreak preparedness and response.

The control of communicable diseases represents a major challenge to those providing health care services in Liberia and neighbouring countries. It is hoped that the *Communicable Disease Toolkit for Liberia* will facilitate the coordination of communicable disease control activities between all agencies working in this region.
COMMUNICABLE DISEASE TOOLKIT

SIERRA LEONE

2. HEALTH SURVEILLANCE FORMS
### 1. SIERRA LEONE MONTHLY MORBIDITY FORM

<table>
<thead>
<tr>
<th>DISEASE / SYNDROME</th>
<th>Week 1</th>
<th>Week 2</th>
<th>Week 3</th>
<th>Week 4</th>
<th>TOTAL</th>
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</thead>
<tbody>
<tr>
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<td>Acute watery diarrhoea</td>
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<td>Bloody diarrhoea</td>
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<td>Lassa Fever – suspected</td>
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<td>Measles</td>
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<td>Meningitis – suspected</td>
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<td>AFP (suspected Poliomyelitis)</td>
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<td>Yellow Fever – suspected</td>
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<td>ALRI / pneumonia</td>
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<td>Malaria – suspected</td>
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<td>Neonatal tetanus</td>
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<td>STIs</td>
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<td>Tuberculosis - suspected</td>
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<td>Fever of unknown origin</td>
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<td>Severe malnutrition (W/H &lt; 70%)</td>
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<td>Non-communicable diseases</td>
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<td>Others</td>
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<td>TOTAL NUMBER OF CONSULTATIONS</td>
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</table>

Diseases with outbreak potential – report **as soon as possible** to your district surveillance officer and DMO or health co-ordinator using outbreak alert form. See alert thresholds in “guidelines for use of health surveillance forms”.

For use by data management office:  
Form received: __/__/__  
Validated □ Entered □ Record number: _
## 2. SIERRA LEONE MONTHLY MORTALITY FORM

**District:** ……………………………    **Chiefdom/Section:** ……………………………    **Town/Village/Camp:** ……………………………

**Health facility:** ………………………    **Supporting Agency:** ………………………    **Reporting period:** From Monday ……/……/……..  To Sunday ……/……/……..

**Catchment Population:** ………………………    **Under 5 population:** ………………………    **Name of reporting officer:** ………………………………………

<table>
<thead>
<tr>
<th>No.</th>
<th>First and middle names</th>
<th>Family name</th>
<th>Sex</th>
<th>Age (mos / yrs)</th>
<th>Fever</th>
<th>Direct causes of death</th>
<th>Underlying causes of death</th>
<th>Date of death</th>
<th>Location of death</th>
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</tbody>
</table>

§ see case definitions list

# If this box is ticked, also specify cause in the “specify cause” column. Example, if cholera is suspected as the cause of the acute watery diarrhoea death, tick the acute watery diarrhoea column and write “cholera” in “specify cause” column.

For use by data management office: Form received: __/__/__  Validated ☐  Entered ☐  Record number: _

World Health Organization Communicable Diseases Working Group on Emergencies
### 3. SIERRA LEONE OUTBREAK ALERT FORM

**District:** …………………………  
**Chiefdom/Section:** ………………………………

**Town/Village/Camp:** …………………………….

**Health Facility:** ………………………………  
**Supporting Agency:** ………………………………

**Date:** ………/……/……….

**Name of reporting officer:** ………………………………

#### Symptoms and signs:  
**you can tick several boxes**

- [ ] Acute watery diarrhoea
- [ ] Bloody diarrhoea
- [ ] Fever
- [ ] Rash
- [ ] Cough
- [ ] Vomiting
- [ ] Neck stiffness
- [ ] Jaundice
- [ ] Sore throat
- [ ] Bleeding
- [ ] Acute paralysis or weakness
- [ ] Other: _______________________________

#### Suspected disease/syndrome:  
**tick one box only**

- [ ] Acute watery diarrhoea
- [ ] Bacillary dysentery/shigellosis
- [ ] Cholera
- [ ] Measles
- [ ] Meningitis
- [ ] Malaria
- [ ] Lassa fever
- [ ] Yellow fever
- [ ] Poliomyelitis
- [ ] Typhoid fever
- [ ] Unknown disease
- [ ] Other: _______________________________

**Total number of cases reported:**

<table>
<thead>
<tr>
<th>Serial No.</th>
<th>Age</th>
<th>Sex</th>
<th>Location</th>
<th>Date of onset</th>
<th>Laboratory specimen taken (yes/no)</th>
<th>Treatment given</th>
<th>Outcome a</th>
<th>Final classification b</th>
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</tbody>
</table>

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**Outcome:** I = currently ill, R = Recovering or recovered, D = died.

**Final classification:** S = suspected case with clinical diagnosis, C = confirmed case with laboratory diagnosis.
# 4. SIERRA LEONE OUTBREAK INVESTIGATION FORM

<table>
<thead>
<tr>
<th>District:</th>
<th>………………………..</th>
<th>Chiefdom/Section:</th>
<th>……………………………</th>
</tr>
</thead>
<tbody>
<tr>
<td>Town/Village/Camp:</td>
<td>………………………..</td>
<td>Health Facility:</td>
<td>…………………….</td>
</tr>
</tbody>
</table>
| Supporting Agency: | …………………………………. | Date: | ……/……/……….
| Name of reporting officer: | ………………….. | 1. PATIENT IDENTIFICATION |

**Case No:** ____________

**Name:** __________________________

**Location in village or site:** ____________________________________

**Date of birth:** __ / __ / _

**Age:** ________

**Sex:** M F

<table>
<thead>
<tr>
<th>2. CLINICAL DATA</th>
</tr>
</thead>
</table>

**Date of onset of illness:** __ / __ / __

- □ Acute watery diarrhoea
- □ Bloody diarrhoea
- □ Fever
- □ Rash
- □ Cough
- □ Vomiting
- □ Neck stiffness
- □ Jaundice
- □ Sore throat
- □ Bleeding
- □ Acute paralysis or weakness

**Other:** __________________________

<table>
<thead>
<tr>
<th>3. LABORATORY DATA</th>
</tr>
</thead>
</table>

**Sample:** ________________

**Date taken:** __ / __ / __

**Lab. received:** __ / __ / __

**Name of Laboratory:** ________________

**Type of test:** ____________

**Date of results:** __ / __ / __

**Result:** Pos. Neg.

<table>
<thead>
<tr>
<th>4. FINAL CLASSIFICATION</th>
</tr>
</thead>
</table>

**Confirmed:**
- □ Laboratory
- □ Clinical case

**Date of final diagnosis:** __ / __ / __

**Discarded final diagnosis:** __________________________

<table>
<thead>
<tr>
<th>5. FIELD INVESTIGATOR</th>
</tr>
</thead>
</table>

**Name:** __________________________

**Position:** __________________________

**Signature:** __________________________

**NOTE:** ONE FORM PER CASE INVESTIGATED
COMMUNICABLE DISEASE TOOLKIT

SIERRA LEONE

3. SURVEILLANCE SYSTEM GUIDELINES AND ALERT_THRESHOLDS
PURPOSE
These surveillance forms are for use in Sierra Leone. Included are: a monthly morbidity form, a monthly mortality form, an outbreak alert form and a case investigation form. They aim to provide early warning of outbreaks of the following major communicable diseases:
– Bacillary dysentery
– Cholera
– Lassa fever
– Measles
– Meningococcal meningitis
– Poliomyelitis
– Typhoid fever
– Yellow fever

In addition to the above outbreak-prone diseases, the main health problems are likely to be:
– Malaria
– Lower respiratory tract infection/pneumonia
– Malnutrition

REPORTING MECHANISMS
In each health facility, a daily register of consultations should be kept
Suggested lay out of register in health facility:

<table>
<thead>
<tr>
<th>OPD no</th>
<th>Date</th>
<th>Name</th>
<th>Location</th>
<th>Sex</th>
<th>DOB</th>
<th>New case/ Follow up</th>
<th>Diagnosis</th>
<th>Treatment</th>
<th>Outcome</th>
</tr>
</thead>
</table>

– One person in each health facility should be identified as responsible for data collection and notification of potential epidemics to the District Surveillance Officer or DMO. One person should be responsible for compiling the data from the daily register for the Weekly Morbidity Report

– The monthly morbidity report should be filled out on a weekly basis from Monday – Sunday and compiled by the in-charge as soon as possible.

HOW TO FILL IN THE MONTHLY MORBIDITY REPORT
– Data should be recorded in two age categories: under 5 years and 5 years and over.
– New cases/consultations requested for communicable and non-communicable diseases.
– All cases attending the health facility should be recorded on the Monthly Morbidity Report including those who are subsequently referred to hospital.
— The first consultation only should be reported; follow-up visits for the same disease should not be reported.
— At the end of each week, the reporting officer must count up all the cases and deaths from each disease as recorded in the outpatient and inpatient records. The health worker must select the main cause for the consultation, i.e. one disease/syndrome for each case.
— If one of the diseases has epidemic potential marked with an asterisk in the form, record this disease as the main cause of consultation.
— “Other communicable diseases” include all cases of communicable diseases not mentioned in the list of diseases e.g. skin infections
— “Other non-communicable diseases” include all cases of non-communicable diseases not mentioned in the list of diseases e.g. gastrointestinal problems, heart disease, diabetes.

— Diseases of outbreak potential are marked with an asterisk * on the morbidity form. They must be reported to your district surveillance officer or DMO using the outbreak alert form if the weekly alert thresholds below are passed (see box on alert thresholds below).
— In the event of an increase in the number of cases of a disease/syndrome, surveillance activities may need to be enhanced. For example, active case finding and case definitions may need to be revised, such as in the event of an outbreak of meningitis.
— Record total number of consultations in the health facility every week and total it for the month.

HOW TO FILL IN THE MONTHLY MORTALITY FORM:
— This form is a line-listing of all deaths.
— Fill in all the details as required for each case including names, age, sex, date and location of death and laboratory sample taken, and record a main cause of death for each entry even if “unknown”.
Calculations of mortality rates can be performed as follows:

<table>
<thead>
<tr>
<th>Crude mortality rate (CMR):</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total number of deaths for the month / total population at the end of the month x 1,000 persons = deaths/1,000 persons/month</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Under 5 mortality rate (U5MR):</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of deaths among children &lt; 5 years for the month / under 5 year population at the end of the month x 1,000 persons = deaths/1,000 persons/month</td>
</tr>
</tbody>
</table>
Alert thresholds for mortality are shown in the box below.

<table>
<thead>
<tr>
<th>ALERT THRESHOLDS PER WEEK FOR REPORTING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute watery diarrhoea: 5 cases in the 5 years and over age group</td>
</tr>
<tr>
<td>Bloody diarrhoea: 5 cases or 1.5 times the baseline</td>
</tr>
<tr>
<td>Malaria: 1.5 times the baseline</td>
</tr>
<tr>
<td>Measles: 1 case</td>
</tr>
<tr>
<td>Meningitis -- suspected: 5 cases or 1.5 times the baseline</td>
</tr>
<tr>
<td>Lassa fever -- suspected: 1 case</td>
</tr>
<tr>
<td>Yellow Fever -- suspected: 1 case</td>
</tr>
<tr>
<td>AFP (suspected poliomyelitis): 1 case</td>
</tr>
<tr>
<td>Neonatal tetanus: 1 case</td>
</tr>
<tr>
<td>Fever of unknown origin: 1.5 times the baseline</td>
</tr>
<tr>
<td>Other communicable diseases: 1.5 times the baseline</td>
</tr>
<tr>
<td>Severe malnutrition: 3 cases</td>
</tr>
<tr>
<td>CMR: &gt; 2.8/1000/month (&gt;1/10,000/day)</td>
</tr>
<tr>
<td>U5MR: &gt; 5.6/1000/month (&gt;2/10,000/day)</td>
</tr>
</tbody>
</table>

Baseline = average weekly number of cases of the disease calculated over the last 3 weeks.

Use Alert form to report to District Surveillance Officer and DMO if one of these thresholds is reached in a week.
COMMUNICABLE DISEASE TOOLKIT

SIERRA LEONE

4. CASE DEFINITIONS
WHO RECOMMENDED CASE DEFINITIONS

ACUTE WATERY DIARRHOEA
Three or more abnormally loose or fluid stools in the past 24 hours with or without dehydration.

Suspected cholera case:
- Person aged over 5 years with severe dehydration or death from acute watery diarrhoea with or without vomiting.
- Person aged over 2 years with acute watery diarrhoea in an area where there is a cholera outbreak.

Confirmed cholera case:
Isolation of *Vibrio cholera* O1 or O139 from diarrhoeal stool sample.

ACUTE BLOODY DIARRHOEA
Person with acute diarrhoea with visible blood in the stool.

To confirm case of epidemic bacillary dysentery:
Isolation of Shigella dysenteria type 1 through stool culture and serology from a suspected case.

LASSA FEVER

Suspected case:
Person with acute illness of <3 weeks’ duration and temperature ≥38 °C, with no response to effective antimalarial after the first dose and no response to chloramphenicol after 48 hours.

Clinical case definition:
A person with severe illness of <3 weeks’ duration and temperature ≥38 °C, no predisposing factors for haemorrhage, no established alternative diagnosis, with at least two of the following:
- petechial or haemorrhagic rash
- epistaxis
- haematemesis
- haemoptysis
- haematochezia (normally formed faeces with fresh blood present)
- bleeding from other sites

In an endemic area of Sierra Leone, the combination of fever + exudative pharyngitis + retrosternal pain + proteinuria distinguished Lassa fever from other febrile illness with a positive predictive value of 80%.

The most important differential diagnoses include falciparum malaria, typhoid, other viral haemorrhagic fevers, meningococcaemia and septicaemia.

To confirm case:
- Identification of Lassa virus from a clinical specimen (blood, throat swabs, urine and other tissues) by immunohistochemistry (post-mortem diagnosis) or RT-PCR, or
- Serological diagnosis. The most common diagnostic test is the enzyme-linked immunosorbent serologic assay (ELISA), which can detect IgM antibody (acute infection) and IgG antibody (recent infection), as well as Lassa virus antigen.
- In Africa, acute Lassa fever is best diagnosed by the combined ELISA for IgM antibody and Lassa antigen, which has a sensitivity in excess of 90% within 48 hours of admission.
Case classification:

Probable
A case that meets the clinical case definition, is not laboratory-confirmed, and is not epidemiologically linked to a confirmed case, but has appropriate exposure history.

Confirmed
A case that is laboratory-confirmed, or a case that meets the clinical case definition and is not laboratory-confirmed, but is epidemiologically linked to a confirmed case.

MEASLES

Person with fever and maculopapular (i.e. non-vesicular) rash and cough, coryza (i.e. runny nose) or conjunctivitis (i.e. red eyes) or
Any person in whom a clinical health worker suspects measles infection.

To confirm case:
Presence of measles-specific IgM antibodies.

MENINGITIS

Suspected case:
Sudden onset of fever (>38.0 °C axillary) and one of the following:
– neck stiffness
– altered consciousness
– other meningeal sign or petechial/purpural rash.
In children <1 year, meningitis is suspected when fever is accompanied by a bulging fontanelle

To confirm case:
Positive cerebrospinal fluid antigen detection or positive cerebrospinal fluid culture or positive blood culture.

ACUTE FLACCID PARALYSIS (SUSPECTED POLIOMYELITIS)

Acute flaccid paralysis in a child aged <15 years, including Guillain–Barré syndrome or Any paralytic illness in a person of any age.

To confirm case:
Laboratory-confirmed wild poliovirus in stool sample.

YELLOW FEVER

Suspected case:
Any person with acute onset of fever followed by jaundice within 2 weeks of onset of first symptoms. Haemorrhagic manifestations and signs of renal failure may occur.

There are 2 disease phases for yellow fever.

Acute phase:
While some infections cause no symptoms at all, this first phase is normally characterized by fever, muscle pain (with prominent backache), headache, shivers, loss of appetite, nausea and/or vomiting. Often, the high fever is paradoxically associated with a slow pulse (Faget’s sign). Most patients improve after 3–4 days and their symptoms disappear, but 15% enter the toxic phase.
Toxic phase:
Fever reappears, the patient rapidly develops jaundice and complains of abdominal pain with vomiting. Bleeding can occur from mouth, nose, eyes and/or stomach. Once this happens, blood appears in the vomit and faeces. Kidney function deteriorates; this can range from abnormal protein levels in the urine (albuminuria) to complete renal failure with no urine production (anuria). Half the patients in the toxic phase die within 10–14 days; the remainder recover without significant organ damage.

