

COMMUNICABLE DISEASE TOOLKIT

LIBERIA

6. CASE MANAGEMENT OF EPIDEMIC-PRONE DISEASES



World Health Organization
Geneva

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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 may 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

- Collect specimens from case with current bloody diarrhoea and onset of illness <4 days who has not been given antimicrobials for this illness.
- Fresh stools in sterile container must be kept at 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.
- Where transport to the laboratory will take longer, Cary-Blair transport media must be used.
- Transport container should be well insulated with 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* types 1 (Sd1) from stool samples.

Table 1. High-risk patients

- | |
|---|
| <ul style="list-style-type: none">• Children under 5 years of age, but especially infants, severely malnourished children and children who have had measles in the past 6 weeks• Older children and adults who are obviously malnourished• A patient who is severely dehydrated, has had a convulsion, or is seriously ill when first seen• Adults aged 50 years or more |
|---|

Standard treatment regimens:

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

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

B. 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. 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, if available, for 5 days, otherwise continue full 5-day course of first-line drug. Use only one of the following antibiotics:

Antibiotic	Doses	Children		Adults
		1–5 years	5–15 years	
Ciprofloxacin 500 mg	30 mg/kg divided, 2 times/day for 3 days	½ tab, twice a day for 3 days	1 tablet, twice a day for 3 days	1 tablet, twice a day for 3 days

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 of 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 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 cholera*, 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), case–fatality rate 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 within for 7–14 days after collection.

Case management

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

Laboratory criteria: Isolation of *Vibrio cholerae* O1 or O139 from stools

The prevention and treatment of dehydration are the mainstay in the management of cholera:

- STEP 1 Assess for dehydration (see Annex)
- STEP 2 Rehydrate and monitor frequently
- STEP 3 Maintain hydration: replace ongoing fluid losses until diarrhoea stops
- STEP 4 Give oral antibiotics 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:

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

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

B. Give antibiotics for severe cholera cases only.

Antibiotic	Dose	Children			Adults	Pregnant women
		Under 1 year	1–5 years	5–15 years		
Erythromycin 250 mg	30 mg /kg Divided, 4 times/day 3 days	¼ tablet 4 times/day 3 days	½ tablet 4 times/day 3 days	1 tablet 4 times/day 3 days	2 tablets 4 times/day 3 days	2 tablets 4 times/day 3 days
Doxycycline	300 mg single dose				3 tablets	

- **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 IV fluids are expected to reach critical levels in respect of case management capacity.
- An antibiotic sensitivity profile 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 the mouth and anus of the corpse 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 outbreak.
- Chemoprophylaxis and quarantine measures are not effective in containing 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 enterica* serovar Typhi (S. 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 case–fatality rate can be reduced to 1%.
- Relapses occur in 3–4% of cases.
- Some strains of S. 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; a single injection provides effective protection 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 also occur).

Laboratory criteria: isolation of relevant serovars of *S. Typhi* from stool or blood of patient.

Standard treatment regimens:

- A. Rehydrate with ORS or IV solution, depending on the severity. (See Annex for assessment and treatment of diarrhoea and dehydration.)**
- B. 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. Only one of the following **antibiotics** should be used:

Susceptibility	Antibiotic	Daily dose	Days
Fully sensitive	Chloramphenicol	50–75 mg/kg	14–21
	Amoxicillin	75–100 mg/kg	14
	Co-trimoxazole	8–40 mg/kg	14
Multidrug resistance	Cefixime	15–20 mg/kg	7–14
	Azithromycin	8–10 mg/kg	7

Treatment of complications

Treatment for complications may include rest, diuretics, ionotropes, and anti-arrhythmic drugs for myocarditis, replacement blood components for bone marrow suppression, and blood transfusion for the 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 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 typhoid (Table 8).

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

4. 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 from 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 has 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 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 develops following infection, but the duration of this 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 with 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 hemorrhages, 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, 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 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, such as Sierra Leone, the alert threshold may be defined according to baseline data.

Diagnosis

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

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 (post-mortem diagnosis);
- serological diagnosis – demonstrating the presence of specific IgM antibody to Lassa virus or/and a fourfold rise in titre of IgG antibody between acute- and convalescent-phase serum specimens.

The most common diagnostic test is the enzyme-linked immunosorbent 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 combination of analyses using ELISA for IgM antibody (acute infection) and IgG antibody and Lassa antigen. (PCR and ELISA antigen detection)

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 distinguished 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. All medication should be given intravenously or orally: intramuscular and subcutaneous injections are contraindicated because of the risk of haematomas. *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. Side-effects of ribavirin are restricted largely to reversible haemolysis. Lassa fever convalescent plasma has not been 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 (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 by the oral or intravenous route. Intramuscular and subcutaneous injections are contraindicated because of the risk of haematomas.

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
- *Infection control for viral haemorrhagic fevers in the African health care setting*. Geneva, WHO, 1998 (WHO/EMC/ESR/98.2, available at: http://www.who.int/emc-documents/haem_fevers/whoemcesr982c.html)

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 of this Toolkit
- Annex 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.

