

Ministry of Health

Standard Operating Procedures

**Detection, Confirmation and
Management of a Dysentery Outbreak
caused by Shigella Dysenteriae type 1**

Contents

Introduction.....	3
Objectives	3
General Objective	3
Specific Objective.....	3
Epidemiology.....	3
Infectious agent.....	3
Disease burden.....	4
Reservoirs and mode of transmission	4
Risk factors for outbreak.....	4
Detection and confirmation of an outbreak.....	4
Early warning.....	4
Case definition	4
Detection of a suspected outbreak	5
Alert thresholds for an evolving outbreak.....	5
Outbreak investigation.....	5
Steps in detection and confirmation of a Dysentery outbreak	7
Public health response and control strategies for management of dysentery outbreak.....	9
Management of patients with bloody diarrhea.....	9
Temporary hospital	10
Personal Hygiene	10
Safe Water.....	10
Sanitation	11
Disinfection.....	12
Health Education.....	12
Food safety.....	13

1. Introduction

Dysentery, often, clinically manifested by “acute bloody diarrhoea” is endemic in many developing countries. Endemic dysentery is caused by a number of organisms including bacteria from *Shigella* species. Amongst the *Shigella* species, *Shigella dysenteriae type 1 (Sd1)* represents a particular threat because it is the only strain responsible for causing large scale epidemics of dysentery, particularly amongst displaced population and in refugee camps. Other than the *Shigella* species, endemic dysentery may be caused by *Campylobacter jejuni*, enteroinvasive *Escherichia coli*, *Salmonella* and infrequently by *Entamoeba histolytica*. Amongst these organisms, *Shigella Dysenteriae Type 1 (Sd1)*.

This Standard Operating Procedure (SOP) is intended to assist the peripheral health authorities as well as the public health officers with evidence based guidance and standardized procedures for detection and confirmation of a dysentery outbreak including prevention and control of endemic shigellosis as well as outbreaks due to Sd1.

2. Objectives

2.1. General Objective

The general objective of this “Standard Operative Procedure (SOP)” is to prompt detect, confirm, and appropriately respond to dysentery outbreaks caused by *Shigella* species including that caused by *Shigella dysenteriae Type 1 (Sd1)*

2.2. Specific Objective

To systematically collect and analyze epidemiological data on suspected cases for early detection, raising outbreak alert and confirmation of any dysentery outbreak caused by *shigella* species;

To conduct rapid laboratory confirmation of causal pathogens through systematic collection and investigation of stool specimens;

To assist in public health decision making towards prevention and control of the dysentery outbreak caused by *Shigella* species once an outbreak has been confirmed.

3. Epidemiology

3.1. Infectious agent

Most cases of dysentery are caused by *Shigella*. They are classified into four species:

S. dysenteriae, *S. flexneri*, *S. boydii*, and *S. sonnei*. Of these species, one particular serotype of *S. dysenteriae* family, the *Shigella dysenteriae type 1 (Sd1)* represents a particular threat because of the severity of the disease and its epidemic potential. *Shigella dysenteriae*

type 1 (Sd1) is an unusually virulent enteric pathogen that produces a cytotoxin and causes a more severe, prolonged and more frequently fatal illness than infection with other *Shigellae*. Antimicrobial resistance also occurs more frequently with Sd1 than other *Shigellae*.**3.2.**

Disease burden

Shigellosis continues to be a major public health problem and remains endemic in many developing countries.

Incidence of shigellosis is usually highest amongst children 1 to 4 years old. The case-fatality without effective prompt treatment may range from 1% to 10%. The highest case fatality is observed among children, the elderly and the malnourished.

3.3. Reservoirs and mode of transmission

The mode of transmission of *Shigella* is by direct contact with an infected person or by eating or drinking contaminated food or water. Flies may also serve as a vector for transmission. The predominant mode of transmission is by faecal-oral route. Transmission of the disease increases with poor hand hygiene, contaminated drinking water, inadequate sanitation and improper disposal of human wastes..

3.4. Risk factors for outbreak

The following factors are associated with increased spread and death from an outbreak of dysentery:

- **Agent:** disease agents may become more virulent or increasingly resistant to available antibiotics;
- **Environment:** overcrowding, inadequate sanitation facilities and contamination of water sources make it easier for dysentery pathogens to be transmitted quickly
- **Host:** poor hygiene practices (personal, domestic and environmental), poor nutritional status and low immunity prior to infection may favour quick transmission.