To confirm case:
Laboratory confirmation through
- isolation of yellow fever virus, or
- presence of yellow-fever-specific IgM or a 4-fold or greater rise in serum IgG levels in paired sera (acute and convalescent), or
- positive post-mortem liver histopathology, or
- detection of yellow fever antigen in tissues by immunohistochemistry, or
- selection of yellow fever virus genomic sequences in blood or organs by PCR.
Or epidemiologically linked to a confirmed case or outbreak.

ACUTE LOWER RESPIRATORY TRACT INFECTION / PNEUMONIA IN CHILDREN <5 YEARS
Cough or difficult breathing
and
Breathing 50 or more times per minute for infants aged 2 months to 1 year
Breathing 40 or more times per minute for children aged 1 to 5 years
and
No chest indrawing, no stridor, no general danger signs.

Note: Severe pneumonia = Cough or difficult breathing plus any general danger sign (unable to drink or breastfeed, vomits everything, convulsions, lethargic or unconscious) or chest indrawing or stridor in a calm child.

MALARIA

Uncomplicated malaria
Patient with fever or history of fever within the past 48 hours (with or without other symptoms such as nausea, vomiting and diarrhoea, headache, back pain, chills, myalgia) in whom other obvious causes of fever have been excluded.

Severe malaria
Patient with symptoms as for uncomplicated malaria, as well as drowsiness with extreme weakness and associated signs and symptoms related to organ failure such as disorientation, loss of consciousness, convulsions, severe anaemia, jaundice, haemoglobinuria, spontaneous bleeding, pulmonary oedema and shock.

To confirm case:
Demonstration of malaria parasites in blood film by examining thick or thin smears, or by rapid diagnostic test kit for P. falciparum.

NEONATAL TETANUS

Suspected case:
Any neonatal death at between 3 and 28 days of age in which the cause of death is unknown
or
any neonate reported as having suffered from neonatal tetanus between 3 and 28 days of age but not investigated.

**Confirmed case:**
Any neonate with normal ability to suck and cry during the first 2 days of life but who, between 3 and 28 days of age, can no longer suck normally and becomes stiff or has convulsions (i.e. jerking of the muscles) or both. Hospital-reported cases are considered as confirmed cases.

**The diagnosis is entirely clinical and does not depend on bacteriological confirmation.**

**SEXUALLY TRANSMITTED INFECTIONS**

*Genital ulcer syndrome*
Ulcer on penis or scrotum in men and on labia, vagina or cervix in women, with or without inguinal adenopathy.

*Urethral discharge syndrome*
Urethral discharge in men, with or without dysuria.

*Vaginal discharge syndrome*
Abnormal vaginal discharge (amount, colour, and odour), with or without lower abdominal pain or specific symptoms or specific risk factors.

*Lower abdominal pain*
Symptoms of lower abdominal pain and pain during sexual relations, with examination showing vaginal discharge, lower abdominal tenderness on palpation, or axillary temperature >38 °C.

**TUBERCULOSIS**

*Suspected case:*
Any person who presents with symptoms or signs suggestive of pulmonary TB, in particular cough of long duration (>2 weeks).
May also be coughing blood, have chest pain, breathlessness, fever/night sweats, tiredness, loss of appetite and significant weight loss.

All TB suspects should have three sputum samples examined by light microscopy. Early morning samples are more likely to contain the TB organism than samples taken later in the day.

**Pulmonary TB smear-positive (PTB+)**
Diagnostic criteria should include:
- At least two sputum smear specimens positive for acid-fast bacilli (AFB)
  or
- One sputum smear specimen positive for AFB and radiographic abnormalities consistent with active pulmonary TB
  or
- One sputum smear specimen positive for AFB and a culture positive for *M. tuberculosis*.

**Pulmonary TB smear-negative (PTB−)**
A case of pulmonary tuberculosis that does not meet the above definition for smear-positive TB. Diagnostic criteria should include:
- At least three sputum smear specimens negative for AFB
  and
- Radiographic abnormalities consistent with active pulmonary TB
• No response to a course of broad-spectrum antibiotics
  and
• Decision by a clinician to treat with a full course of anti-TB chemotherapy.

FEVER OF UNKNOWN ORIGIN
Any person with fever (>38 °C axillary) in whom all obvious causes of fever have been excluded.

OTHER COMMUNICABLE DISEASES
Typhoid fever
Person with fever of at least 38 °C for three or more days is considered suspect if the epidemiological context is conducive.

Clinical diagnosis is difficult as it may vary from a mild illness with low-grade fever and malaise to a severe picture of sustained fever, diarrhoea or constipation, anorexia, severe headache and intestinal perforation.

To confirm case:
Isolation of S. typhi from blood or stool cultures.

SEVERE MALNUTRITION
In children 6–59 months (65–110 cm in height):
• Weight-for-height (W/H) index < –3 Z-scores (on table of NCHS/WHO normalized reference values of weight-for-height by sex)
  or
• Bilateral pitting oedema irrespective of W/H, in absence of other causes.

TRAUMA/INJURY
Injury (intentional)
A bodily lesion at the organic level, resulting from an intentionally inflicted acute exposure to energy in amounts that exceed the threshold of physiological tolerance.

Injury (non-intentional)
A bodily lesion at the organic level, resulting from a non-intentionally (i.e. “accidentally”) inflicted acute exposure to energy in amounts that exceed the threshold of physiological tolerance.

Landmine/UXO Injury
A person who has sustained, either directly or indirectly, a fatal or non-fatal injury caused by the explosion of a landmine or other unexploded ordnance (UXO).

Note: Landmine injuries relate to buried mines (e.g. anti-personnel and/or anti-vehicle mines). UXO injuries arise from explosive objects/devices that are typically above ground at the time of detonation, such as cluster munitions that did not detonate on impact.

MATERNAL DEATH
Death of a woman while pregnant or within 42 days of termination of pregnancy, regardless of the site or duration of pregnancy, from any cause related to or aggravated by the pregnancy or its management.
NEONATAL DEATH
Death of liveborn infant during the first 28 days of life. It is a classification by age not cause.
COMMUNICABLE DISEASE TOOLKIT

SIERRA LEONE

5. GUIDELINES FOR OUTBREAK CONTROL
TABLE 1. STEPS IN MANAGEMENT OF AN OUTBREAK

1. PREPARATION
   - Health coordination meetings
   - Surveillance system: weekly epidemic-prone disease reports to MOHS and WHO
   - Stockpiles: sampling kits, appropriate antibiotics, intravenous fluids
   - Contingency plans for isolation wards in hospitals
   - Laboratory support

2. DETECTION
   - Diseases of outbreak potential are marked with an asterix [*] on the weekly morbidity form. They must be reported as soon as possible to your district medical officer, district surveillance officer or health coordinator using the Outbreak alert form if the weekly alert thresholds provided in “Guidelines for use of surveillance forms” are passed. The health coordinator should inform the Ministry of Health and Sanitation and WHO.
   - A clinical specimen (e.g. stool, serum, cerebrospinal fluid) must be taken for laboratory confirmation. Include the case in the weekly health report.

3. RESPONSE
   **Confirmation**
   - The lead health agency should investigate reported cases to confirm the outbreak. Clinical specimens will be sent for testing.
   - The lead health agency should set up an outbreak control team with membership from relevant organizations: Ministry of Health and Sanitation, WHO and other United Nations organizations, nongovernmental organizations in the fields of health and water and sanitation, veterinary experts.

   **Investigation**
   - Confirm diagnosis (laboratory testing of samples).
   - Define outbreak case definition.
   - Count number of cases and determine size of population (to calculate attack rate).
   - Collect/analyse descriptive data to date (e.g. time/date of onset, place/location of cases and individual characteristics such as age/sex).
   - Follow up cases and contacts.
   - Determine the at-risk population.
   - Formulate hypothesis for pathogen/source/transmission.
   - Conduct further investigation/epidemiological studies (e.g. to clarify mode of transmission, carrier, infectious dose required, better definition of risk factors for disease and at-risk groups).
   - Write an investigation report (investigation results and recommendations for action).

   **Control**
   - Implement control measures specific for the disease.
   - Treat cases with recommended treatment as in WHO guidelines.
   - Prevent exposure (e.g. isolation of cases in cholera outbreak).
   - Prevent infection (e.g. immunization in measles outbreak).

4. EVALUATION
   - Assess timeliness of outbreak detection and response.
   - Change public health policy if indicated (e.g. preparedness).
   - Write and disseminate outbreak report.
TABLE 2. RESOURCES NEEDED FOR OUTBREAK RESPONSE

- Personnel (trained staff)
- Supplies (e.g. oral rehydration salts, intravenous fluids, water containers, water purifying tablets, drinking cups, vaccines, vitamin A, monitoring forms, vaccination cards, tally sheets)
- Treatment facilities (location, beds available, stocks of basic medical supplies)
- Laboratory facilities (location, capacity, stocks of reagents, etc.)
- Transport (sources of emergency transport and fuel, cold chain)
- Communication links (between health centres; between Ministry of Health and Sanitation, nongovernmental organizations and United Nations agencies)
- Computers (not essential)
- In an outbreak requiring an immunization campaign:
  - safe injection equipment (e.g. auto-disable syringes and safety boxes (puncture-resistant boxes)
  - immunization facilities (location, capacity)
  - cold-chain equipment (number and condition of refrigerators, cold boxes, vaccine carriers, ice-packs)
### TABLE 3. RISK FACTORS FOR OUTBREAKS IN EMERGENCY SITUATIONS

<table>
<thead>
<tr>
<th>Category</th>
<th>Risk Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute respiratory infections</td>
<td>Inadequate shelter with poor ventilation</td>
</tr>
<tr>
<td></td>
<td>Indoor cooking, poor health care services</td>
</tr>
<tr>
<td></td>
<td>Malnutrition, overcrowding</td>
</tr>
<tr>
<td></td>
<td>Age group under 1 year old</td>
</tr>
<tr>
<td></td>
<td>Large numbers of elderly</td>
</tr>
<tr>
<td></td>
<td>Cold weather</td>
</tr>
<tr>
<td>Diarrhoeal diseases</td>
<td>Overcrowding</td>
</tr>
<tr>
<td></td>
<td>Inadequate quantity and/or quality of water</td>
</tr>
<tr>
<td></td>
<td>Poor personal hygiene</td>
</tr>
<tr>
<td></td>
<td>Poor washing facilities</td>
</tr>
<tr>
<td></td>
<td>Poor sanitation</td>
</tr>
<tr>
<td></td>
<td>Insufficient soap</td>
</tr>
<tr>
<td></td>
<td>Inadequate cooking facilities</td>
</tr>
<tr>
<td>Malaria</td>
<td>Movement of people from endemic into malaria-free zones or from areas of low</td>
</tr>
<tr>
<td></td>
<td>endemicity to a hyperendemic areas.</td>
</tr>
<tr>
<td></td>
<td>Increased population density promoting mosquito bites.</td>
</tr>
<tr>
<td></td>
<td>Interruption of vector control measures</td>
</tr>
<tr>
<td></td>
<td>Inadequate health care services</td>
</tr>
<tr>
<td></td>
<td>Stagnant water</td>
</tr>
<tr>
<td></td>
<td>Flooding, changes in weather patterns</td>
</tr>
<tr>
<td>Measles</td>
<td>Measles immunization coverage rates below 80%</td>
</tr>
<tr>
<td></td>
<td>Population movement</td>
</tr>
<tr>
<td></td>
<td>Overcrowding</td>
</tr>
<tr>
<td>Meningococcal meningitis</td>
<td>Meningitis belt</td>
</tr>
<tr>
<td></td>
<td>Dry season</td>
</tr>
<tr>
<td></td>
<td>Dust storms</td>
</tr>
<tr>
<td></td>
<td>Overcrowding</td>
</tr>
<tr>
<td></td>
<td>High rates of acute respiratory infections</td>
</tr>
<tr>
<td>Viral haemorrhagic fever</td>
<td>Lack of hygiene, poor sanitation, contact with objects/food contaminated with</td>
</tr>
<tr>
<td></td>
<td>rodent excreta; unsafe food handling and storage practices (Lassa fever)</td>
</tr>
<tr>
<td></td>
<td>Population displacement with subsequent overcrowding</td>
</tr>
<tr>
<td></td>
<td>Poor access to health services, poor isolation and protection measures (</td>
</tr>
<tr>
<td></td>
<td>barrier nursing)</td>
</tr>
<tr>
<td></td>
<td>Tick-infested areas (Crimean–Congo haemorrhagic fever)</td>
</tr>
<tr>
<td></td>
<td>Handling or eating ill or dead infected chimpanzees (Ebola) or rodents (Lassa</td>
</tr>
<tr>
<td></td>
<td>fever).</td>
</tr>
<tr>
<td>Yellow fever</td>
<td>Unvaccinated people moving to areas of endemicity are at risk</td>
</tr>
<tr>
<td></td>
<td>Overcrowding</td>
</tr>
<tr>
<td></td>
<td>Open water storage provides favourable habitat for <em>Ae. aegypti</em></td>
</tr>
<tr>
<td></td>
<td>Old tyres, old water containers increase vector breeding</td>
</tr>
<tr>
<td></td>
<td>Poor drainage (leading to pools and open channels of water) may increase</td>
</tr>
<tr>
<td></td>
<td>vector breeding opportunities</td>
</tr>
</tbody>
</table>
Four separate spaces:
- Admission and observation unit
- Neutral Part: Staff office and staff rest room, hospital Kitchen, store rooms
- Hospitalisation unit: reserved for severe patients with IV fluids
- Recovery unit: Oral Rehydration space

In each space: ensure exclusive latrines, washing areas, large quantity of water and safe disposal of waste

Cholera bed in wood and rope
### TABLE 4. ESSENTIAL HYGIENE RULES IN CHOLERA TREATMENT CENTRE

<table>
<thead>
<tr>
<th>Mode of transmission</th>
<th>Essential rules in the unit</th>
<th>Additional recommended rules</th>
</tr>
</thead>
</table>
| People               | - Access limited to patient + one family member + staff  
                       - One-way flow of people | - Ideally one carer per patient only  
                       - Three separate spaces within unit (see Figure 1) |
| Water                | - Safe water (chlorination concentration according to specific use; see Table 5)  
                       - Large quantity needed (minimum 10 litres/person per day) | - Ideally 50 litres/patient per day |
| Hands                | - Hand-washing stations with safe water and soap in sufficient quantities  
                       - Wash hands with water and soap  
                       -- before and after taking care of patients  
                       -- after using the latrines  
                       -- before cooking or eating  
                       -- after leaving the admission ward | - Cut and clean nails |
| Food                 | - Cooked food  
                       - Health care workers should not handle food or water | - Food provided by the unit (preferably not by families)  
                       - Large stocks of food may be "tempting" and may lead to security problems |
| Clothes              | - Wash clothes and linen with the appropriate chlorine solution | - If no chlorine available, wash clothes with soap and dry them in the sun |
| Environmental contamination (faeces and waste) | - Ensure exclusive latrines for the unit  
                       - Disinfect buckets, soiled surfaces and latrines regularly with the appropriate chlorine solution (see Table 5)  
                       - Incinerator for medical waste | - Latrines at least 100 metres away from wells or surface sources  
                       - Special cholera beds |
| Corpses              | - Separate morgue  
                       - Disinfect corpses (see Table 5) | - Find ways to have safe funeral practices  
                       - Bury corpses as soon as possible |

*Developed by WHO Global Task Force on Cholera Control*
### TABLE 5. PREPARATION AND USE OF DISINFECTANTS

<table>
<thead>
<tr>
<th>Starting with:</th>
<th>2% solution</th>
<th>0.2% solution</th>
<th>0.05% solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calcium hypochlorite</td>
<td>30 g/litre or</td>
<td>30 g/10 litres or</td>
<td>7 g/10 litres or</td>
</tr>
<tr>
<td>at 70% active chlorine (&quot;high-test hypochlorite&quot;, “HTH”)</td>
<td>2 tablespoons/litre</td>
<td>2 tablespoons/10 litres</td>
<td>½ tablespoon/10 litres</td>
</tr>
<tr>
<td>Chlorinated lime</td>
<td>66 g/litre or</td>
<td>66 g/10 litres or</td>
<td>16 g/10 litres or</td>
</tr>
<tr>
<td>at 30% active chlorine (&quot;bleaching powder&quot;)</td>
<td>4 tablespoons/litre</td>
<td>4 tablespoons/10 litres</td>
<td>1 tablespoon/10 litres</td>
</tr>
<tr>
<td>Sodium hypochlorite solution</td>
<td>333 ml/litre or</td>
<td>333 ml/10 litres or</td>
<td>83 ml/10 litres or</td>
</tr>
<tr>
<td>at 6% active chlorine (&quot;household bleach&quot;)</td>
<td>22 tablespoons/litre</td>
<td>22 tablespoons/10 litres</td>
<td>5 tablespoons/10 litres</td>
</tr>
</tbody>
</table>

**USE FOR DISINFECTION OF:**
- Excreta
- Corpses
- Shoes
- Floor
- Utensils
- Beds
- Hands
- Skin
- Clothes

*Developed by WHO Global Task Force on Cholera Control*

Measurements used: 1 teaspoon = 5 ml
1 tablespoon = 15 ml

*Do not use metallic bucket for preparation and storage of chlorinated solutions*
TABLE 6. CHOLERA TREATMENT SUPPLIES PER POPULATION

How to estimate the initial amount of supplies needed for a cholera outbreak:
0.2% of the population expected to fall ill initially.