5. 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 group is 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 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 immunization is 6 months to 15 years, with vitamin A supplementation for children aged 6–59 months. Those vaccinated between the ages of 6 and 9 months must have another dose on reaching 9 months of age.

Clinical Features

- 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 measles 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: compromises 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:

Symptoms	Signs
Ability to take feeds of fluids	Nutritional status
Cough and difficult breathing	Breathing rate, chest indrawing, stridor
Diarrhoea or blood in stools	Dehydration and fever
Sore mouth, eyes or ears	Mouth ulcers, sore and discharging ears and eyes, white spots on eyes, level of consciousness

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 giving paracetamol.
- Maintain good hydration: treat diarrhoea with ORS.
- Observe closely for complications.
- Give prophylaxis against xerophthalmia: vitamin A on day 1 and day 2

	Day 1	Day 2
Infants <6 months	50 000 IU	50 000 IU
Infants 6–11 months	100 000 IU	100 000 IU
Children >11 months	200 000 IU	200 000 IU

- 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 infectious period.
- If there are high numbers of cases, it may be necessary to set up a small unit for children with measles, as these children and their mothers need considerable supportive care.
- Use antimicrobials only when indicated.
- 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 antimicrobial 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.

6. 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, C and W).
- *N. meningitidis* also causes meningococcal septicaemia – this is 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 a number of viruses such as Coxsackie virus or Enterovirus.
- Displaced populations are at increased risk of meningitis due to 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, case–fatality rates in meningococcal meningitis without appropriate treatment 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 and w135 and are very effective in controlling epidemics. In rapid mass campaigns, vaccination can contain an outbreak within 2–3 weeks. For individuals aged over 2 years, vaccine efficacy 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.

Bacterial meningitis if:

WCC measurement: >1000 cells/mm³ (<3 in normal CSF) with >60% polymorphs

Protein: >0.80 g/l (<0.60 g/l in normal CSF)

Gram stain: Gram-negative diplococci in 80% of cases not previously treated

Differential diagnosis of bacterial meningitis

Viral meningitis: do lumbar puncture and examine CSF

Case management

- Bacterial, particularly meningococcal, meningitis is potentially fatal and is a medical emergency.
- Viral meningitis is rarely serious and requires 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 2. Initial empirical antimicrobial therapy for presumed bacterial meningitis

Age group	Probable pathogens	Antimicrobial – first choice	Alternative
In epidemic situations: all age groups	<i>N. meningitidis</i>	Oily chloramphenicol	Ampicillin Ceftriaxone or Cefotaxime Co-trimoxazole Benzylpenicillin
In non-epidemic situations: adults children >5 years	<i>N. meningitidis</i> <i>S. pneumoniae</i>	Benzylpenicillin or oily chloramphenicol	Ampicillin Ceftriaxone or cefotaxime Co-trimoxazole
children 1 m – 5 y	<i>H. influenzae</i> <i>S. pneumoniae</i> <i>N. meningitidis</i>	Ampicillin or amoxicillin Chloramphenicol	Ceftriaxone or cefotaxime
neonates	Gram-negative bacteria Group B streptococci <i>Listeria</i>	Ampicillin and gentamicin	Ceftriaxone or cefotaxime Chloramphenicol

- IV benzylpenicillin, ampicillin, ceftriaxone or cefotaxime is recommended for bacterial meningitis; however, ceftriaxone and cefotaxime are very expensive.
- In patients who cannot be given drugs 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 by giving diazepam IV or rectally.
- Nurse patients 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

Agent	Route	Daily dose – adults	Daily dose – children	Duration (days)	Cost ^a
Benzylpenicillin	IV	3–4 Million Units 4–6 times	400 000 U/kg	>4	low
Ampicillin/ amoxicillin	IV	2–3 g twice	250 mg/kg	>4	moderate
Amoxicillin	Oral	2–3 g twice	250 mg/kg	>4	high
Chloramphenicol	IV	1 g 2–3 times	100 mg/kg	>4	moderate
Chloramphenicol (oily)	IM	3 g single dose	100 mg/kg	1–2	low
Cefotaxime	IV	2 g twice	250 mg/kg	>4	very high
Ceftriaxone	IV	1–2 g once or twice	50–80 mg/kg	>4	Low
Ceftriaxone	IM	1–2 g, single dose	50–80 mg/kg	1–2	Low
Co-trimoxazole	IV/IM	2 g SMZ twice	100 mg/kg	>4	moderate
Co-trimoxazole	Oral	2 g SMZ twice	100 mg/kg	>4	low
Sulfadiazine	IV	1 g six times	200 mg/kg	>4	low

Guide to cost of full treatment: low <US\$ 10; medium US\$ 10–50; high US\$ 50–250, very high > \$250

7. 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 by 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 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 aged 9 months up to 14 years.

Clinical features

- An *acute phase* lasting 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 urine production
 - bleeding from the gums or 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 an 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 post-mortem 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 between 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 antibiotics recommended for your area.