4. Detection and confirmation of an outbreak

4.1. Early warning

A basic surveillance system based on simple reporting of case counts and deaths due to “acute bloody diarrhoea” using a standardized case definition and collected on a weekly basis will represent the minimum amount of data needed for monitoring transmission and for issuing any early warning of an impending dysentery outbreak.

4.2. Case definition

Suspected case: A person with diarrhoea with visible blood in stool.

Confirmed case: Suspected case with stool culture positive for *Shigella dysenteriae* type 1..

5. Detection of a suspected outbreak

An outbreak of dysentery should be suspected whenever:

There is a sudden increase, unusual over the same place or period of time, in the weekly number of patients with bloody diarrhoea or deaths from bloody diarrhoea; or

There is an unusual number of acute diarrhoeal cases and the patients have the following points in common:

- They have similar clinical symptoms (visible blood in the stool)
- They are living in the same area or location;
- They are sharing the same water source;
- There is an outbreak of dysentery in a neighbouring community.

In order to spot any clustering of cases or for detection of any “unusual” increase of cases, all suspected cases should be line listed.

5.1. Alert thresholds

An outbreak alert should be raised whenever:

- The disease surveillance system reports higher number of cases or deaths of acute bloody diarrhoea greater than expected given the place and time; or
- There are clustering of at-least 3 to 5 or more linked acute bloody diarrhoea cases in the same settlement, or in the same village ; or
- There are doubling of cases of “acute bloody diarrhoea” in two consecutive weeks; or whenever

5.2. Epidemic Threshold

- ,The epidemic threshold is reached when we have 2 or more confirmed cases per week at a specific health facility,

0.1 Confirmation of an outbreak

Whenever an outbreak alert has been raised, a rapid field investigation should be carried out in order to:

- Confirm or verify the existence of outbreak;
- Identify additional cases and ensure appropriate treatment
- Collect laboratory samples (stools) for confirmation of the causal pathogens
- Determine the magnitude and patterns of the outbreak, if confirmed.
- Estimate the potential for further spread; and
- Recommend effective control measures for stopping transmission

6. Outbreak investigation (Ref IDSR TG)

Data collection : A rapid field investigation (preferably by a trained Rapid Response Team) should be carried out in the particular place/camp/settlement as well as in its immediate surroundings wherein an outbreak alert has been raised. The outbreak investigation team would focus on collecting the following information:

- **Active case finding and risk assessment:** A rapid case investigation would be carried out on all suspected cases using a standardized form seeking details on cases and deaths either from the hospital/health clinic registers or from the community (time/date of onset, place/location of cases and individual characteristics such as age/sex, etc. (*A case investigation form Ref IDSR Technical guide*))
-
- **Collection of laboratory samples:** Stool specimens would be systematically collected from at-least 10-20 suspected “untreated” cases⁷ specially from those cases which conform to the following criteria:
 - onset of illness less than four days before sampling;
 - currently having bloody diarrhoea;
 - have not received antibiotic treatment for this illness;
- **Needs assessment:** The local (from where the suspected cases have been detected) human and material resources (Availability of drugs, trained and skilled providers, etc) would be assessed for control and management;
- **Protocolized treatment:** Local compliance to standardized case management would be required to be assessed.

Data analysis: After completion of the field investigation, data should be analyzed locally and rapidly to determine the extent of the outbreak and the population at risk. The analysis would include:

- **Distribution of cases in terms of time:** Construction of an epidemic curve to show the distribution of cases over time since the first case was reported; number of cases and attack rates by weeks, by age group and by geographic area (administrative unit, sector/locality).
- **Distribution of cases in terms of place:** where the first cases/cluster occurred; number of cases and attack rates by geographical areas; is the outbreak spreading to other areas; mapping the cases;
- **Distribution of cases in terms of person:** what is the age distribution of cases (percentage of cases by age group), what are the most affected age groups (attack rates by age group), what age group presents the highest case fatality ratio.
- **Discounting for seasonal rise in incidence:** Comparison of current week’s/months attack rate with previous week’s/months attack rates (or comparison by geographical area) by providing information on past seasonal and secular trends best presented as line graphs;
- **Fatalities:** Number of deaths and case fatality rate;