The table below gives an estimate of the amount of supplies you will need according to the number of people in your area. To find the amounts needed for each item, look in the column under the approximate population of your catchment area (to the nearest 5000). You may add several columns (e.g. if your health facility serves 35 000 people, add the amounts in the 10 000 and 5000 columns to those in the 20 000 column). Write the amount needed at your health facility in the empty column on the right.

<table>
<thead>
<tr>
<th>Item</th>
<th>Population (in brackets - numbers expected to fall ill)</th>
<th>Your area</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5 000</td>
<td>10 000</td>
</tr>
<tr>
<td></td>
<td>(10)</td>
<td>(20)</td>
</tr>
<tr>
<td>Rehydration supplies</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ORS packets (for 1 litre each)</td>
<td>65</td>
<td>130</td>
</tr>
<tr>
<td>Nasogastric tubes (adults) 5.3/3.5 mm (16 Flack) 50 cm</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Nasogastric tubes (children)</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Ringer’s lactate bags, 1 litre, with giving sets</td>
<td>12</td>
<td>24</td>
</tr>
<tr>
<td>Scalp vein sets</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Antibiotics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Doxycycline, 100 mg (adults)</td>
<td>6</td>
<td>12</td>
</tr>
<tr>
<td>Erythromycin, 250 mg (children)</td>
<td>24</td>
<td>48</td>
</tr>
<tr>
<td>Other treatment supplies</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Large water dispensers with tap (marked at 5–10 litres)</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>1-litre bottles for ORS solution</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>0.5-litre bottles for ORS solution</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Tumblers, 200 ml</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>Teaspoons</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Cotton wool, kg</td>
<td>1/2</td>
<td>1</td>
</tr>
<tr>
<td>Adhesive tape, reels</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

Developed by WHO Global Task Force on Cholera Control
**TABLE 7. DYSENTERY TREATMENT SUPPLIES PER POPULATION**

How to estimate the amount of supplies needed for a dysentery outbreak:

0.2% of the population expected to fall ill initially.

The table below gives an estimate of the amount of supplies you will need according to the number of people in your area. To find the amounts needed for each item, look in the column under the approximate population of your catchment area (to the nearest 5000). You may add several columns (e.g. if your health facility serves 35 000 people, add the amounts in the 10 000 and 5000 columns to those in the 20 000 column). Write the amount needed at your health facility in the empty column on the right.

On the basis of drug resistance in your area, choose only one of the antibiotics.

<table>
<thead>
<tr>
<th>Item</th>
<th>Population (+ numbers expected to fall ill)</th>
<th>Your area</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5 000</td>
<td>10 000</td>
</tr>
<tr>
<td></td>
<td>(10)</td>
<td>(20)</td>
</tr>
<tr>
<td><strong>Rehydration supplies</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ORS packets (for 1 litre each)</td>
<td>10</td>
<td>20</td>
</tr>
<tr>
<td>Ringer’s lactate bags, 1 litre, with giving sets</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Scalp vein sets</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td><strong>Antibiotics</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ciprofloxacin, 500 mg</td>
<td>100</td>
<td>200</td>
</tr>
<tr>
<td><strong>Other treatment supplies</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Large water dispensers with tap (marked at 5–10 litres)</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>1-litre bottles for ORS solution</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>0.5-litre bottles for ORS solution</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Tumblers, 200 ml</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Teaspoons</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Cotton wool, kg</td>
<td>1/2</td>
<td>1</td>
</tr>
<tr>
<td>Adhesive tape, reels</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Hand soap, kg</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Boxes of soap for washing clothes</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>1-litre bottle of cleaning solution (2% chlorine or 1–2% phenol)</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

*Developed by WHO Global Task Force on Cholera Control*
TABLE 8. TYPHOID FEVER TREATMENT SUPPLIES PER POPULATION

How to estimate the amount of supplies needed for a typhoid outbreak:

0.2% of the population expected to fall ill initially.

The table below gives an estimate of the amount of supplies you will need according to the number of people in your area. To find the amounts needed for each item, look in the column under the approximate population of your catchment area (to the nearest 5000). You may add several columns (e.g. if your health facility serves 35 000 people, add the amounts in the 10 000 and 5000 columns to those in the 20 000 column). Write the amount needed at your health facility in the empty column on the right.

On the basis of drug resistance in your area, choose only one of the antibiotics.

<table>
<thead>
<tr>
<th>Item</th>
<th>Population (+ numbers expected to fall ill)</th>
<th>Your area</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5 000 (10)</td>
<td>10 000 (20)</td>
</tr>
<tr>
<td><strong>Rehydration supplies</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ORS packets (for 1 litre each)</td>
<td>10</td>
<td>20</td>
</tr>
<tr>
<td>Ringer’s lactate bagsa 1 litre, with giving sets</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Scalp vein sets</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td><strong>Antibiotics</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chloramphenicol , 250 mg</td>
<td>2500</td>
<td>5000</td>
</tr>
<tr>
<td>Amoxicillin, 500mg</td>
<td>1680</td>
<td>3360</td>
</tr>
<tr>
<td>Co-trimoxazole, (SMX 400 mg + TMP 80 mg )</td>
<td>840</td>
<td>1680</td>
</tr>
<tr>
<td>Cefixime, 200 mg b</td>
<td>840</td>
<td>1680</td>
</tr>
<tr>
<td><strong>Other treatment supplies</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Large water dispensers with tap (marked at 5–10 litres)</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>1-litre bottles for ORS solution</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>0.5-litre bottles for ORS solution</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Tumblers, 200 ml</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Teaspoons</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Cotton wool, kg</td>
<td>½</td>
<td>1</td>
</tr>
<tr>
<td>Adhesive tape, reels</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Hand soap, kg</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Box of soap for washing clothes</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>1-litre bottle of cleaning solution (2% chlorine or 1–2% phenol)</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

a Less than 50% of the patients need IV rehydration.

b In case of multidrug resistance to above antibiotics, choose cefixime.

*Developed by WHO Global Task Force on Cholera Control*
**VIRAL HAEMORRHAGIC FEVER OUTBREAK CONTROL**

Identify suspected cases of viral haemorrhagic fever (VHF)

- Severe illness with weakness and fatigue.
  - Fever (38.5 °C or 101 °F) for more than 72 hours and less than 2 weeks.

- Diagnose and treat* for likely cause of fever in area (such as malaria, typhoid fever, dysentery, severe bacterial infection).

- If no response to antimalarial and antibiotic treatment,

- Evaluate signs and symptoms and decide whether they correspond to any of the VHF case definitions (See "Case definitions" section in this CD toolkit).
  - Review the patient's history for any contact with an individual who died from unexplained illness (e.g. with fever and bleeding)

- Suspect VHF
  - Begin VHF isolation procedures

*Note: The above flowchart applies to the first steps for VHF outbreak investigation.
Health workers should be aware of the possibility of suspecting a VHF in a non-outbreak situation. As soon as a VHF is suspected, VHF isolation precautions should begin. This will help to reduce the number of people exposed to the VHF.

**Use information from previous outbreaks to suspect a VHF**

Talk with the district or national surveillance officer about VHFs that have been reported in your area. Report suspected cases of VHF according to national surveillance guidelines to the corresponding health authorities.

**Begin VHF isolation precautions**

- Adapt VHF isolation precautions as needed.
- Designate the health officer who will coordinate VHF isolation precautions. As soon as a health care worker suspects a VHF, he or she should notify the health facility administrator and the VHF coordinator who will:
  - refer the patient to the isolation area and take the necessary steps to begin VHF isolation precautions as described below;
  - limit the number of health facility staff and visitors in the patient’s room;
  - limit the use of invasive procedures and reduce the number of injectable medications.

> **Important!** Between the time when VHF is suspected and the time when the patient is received in the isolation area, there is a risk for disease transmission from the patient’s blood and other body fluids (stool, urine, vomit). Prevent disease transmission to other patients, visitors and health staff in the waiting area by placing the suspected VHF patient apart from other patients. Make every effort to reduce this waiting time.

➢ *Reinforce standard universal precautions in the health centre/hospital.*

**VHF ISOLATION PRECAUTIONS:**

Isolation precautions can be started even if the diagnosis has not been laboratory-confirmed.

- Isolate the patient.
- Wear protective clothing in the isolation area, in the cleaning and laundry areas and in the laboratory. Wear a scrub suit, gown, apron, two pairs of gloves, mask, headcover, eyewear, and rubber boots.
- Clean and disinfect spills, waste, and reusable equipment safely.*
- Clean and disinfect soiled linens and laundry safely.*
- Use safe disposal methods for non-reusable supplies and infectious waste.
- Provide information about the risk of VHF transmission to health facility staff. Reinforce use of VHF isolation precautions with all health facility staff.
- Provide information to families and the community about prevention of VHFs and care of patients.

*Pour or soak in 0.5% chlorine solution (see “Guidelines for collection of specimens for laboratory testing”, Annex 8).

**See:** Appendix, “Select the isolation area”, below.

**Identify patient’s contacts and travel history:**

Ask the patient (or a family member who can answer for the patient) questions on the following topics:

- Place where currently living.
- Other persons with the same symptoms in the family or village,
- Places the patient has visited in the past 3 weeks.
Use the answers to identify contacts. Provide contact with information about VHF and when to seek care.

**Specimens samples for laboratory confirmation:**

According to the VHF suspected, obtain specimens for confirmation of diagnosis. (See “Guidelines for collection of specimens for laboratory testing” in this Toolkit, for specific techniques for collecting blood and other specimens from suspected VHF cases and their method of transport.)

All suspected cases should be reported and laboratory specimens given to the corresponding health authority (surveillance officer or WHO officer) or person responsible for coordinating epidemic control and transport/shipping of specimens to the appropriate reference laboratory and for follow-up of results.

**Alert health facility staff about specific risks for VHF transmission:**

- As soon as a VHF is suspected, alert the relevant health staff to begin using VHF isolation precautions. This applies especially to:
  - doctors or nurses providing direct patient care;
  - cleaning, laundry, and waste disposal staff who clean and disinfect contaminated material and supplies;
  - laboratory staff who handles samples from the suspected VHF cases;
  - medical or support staff who prepare or handle the bodies of VHF patients who die

- Explain how VHF transmission can occur in the health facility and the risks to health facility staff. Remind the staff that VHF is a highly infectious disease. They must use VHF isolation precautions whenever they have contact with a VHF patient, the patient’s blood or other body fluids, or contaminated supplies and equipment.

**SELECT THE ISOLATION AREA**

Establish a barrier between the VHF patient and uninfected patients, other health facility staff, and visitors.

**Description**

- A single room with an adjoining toilet or latrine.
- A separate building or ward that can be used for VHF patients only (especially if Ebola haemorrhagic fever is suspected, or if there is a large number of patients).
- An area in a larger ward that is separate and far away from other patients in the ward.

**Important:** There should be an isolated toilet, adequate ventilation, and screened windows.

Place a security barrier around the isolation area and restrict access. Place signs around the isolation area clearly stating that access is restricted.

**Set up changing rooms for staff providing patient care**

One changing room is needed outside the patient isolation area. This is where health care workers will put on protective clothing. Contaminated clothing and supplies remain in the changing room until cleaning staff – trained to use VHF isolation precautions – take the contaminated items to the laundry or disposal site.

If there are family members who will assist with direct patient care, give them information and training about:
- the risk of VHF transmission and the reason for protective clothing;
- how to wear gloves, gowns, and a mask;
- how to take off gloves, gowns, and mask and store or dispose of them safely.
Figure 2. VHF ISOLATION AREA EXAMPLE

Screens between beds

Disinfecting station

Storage shelf

Changing room

Disinfecting station

Table for medical supply and disinfecting and handwashing

Shallow pan with chlorine disinfecting
SAFE FUNERAL PRACTICES

The bodies and body fluids of deceased VHF patients remain contagious for several days after death. Family and community members are also at risk if funeral practices involve touching and washing the body.

Prepare the body safely

The funeral should take place as soon as possible after the body is prepared in the health facility and health facility staff should:
- prepare the body safely;
- be aware of the family’s cultural practices and religious beliefs, and help the family to understand why some practices cannot be observed because they place the family or others at risk for exposure and death.

To prepare the body in the health facility

1. Wear protective clothing as recommended for staff in the patient isolation area. Use thick rubber gloves as the second pair (or outer layer) of gloves.
2. Spray the body and the area around it with a 0.5% chlorine solution.¹
3. Place the body in a body bag (mortuary sack) and close it securely. Spray the body bag with a 0.5% chlorine solution.¹
4. If a body bag is not available, wrap the body in two thickness of cotton cloth soaked with a 0.5% chlorine solution.¹ Then wrap the body in plastic sheeting. Seal the wrapping with plastic tape. Spray the body bag as in step 3. Place the body in a coffin if one is available.
5. Transport the body to the funeral site as soon as possible. Assign a health officer or a member of the health facility staff to accompany the body to ensure that the safety precautions continue to be observed during the journey.

*See annex 8, in “Guidelines for collection of specimens for laboratory testing” in this Toolkit.

Prepare burial site

- If the body is to be buried, the grave should be at least 2 metres deep.
- Carefully explain to the family the reason for limiting attendance at the funeral ceremony to family only.

Disinfect the vehicle after transporting the body

- The staff person who disinfects the vehicle must wear protective clothing.
- Rinse the interior of the vehicle where the body was carried with a 0.5% chlorine solution¹ and let it soak for 10 minutes.
- Rinse well with clean water and let the vehicle air-dry.

¹ See “Guidelines for collection of specimens for laboratory testing” in Annex 7 of this Toolkit.
COMMUNICABLE DISEASE TOOLKIT

SIERRA LEONE

6. CASE MANAGEMENT OF EPIDEMIC-PRONE DISEASES

World Health Organization
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APPENDIX

ASSESSMENT AND TREATMENT OF DIARRHOEA..............................................21
1. BACILLARY DYSENTERY (SHIGELLOSIS)

Basic facts
- Bacillary dysentery is an acute bacterial disease involving the large and small intestines.
- It is the most important cause of acute bloody diarrhoea.
- Two-thirds of cases and most deaths occur in children under 10 years of age.
- Of the four *Shigella* serogroups (*S. dysenteriae, S. flexneri, S. sonnei* and *S. boydii*), *S. dysenteriae* type 1 (Sd1) causes the most severe disease and is the only cause of large-scale epidemics.

*Shigella dysenteriae* type 1:
- Most severe in young children, the elderly and malnourished individuals.
- Displaced populations are at high risk in situations of overcrowding and poor sanitation/water.
- Transmission is by the faecal–oral route from person-to-person and through contaminated food and water.
- Highly contagious: as few as 10–100 bacteria have caused disease in volunteers.
- Treatment is with antimicrobials, which reduce severity and duration of illness.
- Not usually associated with marked loss of fluid and electrolytes.
- Without prompt effective treatment, case-fatality rate can be as high as 10%.
- As infectious dose is low, shigellosis is associated with high secondary attack rates.

Clinical features
- Causes bloody diarrhoea often associated with fever, abdominal cramps and rectal pain.
- Incubation period usually 1–3 days, but may be up to 1 week.
- Complications include sepsis, rectal prolapse, haemolytic uraemic syndrome, seizures.
- Is diagnosed by observing blood in a fresh stool specimen or asking the patient or mother of a child whether the stools are bloody.