ANNEX

ASSESSMENT AND TREATMENT OF DIARRHOEA

Table A1. Assessment of diarrhoeal patients for dehydration

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

^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.

Source: *The treatment of diarrhoea: a manual for physicians and other senior health workers*. Geneva, World Health Organization, 1995 (document WHO/CDR/95.3).

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.

A. 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 yogurt 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.

B. 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.

C. 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
- 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
- if 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.

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

- 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

	Age ^a					
	< 4 months	4–11 months	12–23 months	2–4 years	5–14 years	15 years +
Weight	0 – < 5 kg	5–7.9 kg	8–10.9 kg	11–15.9 kg	16–29.9 kg	30 kg +
In ml	200–400	400–600	600–800	800–1200	1200–2200	2200–4000

^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 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

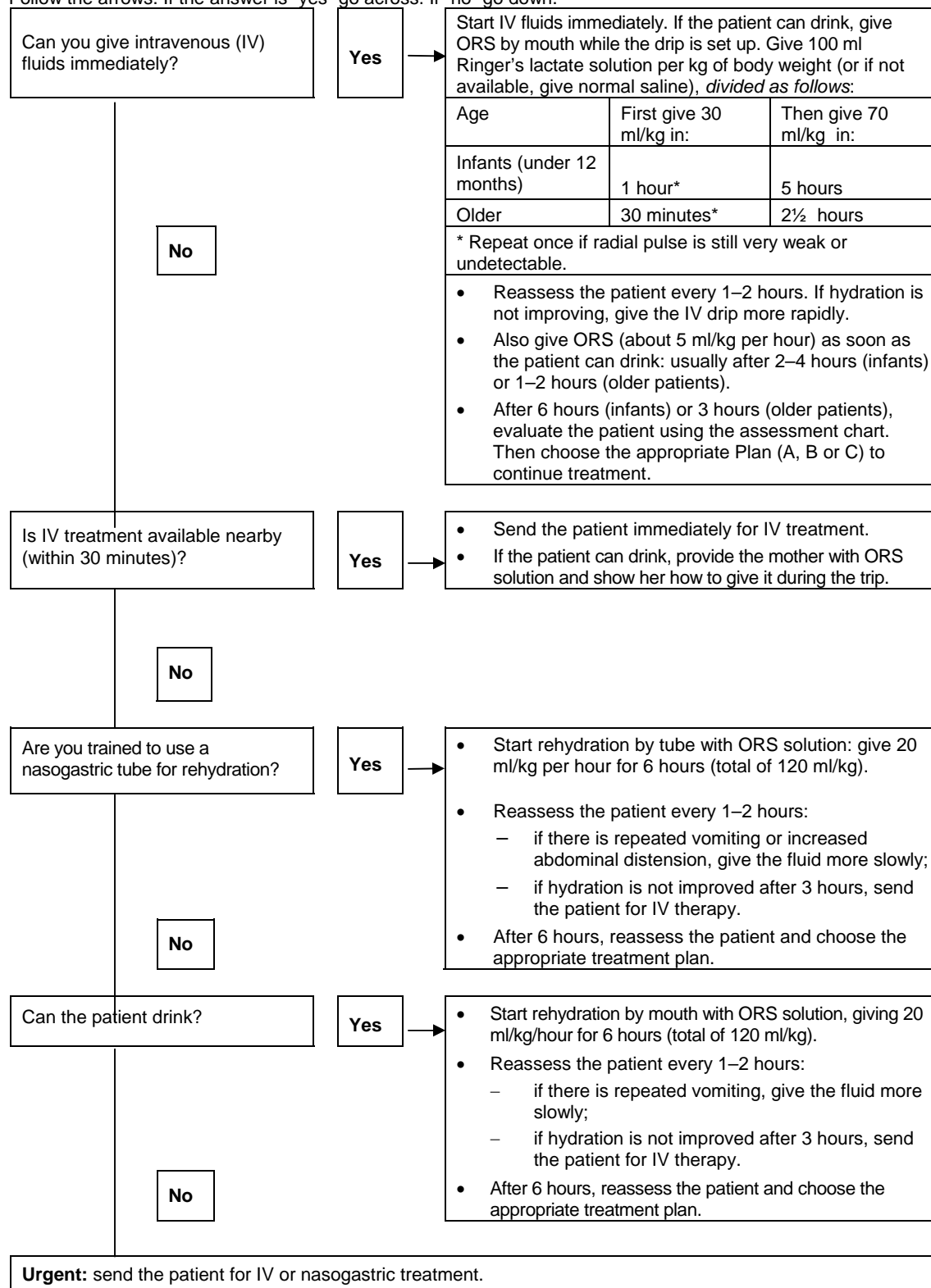
- If there are no signs of dehydration, shift to Plan A. When dehydration has been corrected, the child usually passes urine and may also be tired and fall asleep.
- If signs indicating some dehydration are still present, repeat Plan B but start to offer food, milk and juice as described in Plan A.
- 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;
- show 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.



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.