- **Laboratory diagnosis:** Number of stool specimens collected and percentage of laboratory confirmed cases (including circulating pathogens and antimicrobial sensitivity pattern);
- **Outcome:** Aggregated data by class classification (suspected/confirmed, improved, dead, etc)

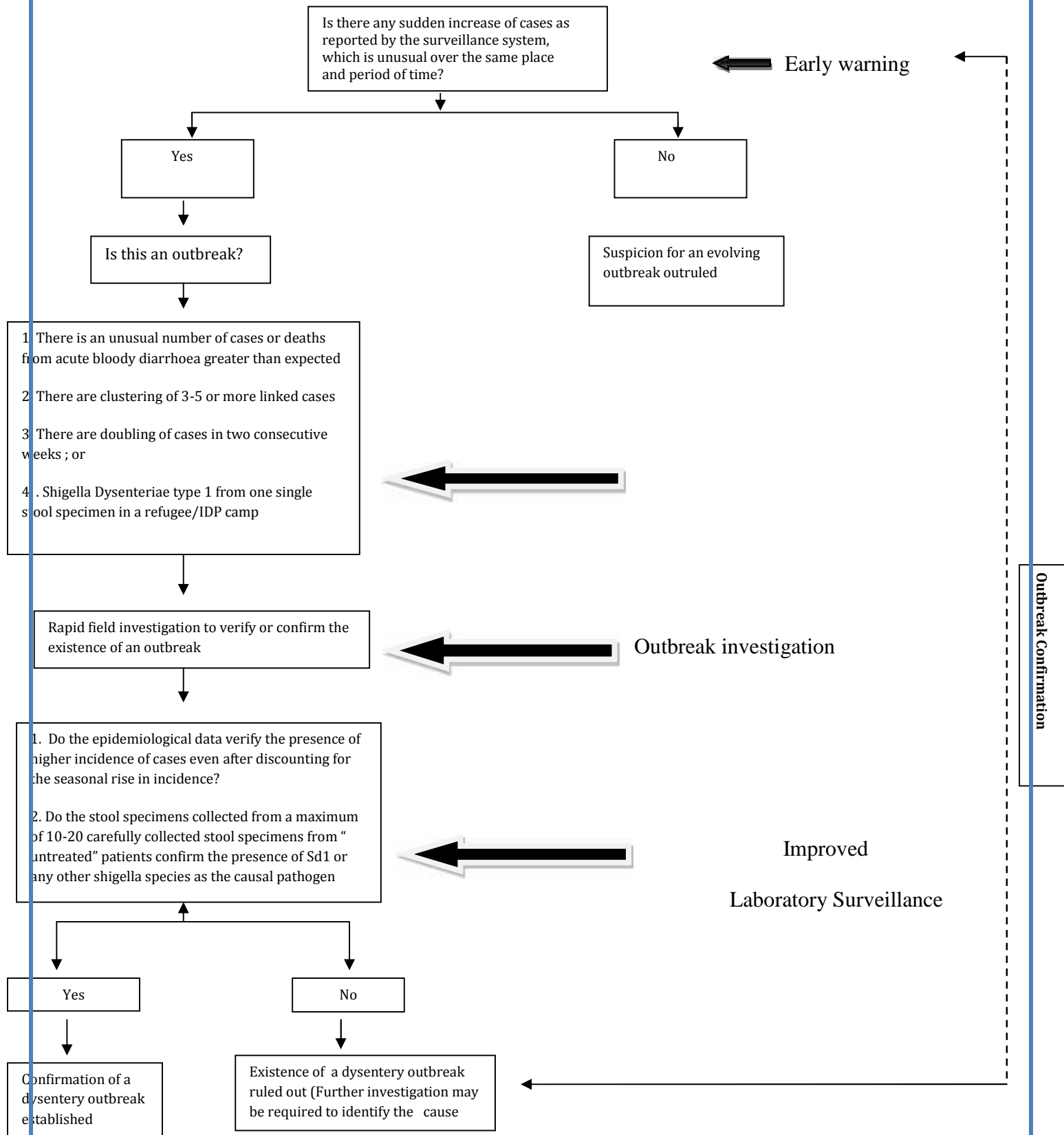
(i) *Source identification* : If need be, further investigation/epidemiological studies should be carried out to clarify mode of transmission, better definition of risk factors for disease and at-risk groups.