Diagnosis
- Within 4 days of onset of illness, collect specimens from case with current bloody diarrhoea who have not received antimicrobials for this illness.
- Fresh stools in sterile container to be kept at temperature 4 °C and must reach the laboratory within 12 hours of being collected. If fresh stools samples are not refrigerated they must reach the laboratory for culture sooner.
- Where transport to the laboratory will take longer, Cary-Blair transport media must be used.
- Transport container should be well insulated and should contain freezer packs or wet ice.
- Transport must not take more than 3 days.

Case management
Clinical case definition: acute bloody diarrhoea.

*Laboratory criteria:* isolation of *Shigella dysenteriae* type 1 (Sd1) from stool samples.

Table 1. High-risk patients

<table>
<thead>
<tr>
<th>High-risk patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Children under 5 years of age, but especially infants, severely malnourished children and children who have had measles in the past 6 weeks</td>
</tr>
<tr>
<td>Older children and adults who are obviously malnourished</td>
</tr>
<tr>
<td>A patient who is severely dehydrated, has had a convulsion, or is seriously ill when first seen</td>
</tr>
<tr>
<td>Adults aged 50 years or more</td>
</tr>
</tbody>
</table>
Standard treatment regimens:

1. Rehydrate with ORS or IV solution, depending on the severity, and monitor the hydration status frequently. (See Appendix for assessment and treatment of diarrhoea and dehydration.)

- Refer seriously ill or severely malnourished patients to hospital immediately.

2. Give antibiotics

- Antimicrobials are essential and should be selected on the basis of susceptibility testing of the organisms grown from patients affected by the disease. The drugs must be effective against the local Sd1 strains.
- If an antimicrobial is effective, clinical improvement should be noted within 48 hours. If there is no improvement, treat with second-line drug for 5 days if available, otherwise continue full 5 day course of first line drug. Use only one of the following antibiotics:

<table>
<thead>
<tr>
<th>Antibiotics</th>
<th>Doses</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Ciprofloxacin</td>
<td>30 mg/kg divided</td>
<td>Children</td>
<td>Adults</td>
</tr>
<tr>
<td>500 mg tablet</td>
<td>2 times/day</td>
<td>½ tablet, twice a day for 3 days</td>
<td>1 tablet, twice a day for 3 days</td>
</tr>
</tbody>
</table>

Note: Do not give antimicrobials that are known to be ineffective. When the supply of an effective antimicrobial is limited, priority should be given to high-risk patients (see Table 1).

Do not forget:

- In health facilities
  - strengthen sanitary and hygiene measures in general;
  - implement disinfection measures in wards.

- In affected areas
  - ensure access to safe water (adequate quality and quantity);
  - strengthen health education on hygiene and disinfection measures;
  - set up surveillance for early detection of cases and monitoring of the outbreak.

See Guidelines for outbreak control in this toolkit for organization of a treatment centre (Figure 1), essential hygiene rules in a treatment centre (Table 4), preparation and use of disinfectants (Table 5) and calculation of treatment supply needs for dysentery (table 7).

This section was developed by WHO Global Task Force on Cholera Control.
2. CHOLERA

Basic facts

- Cholera is an acute bacterial enteric disease with profuse watery stool.
- It is caused by a Gram-negative bacillus, *Vibrio cholerae*, which produces a powerful enterotoxin that causes copious secretory diarrhoea.
- Transmission is by the faecal–oral route. Infection results from ingestion of organisms in food and water, or from indirect person-to-person contamination (unwashed hands).
- Acute carriers, including those with asymptomatic or mild disease, are important in the maintenance and transmission of cholera.
- Cholera is asymptomatic in more than 90% of infected cases.
- Attack rates in displaced populations can be as high as 10–15%; in normal situations, estimated at 1–2%.
- Case-fatality rates are usually around 5% but have reached 40% in large outbreaks in refugee camps.
- With appropriate treatment (with ORS in most cases) CFR can be reduced to 1%.

Clinical features

- Incubation period is 1–5 days.
- Onset of symptoms is abrupt, with copious watery diarrhoea, classic “rice-water” stool with or without vomiting.
- Fluid loss can lead to rapid and profound dehydration, low serum potassium and acidosis.
- Fever is unusual, except in children.
- Vomiting without associated nausea may develop, usually after the onset of diarrhoea.
- Severe dehydration leads to loss of skin turgor, malaise, tachypnoea and hypotension.

Early detection of cholera cases is important to ensure prompt treatment and reduction of environmental contamination. Cholera should be suspected when:

- a patient over 5 years of age develops severe dehydration from acute watery diarrhoea (usually with vomiting)
  or
- any patient over 2 years of age has acute watery diarrhoea in an area where there is an outbreak of cholera.

Diagnosis

- Fresh stools in sterile container if transport time is less than 2 hours.
- In alkaline peptone water if transport time is less than 24 hours.
- Cary-Blair transport media.
- Media previously cooled for 1 hour.
- Transport container well insulated.
- Transport possible for 7–14 days.

Case management

**Clinical case definition:** acute watery diarrhoea with or without vomiting, with or without severe dehydration, once cholera has been already confirmed.

*Laboratory criteria:* isolation of *Vibrio cholerae* O1 or O139 from stools.
Prevention and treatment of dehydration are the mainstays in the management of cholera:

**STEP 1** assess for dehydration (see Appendix)

**STEP 2** rehydrate and monitor frequently

**STEP 3** maintain hydration: replace ongoing fluid losses until diarrhoea stops

**STEP 4** give oral antimicrobials to patients with severe dehydration

**STEP 5** feed the patient:
- ensure normal intake of food as soon as possible
- breastfeeding for infants and young children should continue.

### Standard treatment regimens:

1. **Rehydrate with ORS or IV solution depending on the severity and monitor the hydration status frequently** (see Appendix for assessment and treatment of diarrhoea and dehydration)

   - For severe dehydration, give IV fluid immediately to replace fluid deficit. Use Ringer's lactate solution or Hartmann's solution or, if not available, normal saline solution. _Plain glucose solutions are ineffective and should not be used._

2. **Give antibiotics for severe cholera cases only**

<table>
<thead>
<tr>
<th>Antibiotics</th>
<th>Dose</th>
<th>Under 1 year</th>
<th>1–5 years</th>
<th>5–15 years</th>
<th>Adults</th>
<th>Pregnant women</th>
</tr>
</thead>
<tbody>
<tr>
<td>Erythromycin</td>
<td>250 mg</td>
<td>¼ tablet</td>
<td>½ tablet</td>
<td>1 tablet</td>
<td>2 tablets</td>
<td>2 tablets</td>
</tr>
<tr>
<td></td>
<td>30 mg /kg divided</td>
<td>4 times/day</td>
<td>4 times/day</td>
<td>4 times/day</td>
<td>4 times/day</td>
<td>4 times/day</td>
</tr>
<tr>
<td></td>
<td>4 times/day</td>
<td>3 days</td>
<td>3 days</td>
<td>3 days</td>
<td>3 days</td>
<td>3 days</td>
</tr>
<tr>
<td>Doxycycline</td>
<td>300 mg</td>
<td></td>
<td></td>
<td></td>
<td>3 tablets</td>
<td></td>
</tr>
<tr>
<td></td>
<td>single dose</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Antibiotic therapy is not essential** to the management of cholera. _Effective rehydration therapy is life-saving._ In emergencies, systematic administration of antimicrobials is justified only for severe cases, and in situations where bed occupancy, patient turnover or stocks of intravenous fluids are expected to reach critical levels in respect of case management capacity.

- A sensitivity profile (antibiogram) of the outbreak strain must be available as soon as possible to decide on the possible choice of antibiotic. Only oral antimicrobials must be given, and only once the patient has been rehydrated (usually in 4–6 hours) and vomiting has stopped.

**Do not forget:**

- In health facilities
  - strengthen sanitary and hygiene measures in general
  - implement disinfection measures in cholera wards
  - implement special funeral practices:
    - disinfect corpses with 2% chlorine solution;
    - fill mouth and anus with cotton wool soaked with 2% chlorine solution;
    - wash hands with soap after touching the corpse;
    - disinfect the clothing and bedding of the deceased by stirring them in boiling water or by drying them thoroughly in the sun.

- In affected areas
  - ensure access to safe water (adequate quality and quantity);
  - strengthen health education on hygiene, disinfection measures and food safety;
  - set up surveillance for early detection of cholera cases and monitoring of the outbreak.

- Chemoprophylaxis and quarantine measures are not effective to contain the spread of cholera.
See Guidelines for outbreak control in this toolkit for organization of a treatment centre (Figure 1), essential hygiene rules in a cholera treatment centre (Table 4), preparation and use of disinfectants (Table 5) and calculation of treatment supply needs for cholera (Table 6).

This section was developed by WHO Global Task Force on Cholera Control.
3. TYPHOID FEVER

Basic facts

- Typhoid fever is a serious systemic infection caused by the enteric bacillus *Salmonella typhi*.
- Transmission is via the faecal–oral route, mainly from ingestion of organisms in food and water contaminated by faeces and urine of patients and carriers, or indirectly from person-to-person (unwashed hands).
- 2–5% of infected cases remain carriers for several months, and are highly involved in the spread of the disease.
- Case–fatality rate is high (10–20%) in the absence of proper treatment.
- With appropriate antibiotic therapy CFR can be reduced to 1%.
- Relapses occur in 3–4% of cases.
- Some strains of *Salmonella typhi* are resistant to antibiotics.
- Mass immunization may be a valuable adjunct for the control of typhoid fever during a sustained, high-incidence epidemic.
- A parenteral vaccine containing the polysaccharide Vi antigen is the vaccine of choice for displaced populations; effective protection is afforded by a single injection and adverse reactions are minimal.

Clinical features

- Incubation period is usually 8–14 days, but may vary from 3 days to as much as 1 month.
- Mild or inapparent forms are common, especially in endemic areas, and present with low-grade fever and malaise.
- Severe symptoms begin with the sudden onset of sustained fever, severe headache, nausea and loss of appetite, sometimes accompanied by hoarse cough and constipation or diarrhoea.
- Complications of intestinal ulceration can include intestinal perforation or haemorrhage.

Diagnosis

- Isolation of *S. typhi* from blood culture early after disease onset or from stool culture after the first week.
- Because of limited specificity and sensitivity, serological tests are generally of little diagnostic value.

Case management

**Clinical case definition:** acute or insidious onset of sustained fever, headache, malaise, anorexia, relative bradycardia, constipation or diarrhoea and non-productive cough (but many mild and atypical infections occur).

**Laboratory criteria:** isolation of relevant serovars of *Salmonella enterica* serovar Typhi (S.Typhi) from stool or blood of patient.

**Standard treatment regimens:**

1. Rehydrate with ORS or IV solution, depending on severity (see Appendix for assessment and treatment of diarrhoea and dehydration)

2. Give antibiotics

Antibiotics are essential and should be selected on the basis of susceptibility testing of the organisms grown from patients affected by the disease. Use only one of the following antibiotics:
<table>
<thead>
<tr>
<th>Susceptibility</th>
<th>Antibiotic</th>
<th>Daily dose</th>
<th>Days</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fully sensitive</td>
<td>Chloramphenicol</td>
<td>50–75 mg</td>
<td>14 – 21</td>
</tr>
<tr>
<td></td>
<td>Amoxicillin</td>
<td>75–100 mg</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>Co-trimoxazole</td>
<td>8–40 mg</td>
<td>14</td>
</tr>
<tr>
<td>Multidrug-resistant</td>
<td>Cefixime</td>
<td>15–20 mg</td>
<td>7 – 14</td>
</tr>
<tr>
<td></td>
<td>Azithromycin</td>
<td>8–10 mg</td>
<td>7</td>
</tr>
</tbody>
</table>

**Treatment of complications**

Therapy for complications may include rest, diuretics, inotropes, and anti-arhythmic drugs for myocarditis, replacement blood components for bone marrow suppression and blood transfusion for haemorrhagic problems. Surgery is necessary in case of intestinal perforation.

**Vaccination**

Vaccination against typhoid fever during an outbreak should be considered: Please contact the WHO Global Task force on Cholera Control (e-mail cholera@who.int).

**Do not forget:**

- In health facilities
  - strengthen sanitary and hygiene measures in general;
  - implement disinfection measures in wards;
  - implement special funeral practices.

- In affected areas
  - ensure access to safe water (adequate quality and quantity);
  - strengthen health education on hygiene and disinfection measures;
  - set up surveillance for early detection of cases and monitoring of the outbreak.

See Annex 5 *Guidelines for outbreak control* in this toolkit for organization of a treatment centre (Figure 1), essential hygiene rules in a treatment centre (Table 4), preparation and use of disinfectants (Table 5) and calculation of treatment supply needs for typhoid (Table 8).

*This section was developed by WHO Global Task Force on Cholera Control.*
4. MEASLES

Basic facts

- Measles is a highly communicable viral infection transmitted through airborne spread of respiratory droplets from person to person, or by direct contact with nasal and throat secretions of infected persons or via objects that have been in close contact with an infected person.
- It is a severe disease caused by the rubeola virus, which damages epithelial surfaces and the immune system.
- Measles can increase susceptibility to other infections such as pneumococcus and Gram-negative bacteria.
- It can lead to or exacerbate vitamin A deficiency, increasing the susceptibility to xerophthalmia, blindness and premature death.
- The most vulnerable age groups are children between the age of 9 months and 5 years in developing countries, but this depends on the immunization coverage rates.
- Deaths are mostly the result of complications such as pneumonia, croup and diarrhoea and are frequently associated with malnutrition.

Note: While this section details the diagnosis and case management of measles, immunization remains the most important strategy for measles control. Measles immunization campaigns are one of the highest priorities in displaced populations. Recommended age group for immunizations is 6 months to 15 years, with vitamin A supplementation in children 6–59 months. Those vaccinated between 6 and 9 months must have another dose on reaching 9 months of age.

Natural history

- Incubation period from exposure to onset of fever is usually 10 days.
- Initial symptoms and signs are high fever, runny nose, coryza, cough, red eyes and Koplick spots (small white spots on the buccal mucosa).
- Characteristic erythematous (red) maculopapular (blotchy) rash appears on the third to seventh day, starting behind the ears and on the hairline and then spreading to the rest of the body.
- Temperature subsides after 3–4 days and the rash fades after 5–6 days.
- Measles is highly infectious from the start of the prodromal period until approximately 4–5 days after the rash appears.
- Case-fatality rates are estimated to be 3–5% in developing countries but may reach as much as 10–30% in displaced populations.

Complications

- Complications develop in 5–10% of cases.
- Complications occurring in the first week of illness, such as croup, diarrhoea and pneumonia, are usually due to effects of the measles virus and are rarely life-threatening.
- Later complications are usually due to secondary viral or bacterial infections – post measles pneumonia, diarrhoea and croup are the most common life-threatening complications.
- Pneumonia: usually severe, Gram-negative or staphylococcal.
- Diarrhoea: either due to virus or to a secondary infection e.g. Shigella.
- Malnutrition: precipitated by anorexia, stomatitis, fever, vomiting, diarrhoea and other complications.
- Stomatitis: comprises sucking and eating.
- Vitamin A deficiency: keratoconjunctivitis. Measles increases the need for vitamin A and often precipitates xerophthalmia.
- Encephalitis: caused by the measles virus itself, occurs on about the 5th day of the rash.
- Otitis media, croup.
- Blindness due to scarring, as a result of vitamin A deficiency and/or conjunctivitis.
**Case management**

Take a history from the mother and examine the child for the following:

<table>
<thead>
<tr>
<th>Symptoms</th>
<th>Signs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ability to take feeds of fluids</td>
<td>Nutritional status</td>
</tr>
<tr>
<td>Cough and difficult breathing</td>
<td>Breathing rate, chest indrawing, stridor</td>
</tr>
<tr>
<td>Diarrhoea or blood in stools</td>
<td>Dehydration and fever</td>
</tr>
<tr>
<td>Sore mouth, eyes or ears</td>
<td>Mouth ulcers, sore and discharging ears and eyes, white spots on eyes</td>
</tr>
<tr>
<td></td>
<td>Level of consciousness</td>
</tr>
</tbody>
</table>

**Case management of uncomplicated measles – health centre**

Most children will have uncomplicated measles and require supportive care as outpatients. Good supportive care can improve a child’s outcome. Isolation of patients with measles is not indicated in emergency situations. All children with measles in these settings should have their nutritional status monitored and be enrolled in a feeding programme if necessary.

Nurse the child in a shaded and well ventilated area, which is generally more comfortable – sunlight can hurt the eyes and a cool environment can help keep the body temperature down.