(ii) *Laboratory confirmation:* An outbreak of dysentery would be laboratory confirmed when the causative pathogens (*Shigella dysenteriae type 1* or any other *Shigella* species) are isolated from a maximum of 10 to 20 carefully collected stool specimens. In dysentery outbreaks caused by *Shigella dysenteriae type 1*(Sd1), most of the organisms (Out of 70 specimens) identified in stool specimens must be Sd1, particularly at the beginning of the outbreak⁹.

(iii) *Outbreak verification* :There would be two elements for consideration. The existence of a dysentery outbreak in a village/settlement/refugee/IDP camp would be confirmed, If, following the outbreak investigation:

- The collected epidemiological data verify the presence of higher incidence of “acute bloody diarrhoea” in a settlement/refugee/IDPcamp/village that is proved to be unusually higher or unexpected for the given place and time, even after discounting for the seasonal rise, and is backed up by:
- Laboratory isolation of *Shigella dysenteriae type 1* or any other *Shigella* species from a maximum of 10 to 20 carefully collected stool specimens from the patients who truly represent the particular village/settlement, refugee or IDP camp in question.

7. Steps in detection and confirmation of a Dysentery outbreak



8. Public health response and control strategies for management of dysentery outbreak

Different public health interventions have to be combined together to stop transmission of dysentery outbreak. Measures should target at stopping the transmission from the both the “reservoir” as well as the “source” of the infection.

Such measures to control a dysentery outbreak (whatever the cause may be) should include:

- Appropriate case management,
- Personal hygiene (particularly hand washing practices),
- Ensuring drinking water quality with point-of-use water disinfection and safe water storage,
- Improving sanitation conditions,
- Food safety; and
- Appropriate health education altering toileting practices in order to minimize contact between hands and stool and fly control where appropriate.

8.1. Management of patients with bloody diarrhea

All cases of dysentery should be identified quickly as soon as an outbreak has been confirmed so that appropriate treatment with antimicrobials can be initiated without any delay. Even when the laboratory report is pending, treatment can be started with antimicrobials on the basis of clinical diagnosis alone. The basic principles guiding the case management of patients with bloody diarrhea caused by *Shigella* include the following steps:

- In an epidemic situation, all patients with bloody diarrhoea should be considered as being infected with *Shigella* and be treated with antimicrobials because:
 - Epidemics of bloody diarrhoea are essentially caused by *Shigella*, especially *S. dysenteriae* type 1,
 - *Shigella* are more likely than other causes of diarrhoea to result in complications and death if effective treatment is not started promptly, and
 - Early treatment with an effective antibiotic substantially reduces the risk of severe morbidity or death.
- Treating all cases, that conform to case definition, promptly, with the recommended first line drug (Table-1) for dysentery;

Antimicrobials	Treatment regimens	
	Children	Adult
Ciprofloxacin	15 mg/kg 2 times a day for 3 days	500 mg 2 times a day for 3 days
Ceftriaxone	50-100 mg/kg/day IM once a day for 2 to 5 days	1-1.5g/day for 2 to 5 days

- Administering Zinc supplementation¹¹ to children up to 5 years of age (Table-2)

Zinc	Treatment regimens	
	< 6 months of age	6 months of age
Liquid (suspension)	10 mg/ day, 14 days	20 mg /day for 14 days
Tablets (20 mg)	½ tablet per day for 14 days	1 tablet per day for 14 days

- Patients whose clinical conditions worsen even after treatment with an antimicrobial for 48 hours and those severe cases and patients at increased risk of death should be referred to hospitals.
- Treating and preventing dehydration with oral rehydration therapy, or intravenous (IV) therapy if severely dehydrated.
- Giving frequent small meals of the patient's usual food; continuing to breastfeed infants and young children.
- Chemoprophylaxis of contacts of cases is strongly discouraged

Treatment center Temporary specialized treatment centres may have to be set up and additional staff recruited in order to cope with influx of patients during large outbreaks. In particular:

- Bloody diarrhoea patients should be triaged and oriented towards specific locations (“diarrhoea wards” or “ diarrhoea corners”) so that they are separated from other patients;
- Basic hygiene and disinfection measures should be enforced in order to reduce risk of spread of *Shigella* infection.
- Appropriate disinfection measures should also be practiced by all persons in contact with bloody diarrhoea patients (health staff and relatives taking care of patients)

8.2. Personal Hygiene

Improvement in personal hygiene including toileting behaviour, such as hand washing with soap holds the key to reduce transmission of dysentery¹³. Handwashing is particularly important:

- After defecation,
- After cleaning a child who has defecated,
- After disposing of a child’s stool,
- Before preparing or handling food and before eating.