- Control the fever by tepid sponging and paracetamol.
- Maintain good hydration: treat diarrhoea with ORS.
- Observe closely for complications.
- Give prophylaxis against xerophthalmia: vitamin A on day 1 and day 2

<table>
<thead>
<tr>
<th></th>
<th>Day 1</th>
<th>Day 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infants &lt;6 months</td>
<td>50 000 IU</td>
<td>50 000 IU</td>
</tr>
<tr>
<td>Infants 6–11 months</td>
<td>100 000 IU</td>
<td>100 000 IU</td>
</tr>
<tr>
<td>Children &gt;11 months</td>
<td>200 000 IU</td>
<td>200 000 IU</td>
</tr>
</tbody>
</table>

- Maintain adequate protein-calorie intake: tell mothers to give frequent small meals.
- Continue breastfeeding.
- Provide supplementary feeding, if available. The diet must be soft, with a high calorie density, so that small portions go a long way. Unless in the form of egg, protein is unlikely to be eaten – remember the child has a sore mouth and poor appetite.
- Do not admit children with measles to general feeding centres until after the infectious period.
- If there are large numbers of cases, it may be necessary to set up a small unit for children with measles, as they and their mothers need considerable supportive care.
- Use antimicrobials only when indicated.
- There should be active case-finding during epidemic if practical (home visits).

**Case management of complicated measles – hospital**

- Control fever, provide nutritional support and vitamin A therapy as for uncomplicated measles.
- Antimicrobials should be given only if there is a specific indication such as pneumonia, otitis media or dysentery.
- Prophylactic antimicrobials should be given to children at significant risk of secondary bacterial infection – such as children with severe malnutrition, HIV infection or xerophthalmia. A broad-spectrum antibiotic such as ampicillin or co-trimoxazole should be used.
- Pneumonia: cough and rapid breathing (40 breaths/minute or more if over 1 year old; 50 breaths/minute if under 1 year old). Give an antibiotic such as ampicillin, amoxicillin or co-trimoxazole. If the child’s condition does not improve after 24–48 hours, change the antibiotic to an antistaphylococcal drug such as cloxacillin or chloramphenicol.
- Diarrhoea: three or more loose or watery stools in 24 hours. Assess for associated dehydration. If there is blood in the stool, the child has dysentery. The commonest cause of dysentery is *Shigella* (see “Bacillary dysentery (shigellosis)” for case management).
• Eye problems: the major eye problems in measles are conjunctivitis or keratitis, and corneal damage due to vitamin A deficiency. Red and watery eyes are the result of conjunctivitis (inflammation of the conjunctiva): no treatment is necessary.
• Sticky eyes or pus in the eyes are caused by a secondary bacterial infection: clean the eyes at least three times a day with cooled boiled water, using cotton wool or a clean cloth. Use tetracycline ointment three times a day for 7 days. NEVER use steroid eye ointments. Ensure that vitamin A has been given. If there is vitamin A eye disease, a third dose must be given 4 weeks later.
5. MENINGITIS

Basic facts
- Meningitis is an acute inflammation of the meninges that can be caused by bacteria or viruses.
- Transmission is through direct contact with respiratory droplets.
- Large outbreaks of meningitis are mainly due to meningococcus (Neisseria meningitidis, serogroups A, B and C).
- \( N. \) meningitidis also causes meningococcal septicaemia – a less common but very severe disease with acute fever, purpura and shock.
- \( N. \) meningitidis, Streptococcus pneumoniae and Haemophilus influenzae account for 80% of all cases of bacterial meningitis.
- Viral meningitis is rarely serious and may be due to a number of viruses such as Coxsackie virus or Enterovirus.
- Displaced populations and displaced persons are at increased risk of meningitis because of overcrowding, poor hygiene and poor access to health care.
- Epidemics in refugee camps have mainly been due to \( N. \) meningitidis, serogroup A.
- 80% of cases of meningococcal meningitis occur in those under 30 years of age.
- Without appropriate treatment, the case-fatality rate in meningococcal meningitis can be as high as 50%; This can be reduced to ~5–15% by correct treatment.
- Vaccines are available against \( N. \) meningitidis, serogroups A, C, Y and W135 which are very effective in controlling epidemics. In rapid mass campaigns, vaccination can contain an outbreak within 2–3 weeks. For individual aged over 2 years, vaccine efficacy rate is 90% one week after injection.

Diagnosis
- Ask about: sudden onset of intense headache, fever, nausea, vomiting, photophobia, stiff neck.
- Examine for:
  - meningeal rigidity, i.e. neck stiffness
  - lethargy, delirium, coma
  - purpura – characteristic sign of meningococcal septicaemia
  - symptoms of shock – low blood pressure.
- In a child <1 year, classic signs are rare; look for:
  - fever, diarrhoea, vomiting, drowsiness
  - convulsions
  - bulging fontanelle.

Lumbar puncture is necessary to determine whether acute meningitis is bacterial and should be done as soon as meningitis is suspected, before starting antimicrobials. In bacterial meningitis, CSF is usually cloudy or purulent (but may be clear or bloody): Basic laboratory examination consists of white cell count (WCC), protein and Gram stain.

<table>
<thead>
<tr>
<th>Bacterial meningitis if:</th>
</tr>
</thead>
<tbody>
<tr>
<td>WCC measurement: &gt;1000 cells/mm(^3) (&lt;3 in normal CSF) with &gt;60% polymorphs</td>
</tr>
<tr>
<td>Protein: &gt;0.80 g/litre (&lt;0.60 g/litre in normal CSF)</td>
</tr>
<tr>
<td>Gram stain: Gram-negative diplococci in 80% of cases not previously treated</td>
</tr>
</tbody>
</table>
Case management

- Bacterial – particularly meningococcal – meningitis is potentially fatal and is a medical emergency.
- Viral meningitis is rarely serious and requires only supportive care, but a lumbar puncture is necessary to differentiate from bacterial meningitis.
- Admit all suspected meningitis cases to hospital for diagnosis and case management.
- Perform lumbar puncture and give antimicrobials immediately without waiting for results.
- Do not delay treatment with antimicrobials if lumbar puncture cannot be done.

<table>
<thead>
<tr>
<th>Age group</th>
<th>Probable pathogens</th>
<th>Antimicrobial – first choice</th>
<th>Alternative</th>
</tr>
</thead>
<tbody>
<tr>
<td>In epidemic situations:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>all age groups</td>
<td>N. meningitidis</td>
<td>Benylpenicillin or oily chloramphenicol</td>
<td>Ampicillin</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Ceftriaxone or cefotaxime</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Co-trimoxazole</td>
</tr>
<tr>
<td>In non-epidemic situations:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>adults</td>
<td>N. meningitidis</td>
<td>Benylpenicillin or oily chloramphenicol</td>
<td>Ampicillin</td>
</tr>
<tr>
<td>children &gt;5 years</td>
<td>S. pneumoniae</td>
<td></td>
<td>Ceftriaxone or cefotaxime</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Cotrimoxazole</td>
</tr>
<tr>
<td>children 1 m – 5 y</td>
<td>H. influenzae</td>
<td>Ampicillin or amoxicillin</td>
<td>Ceftriaxone or cefotaxime</td>
</tr>
<tr>
<td></td>
<td>S. pneumoniae</td>
<td>Chloramphenicol</td>
<td></td>
</tr>
<tr>
<td></td>
<td>N. meningitidis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>neonates</td>
<td>Gram-negative bacteria</td>
<td>Ampicillin and gentamicin</td>
<td>Ceftriaxone or cefotaxime</td>
</tr>
<tr>
<td></td>
<td>Group B streptococci</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Listeria</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- IV benzylpenicillin, ampicillin, ceftriaxone or cefotaxime is recommended for bacterial meningitis; however, ceftriaxone or cefotaxime are very expensive.
- In patients who cannot be given drugs IM or IV, oral administration is acceptable but higher doses are necessary.
- During large epidemics in refugee/displaced populations, a single IM dose of oily chloramphenicol has been used.
- In meningococcal septicaemia with purpura and shock, treat shock by restoring blood volume; give IV dexamethasone to reduce cerebral oedema.
- Chemoprophylaxis of contacts is not recommended in emergency situations.
- Supportive therapy: maintain hydration and adequate nutrition.
- Treat convulsions with diazepam given IV or rectally.
- Nurse in a shaded and well-ventilated area. The unconscious or semiconscious patient should be nursed on his/her side. Turning every 2–3 hours can prevent pressure sores.
### Table 3. Antimicrobials to treat bacterial meningitis

<table>
<thead>
<tr>
<th>Agent</th>
<th>Route</th>
<th>Daily dose – adults</th>
<th>Daily dose – children</th>
<th>Duration (days)</th>
<th>Cost&lt;sup&gt;a&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benzylpenicillin</td>
<td>IV</td>
<td>3–4 million units 4–6 times</td>
<td>400 000U/kg</td>
<td>&gt;4</td>
<td>low</td>
</tr>
<tr>
<td>Ampicillin/amoxicillin</td>
<td>IV</td>
<td>2–3 g twice</td>
<td>250 mg/kg</td>
<td>&gt;4</td>
<td>moderate</td>
</tr>
<tr>
<td>Amoxicillin</td>
<td>Oral</td>
<td>2–3 g twice</td>
<td>250 mg/kg</td>
<td>&gt;4</td>
<td>high</td>
</tr>
<tr>
<td>Chloramphenicol</td>
<td>IV</td>
<td>1 g twice/three times</td>
<td>100 mg/kg</td>
<td>&gt;4</td>
<td>moderate</td>
</tr>
<tr>
<td>Chloramphenicol (oily)</td>
<td>IM</td>
<td>3 g single dose</td>
<td>100 mg/kg</td>
<td>1–2</td>
<td>low</td>
</tr>
<tr>
<td>Cefotaxime</td>
<td>IV</td>
<td>2 g twice</td>
<td>250 mg/kg</td>
<td>&gt;4</td>
<td>very high</td>
</tr>
<tr>
<td>Ceftriaxone</td>
<td>IV</td>
<td>1–2 g once/twice</td>
<td>50–80 mg/kg</td>
<td>&gt;4</td>
<td>low</td>
</tr>
<tr>
<td>Ceftriaxone</td>
<td>IM</td>
<td>1–2 g single dose</td>
<td>50–80 mg/kg</td>
<td>1–2</td>
<td>low</td>
</tr>
<tr>
<td>Co-trimoxazole</td>
<td>IV/IM</td>
<td>2 g SMZ&lt;sup&gt;b&lt;/sup&gt; twice</td>
<td>100 mg/kg</td>
<td>&gt;4</td>
<td>moderate</td>
</tr>
<tr>
<td>Co-trimoxazole</td>
<td>Oral</td>
<td>2 g SMZ&lt;sup&gt;b&lt;/sup&gt; twice</td>
<td>100 mg/kg</td>
<td>&gt;4</td>
<td>low</td>
</tr>
<tr>
<td>Sulfadiazine</td>
<td>IV</td>
<td>1 g six times</td>
<td>200 mg/kg</td>
<td>&gt;4</td>
<td>low</td>
</tr>
</tbody>
</table>

<sup>a</sup> Cost of full treatment: low <US$ 10; moderate US$ 10–50; high US$ 50–250; very high > US$250

<sup>b</sup> Sulfamethoxazole.
6. YELLOW FEVER

Basic facts

- Yellow fever is a viral haemorrhagic fever transmitted by mosquitoes infected with the yellow fever virus. The incubation period is 3–7 days.
- Mosquitoes are infected by feeding on patients in the first 3–4 days of illness, when the virus is circulating in the blood.
- The disease is untreatable, and case-fatality rates in severe cases can exceed 50%.
- Yellow fever can be prevented through immunization with the 17D yellow fever vaccine. The vaccine is safe, inexpensive and reliable. A single dose provides protection against the disease for at least 10 years and possibly for life.
- Any person who is not immunized against yellow fever is at risk for the disease.
- An outbreak of yellow fever is defined as at least one confirmed case.
- In an outbreak situation, the target population for emergency immunization activity is the general population living or working in the same area as the patient. If initial resources are limited, the primary target population is children ages 9 months up to 14 years of age.

Clinical features

- An acute phase lasting for 4–5 days and presenting with:
  - sudden onset of fever
  - headache or backache
  - muscle pain
  - nausea
  - vomiting
  - red eyes (injected conjunctiva).

  Because jaundice may not be present in less severe (or mild) cases of yellow fever, this phase of the disease can be confused with other diseases that also present with fever, headache, nausea and vomiting. The less severe cases are often non-fatal.

- A temporary period of remission follows the acute phase in 5–20% of cases and lasts for up to 24 hours.

- A toxic phase can follow the period of remission and present with:
  - jaundice
  - dark urine
  - reduced amounts of urine production
  - bleeding from the gums, nose or in the stool
  - vomiting blood
  - hiccups
  - diarrhoea
  - slow pulse in relation to fever.

WHO case definition for yellow fever surveillance:

Suspected case: an illness characterized by acute onset of fever followed by jaundice within 2 weeks of onset of the first symptoms AND one of the following: bleeding from the nose, gums, skin, or gastrointestinal tract, OR death within 3 weeks of the onset of illness.

Confirmed case: a suspected case that is confirmed by laboratory results or linked to another confirmed case or outbreak.

Outbreak: an outbreak of yellow fever is at least one confirmed case.
Diagnosis

- Laboratory analysis of blood or tissue samples (usually liver) is needed to confirm a case of yellow fever. Two blood samples must be taken.
- Yellow fever is confirmed if laboratory results show:
  - isolation of the yellow fever virus, or
  - Presence of yellow-fever-specific IgM, or
  - a fourfold or greater rise in serum IgG levels between the acute and convalescent serum samples,
  OR
  - positive postmortem liver histopathology, or
  - detection of yellow fever antigen in tissues by immunohistochemistry, or
  - detection of yellow fever virus RNA genomic sequences in blood or tissues.

Note: Liver samples are taken from fatal cases only.

Case management

- No specific treatment is available for yellow fever. In the toxic phase, supportive treatment includes therapies for treating dehydration and fever. In severe cases, death can occur 7–10 days after onset of the first symptoms.
- For fever: give paracetamol.
- For dehydration: give oral rehydration salts or IV fluids depending on the assessment of dehydration.
- For restlessness: give diazepam.
- For malaria: give an antimalarial recommended for your area.
- For bacterial infections: give antibactic recommended for your area.
7. LASSA FEVER

Basic facts

- Lassa fever is an acute viral illness (viral haemorrhagic fever) of 1–4 weeks’ duration caused by Lassa virus (Arenavirus family).
- It is transmitted to humans from wild rodents (the multimammate rat, *Mastomys natalensis*). Lassa infection in rodents persists and the virus is shed throughout the life of the animal. Disease transmission is primarily through direct or indirect contact with excreta/urine of infected rodents deposited on surfaces such as floors or beds or in food or water.
- The virus may be excreted in the urine of patients for 3–9 weeks after the onset of illness.
- Person-to-person transmission occurs, especially in the hospital environment, by direct contact with blood (contaminated needles), pharyngeal secretions or urine of a patient. Lassa virus may be transmitted via semen for up to 3 months.
- Lassa fever is mild or produces no observable symptoms in about 80% of infected people; the remaining 20% have a severe multisystem disease.
- The mortality rate for patients hospitalized with Lassa fever is 15–20%. Prognosis is particularly poor for women in the third trimester of pregnancy, and a high rate of fetal loss occurs (>80%). Overall case-fatality rate is about 1–5% in endemic situations but could be much higher in epidemic situations.
- No vaccine is currently available. Immunity to reinfection occurs following infection, but the length of this period of protection is unknown.
- Deafness occurs in 25% of patients, with only half recovering some function after 1–3 months.

Clinical features

The onset of the disease is gradual, presenting with: fever, malaise, headache, sore throat, cough, nausea, vomiting and diarrhoea, myalgia (painful muscles), and chest and abdominal pain. The incubation period is 6–21 days.

The fever may be constant or intermittent. Inflammation of the throat and eyes is commonly observed. After the first week of disease, patients in milder cases begin to recover, but those with more serious cases start to deteriorate clinically.

The most important differential diagnosis includes falciparum malaria, typhoid, other viral haemorrhagic fevers, meningococcaemia and septicaemia.

Inflammation of the throat with tonsillar patches is an important distinguishing feature.

Severe cases present with: pleural effusion, hypotension or shock, haemorrhage (conjunctival haemorrhages, mucosal bleeding), seizures, encephalopathy. Oedema of the face and neck is frequent, and some patients experience adult respiratory distress syndrome.

Clinical case definition:

An Illness of gradual onset with one or more of the following:

- malaise, fever, headache, sore throat, cough, nausea, vomiting, diarrhoea, myalgia (painful muscles), and chest pain, hearing loss,
- and
- a history of contact with excreta of rodents or with a probable or confirmed case of lassa fever.

Laboratory criteria: see “Diagnosis” below.

Case classification

Suspected: a case compatible with the clinical description.
Probable: a suspected case that is epidemiologically linked to a confirmed case.
Confirmed: a suspected case that is laboratory-confirmed.
Contact: a person having close personal contact with the patient (living with, caring for) or a person testing the laboratory specimens of a patient in the 3 weeks after the onset of the illness.
Outbreak: in an area where no cases have been reported in the past, an outbreak is defined as one confirmed case of Lassa fever; in areas where the disease is endemic, as is the case of Sierra Leone, the alert threshold may be defined according to baseline data.

Diagnosis

(Only in laboratory of biosafety level 4/reference lab)

Specific diagnosis of Lassa fever can be made in the following ways:

- isolating the Lassa virus from blood, urine or throat swabs and other tissues;
- demonstration of Lassa virus antigen by reverse transcriptase/polymerase chain reaction or immunohistochemistry (postmortem diagnosis);
- serological diagnosis – demonstrating the presence of specific immunoglobulin M (IgM) antibody to Lassa virus and/or showing a fourfold rise in titre of IgG antibody between acute and convalescent-phase serum specimens.

The most common diagnostic test is the enzyme linked immonosorbent assay (ELISA), which can detect IgM antibody (acute infection) and IgG antibody (recent infection) as well as Lassa virus antigen. Antibodies can also be measured by the indirect fluorescent antibody (IFA) technique.

Lassa fever is best diagnosed by a combined ELISA for IgM antibody (acute infection) and IgG antibody and Lassa antigen, which has a sensitivity in excess of 90% by 13-18 days from the onset of infection.

Nonspecific laboratory abnormalities include proteinuria and elevated liver enzymes with levels of aspartate aminotransferase (AST) exceeding those of alanine aminotransferase (ALT). A large increase in AST levels is an adverse prognostic factor.

In an endemic area of Sierra Leone, the combination of fever, exudative pharyngitis, retrosternal pain and proteinuria was able to distinguish Lassa fever from other febrile illness with a positive predictive value of around 70%.

Case management

Ribavirin, an antiviral drug, has been used with success in Lassa fever patients. It has been shown to be most effective in reducing viraemia and the mortality rate when given intravenously early in the course of the illness, especially within the first 6 days of fever. Evidence of the efficacy of oral ribavirin in Lassa fever is not available. However, oral ribavirin therapy may be attempted where IV therapy is not feasible.

General supportive treatment, as well as treatment of any other complicating infection, is also very important in the management of Lassa fever. Medication should be given orally or intravenously: intramuscular and subcutaneous injections are contraindicated because of the risk of haematoma. Side-effects of ribavirin are restricted largely to reversible haemolysis. Lassa fever convalescent plasma has not shown to be beneficial and is not recommended, especially because of the potential for transmitting other viruses, including HIV and hepatitis B.

Intravenous ribavirin treatment

The threshold number of cases at which intravenous ribavirin therapy becomes impossible depends on a variety of factors, including the number of patients and local health care resources.

Adults:
- loading dose* of 17mg/kg IV (maximum 1 g per dose)
- followed by 17 mg/kg IV (maximum 1 g per dose) every 6 hours for 4 days
- followed by 8 mg/kg IV (maximum 500 mg per dose) every 8 hours for 6 days.
* If there is some delay in starting treatment, a loading dose of 30 mg/kg (IV) (maximum 2 g) might be necessary.
Pregnant women:
Same as for adults. Ribavirin is contraindicated in pregnancy; however, in the context of VHF, the benefit of ribavirin therapy appears likely to outweigh any risk to the fetus (the associated mortality of VHF tends to be higher in pregnancy), and ribavirin is therefore recommended.

Children:
Same as for adults, dosed according to weight.

Oral ribavirin treatment

Adults:
- loading dose of 2000 mg orally once
- followed by 1000 mg orally every 6 hours for 4 days
- followed by 500 mg orally every 6 hours for 6 days.

Pregnant women:
Same as for adults.

Children:
- loading dose of 30 mg/kg orally once
- followed by 15 mg/kg every 6 hours for 4 days
- followed by 7 mg/kg every 6 hours for 6 days.

Supportive treatment

All Lassa fever patients should receive supportive treatment, with careful maintenance of fluid and electrolyte balance, circulatory volume, blood pressure and oxygenation, as well as treatment of any other complicating infection. Mechanical ventilation, renal dialysis, and anti-seizure therapy may be required.

Medication should be given orally or intravenously: intramuscular and subcutaneous injections are contraindicated because of the risk of haematoma.

Protective measures

Patients with probable or confirmed Lassa fever should be isolated and cared for using barrier-nursing techniques. Isolation precautions to reduce the risk of transmission of Lassa fever in the health care setting should follow the guidelines developed by WHO/CDC.

See:
- “VHF outbreak control” in Guidelines for outbreak control in this toolkit

Universal precautions must be observed when handling specimens of blood or tissues, and when disposing of waste material, needles, and other sharp instruments.

See:
- “Prevention” in Section 7, HIV/AIDS, in the Communicable Disease profile in this toolkit.
- Appendix 8 in Guidelines for collection of specimens for laboratory testing, in this toolkit.

Hospital control

Basic barrier-nursing methods (gloves, gowns and masks) are highly effective in preventing secondary spread of the infection. Strict isolation with rigorous barrier nursing should be combined with full medical care, to ensure the safety of the staff and survival of the patient.
Appendix

ASSESSMENT AND TREATMENT OF DIARRHOEA

Table A1. Assessment of diarrhoeal patients for dehydration

<table>
<thead>
<tr>
<th>First assess your patient for dehydration</th>
<th>PLAN A</th>
<th>PLAN B</th>
<th>PLAN C</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Look at: General condition</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eyes a</td>
<td>Normal</td>
<td>Sunken</td>
<td>Very sunken and dry</td>
</tr>
<tr>
<td>Tears</td>
<td>Present</td>
<td>Absent</td>
<td>Absent</td>
</tr>
<tr>
<td>Mouth and tongueb</td>
<td>Moist</td>
<td>Dry</td>
<td>Very dry</td>
</tr>
<tr>
<td>Thirst</td>
<td>Drinks normally, not thirsty</td>
<td><em>Thirsty, drinks eagerly</em></td>
<td><em>Drinks poorly or not able to drink</em></td>
</tr>
<tr>
<td>2. Feel: Skin pinch c</td>
<td>Goes back quickly</td>
<td><em>Goes back slowly</em></td>
<td><em>Goes back very slowly</em></td>
</tr>
<tr>
<td>3. Decide: The patient has no signs of dehydration</td>
<td>If the patient has two or more signs, including at least one <em>sign</em> there is some dehydration</td>
<td>If the patient has two or more signs, including at least one <em>sign</em> there is severe dehydration</td>
<td></td>
</tr>
<tr>
<td>4. Treat: Use Treatment Plan A</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weigh the patient if possible and use Treatment Plan B</td>
<td></td>
<td>Weigh the patient and use Treatment Plan C URGENTLY</td>
<td></td>
</tr>
</tbody>
</table>

a In some infants and children the eyes normally appear somewhat sunken. It is helpful to ask the mother whether the child’s eyes are normal or more sunken than usual.
b Dryness of the mouth and tongue can also be palpated with a clean finger. The mouth may always be dry in a child who habitually breathes through the mouth. The mouth may be wet in a dehydrated patient owing to recent vomiting or drinking.
c The skin pinch is less useful in infants or children with marasmus (wasting) or kwashiorkor (severe malnutrition with oedema) or in obese children.


Treatment plan A: to treat diarrhoea at home

Use this plan to teach the mother to:
- continue to treat her child’s current episode of diarrhoea at home; and
- give early treatment for future episodes of diarrhoea.

Explain the three rules for treating diarrhoea at home:

1. Give the child more fluids than usual to prevent dehydration
   - Use recommended home fluids. These include ORS solution, food-based fluids (such as soup, rice water and yoghurt drinks) and plain water. Use ORS solution as described in the box below.
Note: If the child is under 6 months of age and not yet taking solid food, give ORS solution or water rather than food-based fluid.

- Give as much of these fluids as the child will take. Use the amounts shown below for ORS as a guide.
- Continue giving these fluids until the diarrhoea stops.

2. Give the child plenty of food to prevent malnutrition

- Continue to breastfeed frequently.
- If the child is not breastfed, give the usual milk.
- If the child is 6 months or older, or already taking solid food:
  - also give cereal or another starchy food mixed, if possible, with pulses, vegetables and meat or fish; add one or two teaspoonfuls of vegetable oil to each serving;
  - give fresh fruit juice or mashed banana to provide potassium;
  - give freshly prepared foods; cook and mash or grind food well;
  - encourage the child to eat: offer food at least six times a day; and
  - give the same food after diarrhoea stops, and give an extra meal each day for 2 weeks.

3. Take the child to the health worker if he/she does not get better in 3 days or develops any of the following:

- many watery stools
- repeated vomiting
- marked thirst
- eating or drinking poorly
- fever
- marked thirst
- blood in the stool

**Children should be given ORS solutions at home if:**

- they have been on Treatment Plan B or C;
- they cannot return to the health worker if the diarrhoea gets worse; or
- it is national policy to give ORS to all children who see a health worker for diarrhoea.

**If the child is to be given ORS solution at home, show the mother how much ORS to give after each loose stool and give her enough packets for 2 days.**

<table>
<thead>
<tr>
<th>Age</th>
<th>Amount of ORS to be given after each loose stool</th>
<th>Amount of ORS to provide for use at home</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under 24 months</td>
<td>50–100 ml (¼ – ½ cup)</td>
<td>500 ml/day</td>
</tr>
<tr>
<td>2–10 years</td>
<td>100–200 ml (½ – 1 cup)</td>
<td>1000 ml/day</td>
</tr>
<tr>
<td>10 years or more</td>
<td>as much as wanted</td>
<td>2000 ml/day</td>
</tr>
</tbody>
</table>

- Describe and show the amount to be given after each stool, using a local measure.

**Show the mother how to mix and to give ORS**

- Give a teaspoonful every 1–2 minutes for a child under 2 years.
- Give frequent sips from a cup for older children.
• If the child vomits, wait 10 minutes. Then give the solution more slowly (for example, a spoonful every 2–3 minutes).
• If diarrhoea continues after the ORS packets are used up, tell the mother to give other fluids as described in the first rule above or return for more ORS.

Treatment plan B: to treat dehydration

Table A2. Approximate amount of ORS solution to give in the first 4 hours

<table>
<thead>
<tr>
<th>Agea</th>
<th>Weight</th>
<th>In ml</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 4 months</td>
<td>0 – &lt; 5 kg</td>
<td>200–400</td>
</tr>
<tr>
<td>4–11 months</td>
<td>5–7.9 kg</td>
<td>400–600</td>
</tr>
<tr>
<td>12–23 months</td>
<td>8–10.9 kg</td>
<td>600–800</td>
</tr>
<tr>
<td>2–4 years</td>
<td>11–15.9 kg</td>
<td>800–1200</td>
</tr>
<tr>
<td>5–14 years</td>
<td>16–29.9 kg</td>
<td>1200–2200</td>
</tr>
<tr>
<td>15 years +</td>
<td>30 kg +</td>
<td>2200–4000</td>
</tr>
</tbody>
</table>

a Use the patient’s age only when you do not know the weight. The approximate amount of ORS required (in ml) can also be calculated by multiplying the patient’s weight (in grams) by 0.075.

• If the child wants more ORS than shown, give more.
• Encourage the mother to continue breastfeeding.
• For infants aged less than 6 months who are not breastfed, also give 100–200 ml clean water during this period.

Observe the child carefully and help the mother give ORS solution.
• Show her how much solution to give the child.
• Show her how to give it – a teaspoonful every 1–2 minutes for a child under 2 years, frequent sips from a cup for an older child.
• Check from time to time to see whether there are problems.
• If the child vomits, wait 10 minutes and then continue giving ORS, but more slowly, for example, a spoonful every 2–3 minutes.
• If the child’s eyelids become puffy, stop the ORS and give plain water or breast milk. Give ORS according to Plan A when the puffiness is gone.

After 4 hours, reassess the child using the assessment chart, then select Plan A, B or C to continue treatment
• If there are no signs of dehydration, shift to Plan A. When dehydration has been corrected, the child usually passes urine and may also be tired and fall asleep.
• If signs indicating some dehydration are still present, repeat Plan B but start to offer food, milk and juice as described in Plan A.
• If signs indicating severe dehydration have appeared, shift to Plan C.

If the mother must leave before completing Treatment Plan B:
• show her how much ORS to give to finish the 4-hour treatment at home;
• give her enough ORS packets to complete rehydration, and for 2 more days as shown in Plan A;
• how her how to prepare ORS solution; and
• explain to her the three rules in Plan A for treating her child at home:
  – to give ORS or other fluids until diarrhoea stops
  – to feed the child
  – to bring the child back to the health worker, if necessary.
Treatment plan C: to treat severe dehydration quickly

Follow the arrows. If the answer is "yes" go across. If "no" go down.

<table>
<thead>
<tr>
<th>Can you give intravenous (IV) fluids immediately?</th>
<th>Yes</th>
<th>Start IV fluids immediately. If the patient can drink, give ORS by mouth while the drip is set up. Give 100 ml Ringer's lactate solution per kg of body weight (or if not available, give normal saline), divided as follows:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>First give 30 ml/kg in:</td>
<td>Then give 70 ml/kg in:</td>
</tr>
<tr>
<td>Infants (under 12 months)</td>
<td>1 hour*</td>
<td>5 hours</td>
</tr>
<tr>
<td>Older</td>
<td>30 minutes*</td>
<td>2 1/2 hours</td>
</tr>
</tbody>
</table>

* Repeat once if radial pulse is still very weak or undetectable.
- Reassess the patient every 1–2 hours. If hydration is not improving, give the IV drip more rapidly.
- Also give ORS (about 5 ml/kg per hour) as soon as the patient can drink: usually after 2–4 hours (infants) or 1–2 hours (older patients).
- After 6 hours (infants) or 3 hours (older patients), evaluate the patient using the assessment chart. Then choose the appropriate Plan (A, B or C) to continue treatment.

| Is IV treatment available nearby (within 30 minutes)? | Yes | • Send the patient immediately for IV treatment. • If the patient can drink, provide the mother with ORS solution and show her how to give it during the trip. |
| No | | |

| Are you trained to use a nasogastric tube for rehydration? | Yes | • Start rehydration by tube with ORS solution: give 20 ml/kg per hour for 6 hours (total of 120 ml/kg). • Reassess the patient every 1–2 hours: – if there is repeated vomiting or increased abdominal distension, give the fluid more slowly; – if hydration is not improved after 3 hours, send the patient for IV therapy. • After 6 hours, reassess the patient and choose the appropriate treatment plan. |
| No | | |

| Can the patient drink? | Yes | • Start rehydration by mouth with ORS solution, giving 20 ml/kg/hour for 6 hours (total of 120 ml/kg). • Reassess the patient every 1–2 hours: – if there is repeated vomiting, give the fluid more slowly; – if hydration is not improved after 3 hours, send the patient for IV therapy. • After 6 hours, reassess the patient and choose the appropriate treatment plan. |
| No | | |

Urgent: send the patient for IV or nasogastric treatment.

If possible, observe the patient for at least 6 hours after rehydration to be sure the mother can maintain hydration giving ORS solution by mouth. If the patient is older than 2 years and there is cholera in the area, give an appropriate oral antibiotic after the patient has become alert.
COMMUNICABLE DISEASE TOOLKIT

SIERRA LEONE

7. GUIDELINES FOR COLLECTION OF SPECIMENS FOR LABORATORY TESTING
INTRODUCTION

There is a high risk of communicable disease outbreaks in emergency situations. Outbreaks must be recognized and controlled rapidly in order to minimize their impact. Effective containment of an outbreak depends on:

- early detection and reporting of suspect cases
- rapid epidemiological investigation
- rapid laboratory confirmation of the diagnosis
- implementation of effective control measures.

Rapid identification of the causative agent and the likely source or mode of transmission is essential. The initial investigation involves two important processes: collection of information on suspect cases and collection of clinical specimens for laboratory diagnosis. Successful laboratory confirmation of a disease depends on:

- advance planning
- collection of appropriate and adequate specimens
- correct packaging of specimens and rapid transport to an appropriate laboratory
- the ability of the laboratory to carry out the diagnostic tests
- proper biosafety and decontamination procedures to reduce the risk of further spread of the disease.

The purpose of this document is to ensure that the correct specimens are collected, packaged and transported in a safe and standardized manner during a field investigation of an outbreak in Sierra Leone or its neighbouring countries.

This section is adapted for emergency situations from the WHO document Guidelines for the collection of clinical specimens during field investigation of outbreaks, Geneva, World Health Organization, 2000 (WHO/CDS/CSR/EDC/200.4).
1. Planning for specimen collection

Once a suspected outbreak has been detected and reported, an epidemiological investigation must be quickly organised. The materials and procedures required for efficient collection of specimens and their transport to the laboratory for testing are outlined below.

1.1 Define the possible causes of the outbreak

An assessment of current clinical and epidemiological information is the starting point for considering the potential etiology of the outbreak. The historical knowledge of regional endemic and epidemic diseases, as well as their seasonality, further defines the possible causes. Since a variety of infectious agents can present with a similar clinical picture, the outbreak should be approached in a syndromic manner to obtain the differential diagnosis. One or more specimen types may be required to define the cause of the outbreak.

1.2 Decide which clinical specimens are required to confirm the cause of the outbreak

After defining the clinical syndrome and suspect pathogen(s), determine the clinical specimens for collection and appropriate laboratory diagnosis.

1.3 Laboratory for specimen testing

In the event of an outbreak, WHO will coordinate the transport of specimens and follow up on result of laboratory tests.

1.4 Collecting the specimens

For stools, the health worker should collect the sample, place in cold box and inform WHO. Transport to the laboratory should be done as soon as possible. For CSF the admitting physician should conduct the lumbar puncture and obtain the sample. Blood samples should be taken by the health worker.

2. Specimen collection and processing

Investigation should start as early as possible after a suspected outbreak has been notified. Specimens obtained in the acute phase of the disease, preferably before administration of antimicrobial drugs, are more likely to yield detectable concentrations of antibody, antigen or infective pathogen. Before beginning specimen collection, explain the procedure to the patient and relatives. When collecting the specimen avoid contamination and take a sufficient quantity of material (as guided by the laboratory tests). Follow the appropriate precautions for safety during collection and processing of samples.

2.1 Labelling and identification of specimens

In an outbreak investigation, the information contained in the case investigation and laboratory request forms is collected along with the specimen. Each patient should be assigned a unique identification number by the collection team. This is the link between the laboratory results on the line listing form, the specimens and the patient, which guides further investigation and response to the outbreak. This unique identification number and the patient's name should be present on all specimens, epidemiological data forms and the laboratory request and should be used as a common reference.

2.2 Labelling specimen container/slide

Labels (at least five) should be used whenever possible. The label should be permanently affixed to the specimen container and should include:

- patient's name
- unique identification number
- specimen type and date and place of collection
- name or initials of specimen collector.

2.3 Case investigation and laboratory forms

A case investigation form should be completed for each patient at the time of collection. A laboratory form must also be completed for each specimen. The original case investigation and laboratory forms should remain
with the investigation team, and should be kept together for analysis and later reference. The epidemiological and clinical data gathered in the investigation can later be easily tied to the laboratory results for analysis.

The form includes
- patient information: name, age (or date of birth), sex, and complete address;
- clinical information: date of onset of symptoms, clinical and immunization history, risk factors, antimicrobials taken before specimen collection;
- laboratory information: acute or convalescent specimen, other specimens from the same patient.

The form records the date and time when the specimen is received and the name of the person collecting the specimen.

3. Storage of specimens

To preserve bacterial or viral viability in specimens for microbiological culture or inoculation, they should be placed in appropriate media and stored at recommended temperatures. These conditions must be preserved throughout transport to the laboratory and will vary according to transportation time, nature of specimens and pathogens (sensitivity to desiccation, temperature, nutrient and pH).

Many specimens taken for viral isolation are viable for 2 days if maintained in type-specific media at 4–8 °C. Freeze these specimens as directed by expert advice, as infectivity may be altered.

Specimens for bacterial culture should be kept in appropriate transport media at the recommended temperature. This ensures bacterial viability while minimizing overgrowth of other microorganisms. With the exception of CSF, urine, and sputum, most specimens may be kept at ambient temperature if they will be processed within 24 hours. For longer periods, storage at 4–8 °C would be advisable with the exception of particularly cold-sensitive organisms, such as *Shigella*, *Meningococcus*, and *Pneumococcus*. Longer delays are not advisable as the yield of bacteria may fall significantly.

Specimens for antigen or antibody detection may be stored at 4–8 °C for 24–48 hours, or at −20°C for longer periods. Sera for antibody detection may be stored at 4–8 °C for up to 10 days. Although not ideal, sera stored at room temperature may still be useful for antibody testing even after prolonged periods (weeks). Therefore, sera that have been collected should not be discarded simply because there are no refrigeration facilities available.
### Appendix 1

**LABORATORIES FOR CONFIRMATION OF PRIORITY DISEASES IN SIERRA LEONE**

<table>
<thead>
<tr>
<th>Suspected organism/disease</th>
<th>Laboratory</th>
</tr>
</thead>
</table>
| *Vibrio cholerae* (O1): stool | • Connaught Hospital Laboratory, Freetown, Sierra Leone.  
• Institut Pasteur, Abidjan, Côte d’Ivoire  
• Institut Pasteur, Paris, France for confirmation |
| *Shigella dysenteriae* type 1: stool | • Connaught Hospital Laboratory, Freetown, Sierra Leone.  
• Institut Pasteur, Abidjan, Côte d’Ivoire  
• Institut Pasteur, Paris, France for confirmation |
| Meningitis: cerebrospinal fluid | • Rapid tests (latex agglutination) for meningococci available with some NGOs (e.g. MSF) in Sierra Leone  
• Institut Pasteur, Abidjan, Côte d’Ivoire, and Institut Pasteur, Paris, France, for confirmation of serotype  
• Transport for culture to Institut Pasteur, Paris, France |
| Measles, yellow fever (2 tubes): blood, serum | • Institut Pasteur, Abidjan, Côte d’Ivoire for confirmation |
| Acute flaccid paralysis: stool | • Institut Pasteur, Abidjan, Côte d’Ivoire for confirmation |
| Haemorrhagic fevers: blood, urine | • Hospitalier Universitaire Donka Viroloie, Conakry, Guinea  
• Special Pathogens Unit, National Institute for Communicable Diseases Private Bag X4, Sandringham 2131, South Africa  
• Viral Zoonosis Unit, HPA Laboratory, Colindale, London, England (via WHO) |
Appendix 2

BLOOD SPECIMEN COLLECTION

Blood and separated serum are the most common specimens taken in outbreaks of communicable disease. Venous blood can be used for isolation and identification of the pathogen in culture and by inoculation, or separated into serum for the detection of genetic material (e.g. by polymerase chain reaction), specific antibodies (by serology), antigens or toxins (e.g. by immunofluorescence). For the processing of most specimens for diagnosis of viral pathogens, serum is preferable to unseparated blood except where otherwise directed. When specific antibodies are being assayed, it is often helpful to collect paired sera, i.e. an acute sample at the onset of illness and a convalescent sample 1–4 weeks later. Blood can also be collected by finger prick for the preparation of slides for microscopy or for absorption onto special filter paper discs for analysis. Whenever possible, blood specimens for culture should be taken before antibiotics are administered to the patient.

Note: Collection of blood and other samples for investigation of viral hemorrhagic fevers is described in “Guidelines for outbreak control” in this Toolkit.

Venous blood samples

Materials for collection

- Skin disinfection: 70% alcohol (isopropanol, ethanol) or 10% povidone iodine, swabs, gauze pads, adhesive dressings.
- Disposable latex or vinyl gloves.
- Tourniquet, Vacutainer or similar vacuum blood collection devices, or disposable syringes and needles.
- Vacutainer or sterile screw-cap tubes (or cryotubes if indicated), blood culture bottles (50 ml for adults, 25 ml for children) with appropriate media.
- Labels and indelible marker pen.

Method of collection

Full infection control measures must be taken, with gowns, gloves, masks and boots for suspected viral haemorrhagic fever such as Lassa fever or Ebola.

- Place a tourniquet above the venepuncture site. Disinfect the tops of blood culture bottles.
- Palpate and locate the vein. The venepuncture site must be meticulously disinfected with 10% povidone iodine or 70% alcohol by swabbing the skin concentrically from the centre of the venepuncture site outwards. Let the disinfectant evaporate. Do not palpate the vein again. Perform venepuncture.
- If using conventional disposable syringes, withdraw 5–10 ml of whole blood from adults, 2–5 ml from children and 0.5–2 ml from infants. Using aseptic technique, transfer the specimen to the appropriate cap transport tubes and culture bottles. Secure caps tightly.
- If using a vacuum system, withdraw the desired amount of blood directly into each transport tube and culture bottle.
- Remove the tourniquet. Apply pressure to site until bleeding stops, and apply dressing.
- Label the tube, including the unique patient identification number, using indelible marker pen.
- Do not recap used sharps. Discard directly into the sharps disposal container.
- Complete the case investigation and the laboratory request forms using the same identification number.

Handling and transport

- Blood specimen bottles and tubes should be transported upright and secured in a screw-cap container or in a rack in a transport box. They should have enough absorbent paper around them to soak up all the liquid in case of spill.
- For serum samples (e.g. measles, yellow fever, HIV), the blood cells must be separated from serum. Let the clot retract for 30 minutes then centrifuge at 2000 rpm for 10–20 minutes and pour off serum. If no centrifuge is available, place sample in refrigerator overnight (4–6 hours) and pour off the serum for transport in a clean glass tube.
- Do not attempt this in case of suspected viral hemorrhagic fever unless you are a clinician/laboratory technician experienced in management of the disease. Full protection and infection control measures must be taken.
If the specimen will reach the laboratory within 24 hours, most pathogens can be recovered from blood cultures transported at ambient temperature. Keep at 4–8 °C for longer transit periods, unless the bacterial pathogen is cold-sensitive.
Appendix 3
CEREBROSPINAL FLUID (CSF) SPECIMEN COLLECTION

The specimen must be taken by a physician or a person experienced in the lumbar puncture procedure. CSF is used in the diagnosis of viral, bacterial, parasitic and fungal meningitis/encephalitis.

Materials for collection
Lumbar puncture tray which includes:
- sterile materials: gloves, cotton wool, towels or drapes
- local anaesthetic, needle, syringe
- skin disinfectant: 10% povidone iodine or 70% alcohol
- two lumbar puncture needles, small bore with stylet
- six small sterile screw-cap tubes and tube rack
- water manometer
- microscope slides and slide boxes
- Trans-Isolate media if available (must be kept at 4–8 °C while in storage; allow to get to room temperature before introducing CSF).

Method of collection
- As only experienced personnel should be involved in the collection of CSF samples, the method is not described in this document. CSF is collected directly into the screw-cap tubes. If the samples will not be promptly transported, separate tubes should be collected for bacterial and viral processing.
- If Trans-Isolate media is available, first ensure that the media has come up to room temperature, draw the collected CSF from the sterile tube and inject into the vacuum-sealed TransIsolate bottle. The bottle must be kept for at least 3 days at over 25°C to allow incubation.

Handling and transport
- In general, specimens should be delivered to the laboratory and processed as soon as possible.
- CSF specimens for bacteriology are transported at ambient temperature, generally without transport media. They must never be refrigerated as the pathogens do not survive well at low temperatures. If Trans-Isolate media available, follow the instructions on the packaging precisely.
- CSF specimens for virology do not need transport medium. They may be transported at 4–8 °C for up to 48 hours or at −70 °C for longer periods.
Appendix 4

FAECAL SPECIMEN COLLECTION

Stool specimens are most useful for microbiological diagnosis if collected soon after onset of diarrhoea (for viruses <48 hours and for bacteria <4 days), and preferably before the initiation of antibiotic therapy. If required, two or three specimens may be collected on separate days. Stool is the preferred specimen for culture of bacterial, viral and parasitic diarrhoeal pathogens. Rectal swabs showing faeces may also be used from infants but are not useful for the diagnosis of viruses.

Materials for collection

- Tubes with Cary-Blair transport medium
- Clean, dry, leak-proof, screw-cap container and tape if Cary-Blair transport medium is not available.
- Appropriate bacterial transport media for transport of rectal swabs from infants (ideally Cary-Blair).
- Parasitology transport pack: 10% formalin, polyvinyl isopropyl alcohol (PVA).

Method of collecting a stool specimen

If Cary-Blair transport medium is available:
- Place sterile swab in freshly passed stool to allow it soak up stool.
- Place swab in the Cary-Blair transport medium inside the tube.
- Break off the top part of the stick without touching the tube and tighten the screw cap firmly.
- Label the specimen tube.

If Cary-Blair transport medium is not available, collect freshly passed stool, 5 ml liquid or 5 g solid (pea-size), in a container. Label the container.

Method of collecting a rectal swab from infants

- Moisten a swab in sterile saline.
- Insert the swab tip just past the anal sphincter and rotate gently.
- Withdraw the swab and examine to ensure that the cotton tip is stained with faeces.
- Place the swab in sterile tube/container containing the appropriate transport medium.
- Break off the top part of the stick without touching the tube and tighten the screw cap firmly.
- Label the specimen tube.

Handling and transport

- Stool specimens should be transported in a cold-box at 4–8 °C. Bacterial yields may fall significantly if specimens are not processed within 1–2 days of collection. *Shigella* is particularly sensitive to elevated temperatures. If transport medium is not available, do not allow specimen to dry – add few drops of 0.85% sodium chloride solution.
- Specimens to be examined for parasites should be mixed with 10% formalin or PVA, 3 parts stool to 1 part preservative. Transported at ambient temperature in containers sealed in plastic bags.
Appendix 5

RESPIRATORY TRACT SPECIMEN COLLECTION

Specimens are collected from the upper or lower respiratory tract, depending on the site of infection. Upper respiratory tract pathogens (viral and bacterial) are found in throat and nasopharyngeal specimens. Lower respiratory tract pathogens are found in sputum specimens. For organisms such as *Legionella*, culture is difficult, and diagnosis is best based on the detection of antigen excreted in the urine.

When acute epiglottitis is suspected, no attempt should be made to take throat or pharyngeal specimens since these procedures may precipitate respiratory obstruction. Epiglottitis is generally confirmed by lateral neck X-ray, but the etiological agent may be isolated on blood culture.

Materials for collection
- Transport media – bacterial (Trans Amies) and viral (Cellmatics)
- Dacron and cotton swabs
- Tongue depressor
- Flexible wire calcium alginate-tipped swab (for suspected pertussis)
- Nasal speculum (for suspected pertussis – not essential)
- Suction apparatus or 20–50-ml syringe
- Sterile screw-cap tubes, and wide-mouthed clean sterile jars (minimum volume 25 ml).

Upper respiratory tract specimens

Method of collecting a throat swab
- Hold the tongue down with the depressor. Use a strong light source to locate areas of inflammation and exudate in the posterior pharynx and the tonsillar region of the throat behind the uvula.
- Rub the area back and forth with a Dacron or calcium alginate swab. Withdraw the swab without touching cheeks, teeth or gums and insert into a screw-cap tube containing transport medium.
- Break off the top part of the stick without touching the tube and tighten the screw cap firmly.
- Label the specimen containers.
- Complete the laboratory request form.

Method of collecting nasopharyngeal swabs (for suspected pertussis)
- Seat the patient comfortably, tilt the head back and insert the nasal speculum.
- Insert a flexible calcium alginate/Dacron swab through the speculum parallel to the floor of nose without pointing upwards. Alternatively, bend the wire and insert it into the throat and move the swab upwards into the nasopharyngeal space.
- Rotate the swab on the nasopharyngeal membrane a few times, remove it carefully and insert it into a screw-cap tube containing transport medium.
- Break off the top part of the stick without touching the tube and tighten the screw cap firmly.
- Label the specimen tube, indicating left or right side.
- Complete the laboratory request form.
- Repeat on the other side.

Lower respiratory tract specimens

Method of collecting sputum
- Instruct patient to take a deep breath and cough up sputum directly into a wide-mouthed sterile container. Avoid saliva or postnasal discharge. Minimum volume should be about 1 ml.
- Label the specimen container.
- Complete the laboratory request form.

Handling and transport
- All respiratory specimens except sputum are transported in appropriate bacterial/viral media.
- Transport as quickly as possible to the laboratory to reduce overgrowth by commensal oral flora.
• For transit periods up to 24 hours, transport bacterial specimens at ambient temperature and viruses at 4–8 °C in appropriate media.
Appendix 6

URINE SPECIMEN COLLECTION

Material for collection
- Sterile plastic cup with lid (50 ml or more).
- Clean, screw-top specimen transport containers ("universal" containers are often used).
- Gauze pads.
- Soap and clean water (or normal saline) if possible.
- Labels and indelible marker pen.

Method of collection
- Give the patient clear instructions to pass urine for a few seconds, and then to hold the cup in the urine stream for a few seconds to catch a mid-stream urine sample. This should decrease the risk of contamination from organisms living in the urethra.
- To decrease the risk of contamination from skin organisms, the patient should be directed to avoid touching the inside or rim of the plastic cup with the skin of the hands, legs or external genitalia. Tighten the cap firmly when finished.
- For hospitalized or debilitated patients, it may be necessary to wash the external genitalia with soapy water to reduce the risk of contamination. If soap and clean water are not available, the area may be rinsed with normal saline. Dry the area thoroughly with gauze pads before collecting the urine.
- Urine collection bags may be necessary for infants. If used, transfer urine from the urine bag to specimen containers as soon as possible to prevent contamination with skin bacteria. Use a disposable transfer pipette to transfer the urine.
- Label the specimen containers.

Handling and transport
- Transport to the laboratory within 2–3 hours of collection. If this is not possible, do not freeze but keep the specimen refrigerated at 4–8 °C. Keeping the specimen refrigerated will reduce the risk of overgrowth of contaminating organisms.
- Ensure that transport containers are leak-proof and tightly sealed.
Appendix 7  
SAMPLE COLLECTION FOR VHF INVESTIGATION

All invasive procedures and investigations should be minimized until the diagnosis of VHF is confirmed or excluded. Only the specific diagnostic samples needed should be obtained from acutely ill patients.

Other routine blood samples should be avoided when investigating a case of VHF.

The blood samples should be kept in their original tube (sealed sterile dry tubes, Monovettes or Vacutainer type).

Do not attempt to separate serum or plasma from blood clots in the field – this may be highly risky in case of VHF. If these procedures are needed they should be performed at the reference laboratory.

Each collected sample must be identified as “high risk”. Labels prepared in advance for both specimens collected and laboratory request forms should bear the patient’s name, the date of collection and a coded link to the corresponding record of the case.

Precautions for sampling

In addition to basic safety precautions, certain other specific precautions and additional safety equipment is essential when investigating cases of VHF to protect skin and mucous membranes against the pathogens.

Blood specimens should be taken by a doctor or nurse experienced in the procedure. Urine samples should also be handled carefully: a 20-ml syringe may be used to transfer urine from a bedpan to the specified container.

Protective clothing should always be worn when handling specimens from suspected VHF cases:
- protective gown
- waterproof protective apron
- two pairs of latex gloves
- particulate filter face mask
- goggles
- rubber boots.

Method of collection

- Observe all the basic safety precautions when obtaining specimens samples from suspected VHF cases.
- For taking blood samples, it is advisable the use of a vacuum blood-sampling system (Monovette or Vacutainer); however, you may use the equipment and procedure you are most familiar with to avoid the risk of accidents or spills.
- Withdraw 5–10 ml of whole blood from adults, 2–5 ml from children and 0.5–2 ml from infants, directly into the transport tube (blood sample tube).
- Avoid the use of disposable alcohol swabs to apply pressure to venepuncture wounds; it is advisable to use dry cotton wool balls or gauze swabs.
- After the sample has been taken, the blood sample tube should be externally disinfected by wiping with 0.5% hypochlorite solution (see Appendix 8).

Removing protective clothing

- When the procedure is finished, remove the apron. Before removing the outer pair of gloves, wash your hands with soap and water and rinse them in 0.5% hypochlorite solution (see Appendix 8) for 1 minute.
- Keep the inner gloves on while removing goggles, mask, anything used to cover the head and the external gown; before removing boots soak them in 0.5% hypochlorite solution. Finally, remove the gloves and the inner gown. Then wash your hands well with soap and water and disinfect them with 70% isopropanol or 10% povidone iodine.
- Dispose of all protective clothing, gloves, and materials in a plastic bag and incinerate everything.
• Remember never to recap used sharps. Discard them directly into sharps disposal container for later incineration.

Handling and transport of samples of suspected VHF cases
Particular care is essential to prevent external contamination of specimen containers during specimen collection.

• The blood sample tube should be transported upright and secured in a leak-proof secondary container with a screw-cap and sufficient absorbent material to absorb all the contents should leakage occur. Ensure that the container is tightly capped and labelled (specimen record). The secondary container should be externally disinfected by wiping with 0.5% hypochlorite solution (see Appendix 8).
• Specimen data forms, letters and information that identifies or describes the specimen and also identifies the shipper and receiver should be taped to the outside of the secondary container.
• The secondary container is then placed in a third container (transport box). The outer part of the transport box should be clearly marked with the biohazard label and should bear an address label that clearly identifies the specimen, the shipper and the receiver.

If the blood sample cannot be processed the same day, ice packs must be placed in the transport box to keep the sample cold (4—8 °C). Whole blood samples should not be frozen.

Note: All materials needed for the sample handling and transport are included in “Specimen transport module” in Annex 8, Outbreak investigation kit, of this Toolkit. More information may be found in Guidelines for the collection of clinical specimens during field investigation of outbreaks, Geneva, WHO, 2000.
Appendix 8

CHEMICAL DISINFECTANTS

Chlorine is the recommended disinfectant for use in field outbreak investigations. An all-purpose disinfectant should have a concentration of 0.1% (= 1 g/litre = 1000 ppm) of available chlorine; a stronger solution of 0.5% (= 5 g/litre = 5000 ppm) should be used in situations such as suspected Lassa and Ebola virus outbreaks.

In preparing appropriate dilutions, one must keep in mind that different products have different concentrations of available chlorine. The manufacturer may provide appropriate instructions for the preparation of solutions with the above concentrations. Otherwise, the guidelines provided below may be used. Chlorine solutions gradually lose strength, and so fresh solutions must be prepared daily. Clear water should be used because organic matter destroys chlorine.

Commonly used chlorine-based disinfectants include:

Sodium hypochlorite

Commercial liquid bleaches, such as household bleach (e.g. Chlorox, *eau de javel*) generally contain 5% (50 g/litre or 50 000 ppm) available chlorine.

*To prepare a 0.1% chlorine solution:* make a 1 in 50 dilution, i.e. 1 part bleach in 49 parts water, to give a final concentration of available chlorine of 0.1%. (For example, add 20 ml of bleach to approximately 1 litre of water.)

*To make a 0.5% chlorine solution:* make a 1 in 10 dilution, i.e. 1 part bleach in 9 parts water, to give a final concentration of available chlorine of 0.5%. (For example, add 100 ml of bleach to 900 ml water.)

Chloramine powder

While the bleach solution described above may satisfy all disinfection needs, chloramine powder may prove convenient for disinfecting spills of blood and other potentially infectious body fluids. It may also be useful under field conditions because of ease of transport. It contains approximately 25% available chlorine.

In addition to its use for spills, chloramine powder may be used to prepare liquid chlorine solutions. The recommended formula is 20 g of chloramine powder to 1 litre of clean water.

Decontamination of surfaces

Wear an apron, heavy duty rubber gloves and other barrier protection if needed, and wipe surfaces clean with an absorbent material. Disinfect surfaces by wiping with a 1:10 dilution of household bleach, and incinerate all absorbent material in heavy-duty garbage bags.

Decontamination of blood or body fluid spills

Spills should be very liberally sprinkled with chloramines granules to absorb the liquid and left for at least 30 minutes. If chloramine powder is not available, absorbent materials may be used to soak up most of the fluid before disinfection with 0.5% liquid bleach. These absorbent materials must then be disinfected in bleach before disposal.

Sterilization and reuse of instruments and materials

In a field outbreak situation, it is not advisable to consider sterilization and reuse of any instruments or materials. Sterilization techniques are therefore not required and are not described in this document.

Disinfection of hands

The principal means for disinfection of hands is thorough washing with soap and water. If available, commercial hand disinfectants such as chlorhexidine or povidone iodine may be used.
COMMUNICABLE DISEASE TOOLKIT

SIERRA LEONE

8. OUTBREAK INVESTIGATION KIT
## Communicable Disease Toolkit for SIERRA LEONE: Outbreak Investigation Kit

### 1. Basic consumables module

<table>
<thead>
<tr>
<th>Item</th>
<th>Unit</th>
<th>Quantity/kit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cotton wool, 100 %, surgical quality</td>
<td>roll of 500 g</td>
<td>5</td>
</tr>
<tr>
<td>Ballpoint pen</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Pencil</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Eraser</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Felt-tip pen (waterproof)</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Marking pens, water-resistant ink, black and blue</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Notebook (A4, hard cover, squared paper)</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Labels (blank, self-adhesive)</td>
<td>series</td>
<td>5</td>
</tr>
<tr>
<td>Ruler</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Calculator</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Scissors</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Thermometer</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Torch light</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Sealing tape</td>
<td>roll</td>
<td>5</td>
</tr>
<tr>
<td>Normal saline (0.9%)</td>
<td>500 ml</td>
<td>5</td>
</tr>
<tr>
<td>Sharps container for disposal of needles and syringes, of about 3 litres capacity</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Chlorine granules 500 mg / containers</td>
<td></td>
<td>5</td>
</tr>
</tbody>
</table>

### 2. Common consumables for collection of all specimens

<table>
<thead>
<tr>
<th>Item</th>
<th>Unit</th>
<th>Quantity/kit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gauze swabs, 10 x 10 cm, 100% cotton, 12-ply, 17-thread, sterile</td>
<td>10x10pcs/box</td>
<td>5</td>
</tr>
<tr>
<td>Disinfecting swab, impregnated with 70% isopropanol</td>
<td>100 pcs/box</td>
<td>5</td>
</tr>
<tr>
<td>Microscope slides, 76 x 26 mm, cut edges</td>
<td>50 pcs/box</td>
<td>5</td>
</tr>
<tr>
<td>Cover glasses, 22 x 22 mm</td>
<td>1000pcs/box</td>
<td>5</td>
</tr>
<tr>
<td>Storing box for microslides, wooden frame, for 25 pcs each</td>
<td>10 boxes/pack</td>
<td>5</td>
</tr>
<tr>
<td>Universal container, 70 ml, 55 x 44 mm, reliable sealing and PE cap, machine-sterile with standard label</td>
<td>1000 boxes/pack</td>
<td>5</td>
</tr>
<tr>
<td>Braunoderm (alcohol+PVP-IOD) for surgical scrub, against bacteria, fungus, virus incl. HBV and HIV</td>
<td>1 litre/contain</td>
<td>5</td>
</tr>
<tr>
<td>Povidone Iodine solution</td>
<td>500 ml/contain</td>
<td>5</td>
</tr>
<tr>
<td>Disinfecting solution for hands</td>
<td></td>
<td>5</td>
</tr>
</tbody>
</table>

### 3. Blood module

<table>
<thead>
<tr>
<th>Item</th>
<th>Unit</th>
<th>Quantity/kit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blood lancets, sterile, disposable</td>
<td>pack of 200</td>
<td>5</td>
</tr>
<tr>
<td>Monovettes (orange cap, 10 ml)</td>
<td>pack of 100</td>
<td>1</td>
</tr>
<tr>
<td>Monovettes (red cap, EDTA, 3 ml)</td>
<td>pack of 100</td>
<td>1</td>
</tr>
<tr>
<td>Needles for Monovettes 21G</td>
<td>pack of 100</td>
<td>1</td>
</tr>
<tr>
<td>Needles for Monovettes 23G</td>
<td>pack of 100</td>
<td>1</td>
</tr>
<tr>
<td>Butterfly needles for blood culture 21G</td>
<td>pack of 100</td>
<td>1</td>
</tr>
<tr>
<td>Disposable soft transfer pipettes</td>
<td>pack of 1000</td>
<td>1</td>
</tr>
<tr>
<td>Racks for blood tubes</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Adhesive dressings (small)</td>
<td>pack</td>
<td>5</td>
</tr>
<tr>
<td>Blood culture bottles (Hemoline performance DUO, children)</td>
<td>12 vials/pack</td>
<td>5</td>
</tr>
<tr>
<td>Blood culture bottles (Hemoline performance diphasic)</td>
<td>12 vials/pack</td>
<td>5</td>
</tr>
<tr>
<td>Tourniquets with clip</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Item</td>
<td>Unit</td>
<td>Quantity/kit</td>
</tr>
<tr>
<td>------</td>
<td>------</td>
<td>--------------</td>
</tr>
<tr>
<td><strong>4. Respiratory module</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tongue depressor</td>
<td>pack of 100</td>
<td>5</td>
</tr>
<tr>
<td>Flexible wire calcium alginate tipped swab (for Pertussis)</td>
<td>pack of 100</td>
<td>1</td>
</tr>
<tr>
<td>Syringe for suction, 50/60 ml, with catheter tip</td>
<td>pack of 60</td>
<td>2</td>
</tr>
<tr>
<td>Transport swabs with Trans Amies transport medium</td>
<td>pack of 1000</td>
<td>1</td>
</tr>
<tr>
<td>Virus transport medium (Cellmatics)</td>
<td>pack of 50</td>
<td>1</td>
</tr>
<tr>
<td><strong>5. Urine module</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urine container with boric acid, PS w/screw cap, 30 ml (sterile)</td>
<td>400/pack</td>
<td>1</td>
</tr>
<tr>
<td><strong>6. Stool module</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rectal swabs for adults</td>
<td></td>
<td>25</td>
</tr>
<tr>
<td>Rectal swabs for infants</td>
<td></td>
<td>25</td>
</tr>
<tr>
<td>Stool collection tubes with spoon</td>
<td>pack of 400</td>
<td>1</td>
</tr>
<tr>
<td>Tubes with Cary-Blair transport medium</td>
<td></td>
<td>100</td>
</tr>
<tr>
<td><strong>7. CSF module</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sterile cotton swab</td>
<td>100/pack</td>
<td>5</td>
</tr>
<tr>
<td>Bottle with TransIsolate media</td>
<td></td>
<td>100</td>
</tr>
<tr>
<td>Spinal needle, 25G x 3.5</td>
<td>25/box</td>
<td>5</td>
</tr>
<tr>
<td>Spinal needles, 23G x 3.5</td>
<td>25/box</td>
<td>5</td>
</tr>
<tr>
<td>Needle for transfer into medium, 21G</td>
<td>100/box</td>
<td>1</td>
</tr>
<tr>
<td>Microtube, 2.0 ml, with mouth screw cap and skirted base</td>
<td>50/bag</td>
<td></td>
</tr>
<tr>
<td>Local anaesthetics (lidocaine 2%, 2ml), 25G needle, 5-ml syringe</td>
<td></td>
<td>100</td>
</tr>
<tr>
<td><strong>8. Self-protection module</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disposable surgical gowns</td>
<td></td>
<td>10</td>
</tr>
<tr>
<td>Disposable surgical face masks</td>
<td>50 pcs/box</td>
<td>5</td>
</tr>
<tr>
<td>Disposable gloves: S, M, L</td>
<td>100 pcs/box</td>
<td>5</td>
</tr>
<tr>
<td>Goggles,</td>
<td></td>
<td>10</td>
</tr>
<tr>
<td>Face-mask,</td>
<td></td>
<td>10</td>
</tr>
<tr>
<td>Disposable surgical caps, size M</td>
<td>50 pcs/box</td>
<td>5</td>
</tr>
<tr>
<td>Rubber surgical boots</td>
<td>pair, size 42</td>
<td>5</td>
</tr>
<tr>
<td>Disposable impermeable shoe cover, length 38 cm</td>
<td>100 pcs/bag</td>
<td>5</td>
</tr>
<tr>
<td>Impermeable aprons, 90 x 112 cm</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Visors/face-shields</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td><strong>9. Specimen transport module</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Specimen carrier (cool box), Electrolux, model RCW 8/CF</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Icepacks,</td>
<td>set of 24</td>
<td>5</td>
</tr>
<tr>
<td>Microcentrifuge tube rack</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Complete combination packaging for infectious substances, BioPack 2 with 1.5-litre BioJar</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>CL-4 thermal control unit, polystyrene box set in fibreboard case with all labels and instructions</td>
<td></td>
<td>5</td>
</tr>
</tbody>
</table>