If possible water for washing should be stored separately from drinking water. If soap is not available, ash or earth can be used to scrub the hands. Washed hands should not be dried with dirty cloths. A toilet or latrine should always be used for defecation and the toilet should be kept clean.

8.3. 8.3. Safe Water

The strategy for ensuring safe water for control of dysentery outbreak will comprise of the following measures:

(i) Accessibility and availability of water: All people should have safe and equitable access to a sufficient quantity of water for drinking, cooking and personal and domestic hygiene.

Public water points should be sufficiently close to shelters to allow use of minimum water requirement:

- A minimum of 20 litres of water per person per day should be made available;
- There should be at-least 1 water point (piped tap or hand pump) for every 250 people and the maximum distance from any household to the nearest water point should not be more than 500 meter.

(ii) Water use facilities: People should have adequate facilities and supplies to collect, store and use sufficient quantities of water for drinking, cooking and personal hygiene, and to ensure that drinking water remains safe until it is consumed. Key parameters to ensure that people have adequate facilities for use of sufficient quantities of water include the followings:

– Each household should have at-least two clean water collecting containers of 10-20 litre, plus at-least one 20 litre container for water storage;

– People should have access to at-least 250g of soap per person per month for personal and domestic hygiene;

(iii) Water quality: In order to ensure the safety of drinking water, the quality of community water supplies should conform to the microbial safety standards as well as to other drinking water guidance values:

– Objective of “ zero” E-coli per 100 ml of water should be the goal for all types of community water supplies and should be the target even in any emergency situation. When the community water supplies is disinfected by central services, an adequate disinfectant residual(e.g.,chlorine) should be maintained in the public water supplies distribution system such that the minimum target concentration for chlorine to be maintained at the point of delivery should be at-least 0.5 mg/litre.

– When there is a concern about the quality of drinking water that can not be addressed by central services, household treatment such as bringing water to a rolling boil and cooling before consumption should be encouraged. Adding sodium or calcium hypochloride solution such as household bleach to a bucket of water, mixing thoroughly and allowing it to stand for 30 minutes prior to consumption could also be considered as an alternative to boiling. The boiled or chlorinated drinking water should be stored in a clean container with a small opening or a cover and should not be used for beyond 24 hours.

8.4. Sanitation

Measures targeting at improving sanitation for control of the outbreak will include:

- Safe disposal of human waste through encouraging the use of a pit latrine. Provision should be made to establish at-least 1 toilet for a maximum of 20persons. Alternatively, one waterless toilet per 25 women and one waterless and one urinal for 35 men may be

installed. (Ideally, one toilet for each family should be installed). Toilets should be established no more than 50 metres

from the dwellings and at least 30 metres from any ground water source

- Safe disposal of children's stool in latrines or through burial in the ground;
- Ensuring proper use of latrines, keeping the latrines clean and daily disinfection of the soil of existing or new structures with a 0.2% chlorine solution.
- Designating hand washing stations with soap and adequate water for hand washing near the latrines.

8.5. Disinfection

Prompt and thorough disinfection¹⁶ of patient's clothing, personal article and immediate environment will help to control spread of infection within a family.

Disinfection, appropriately done and targeted, can control spread of infection within a family in a short time if only:

- Clothes are washed thoroughly with soap and water and then boiled or soaked in disinfection solution. Sun-drying of cloths is also helpful.
- Utensils are washed with boiling water or disinfectant solution.
- The washing of contaminated articles, particularly clothes, in places of drinking water sources are prohibited.
- Funerals of persons, who die of diarrhoea, whether bloody or not, are held quickly.

8.6. Health Education

Health education will be key to public awareness and cooperation. Experienced health educators will play an important role in epidemic control. Community groups and service organizations can also assist by disseminating messages through their programmes. Specific goals for health education during a dysentery outbreak shall include:

- Active case finding (encouraging all persons who develop bloody diarrhoea to report immediately to the nearest health facility).
- Organizing multiple social mobilization teams so as to cover the entire area affected by the outbreak.
- Disseminating information to the public how the infection by *Shigella* is spread and how it can be prevented;
Messages should, therefore, focus on safe use of water, personal hygiene (latrine use, hand washing, food handling) and disinfection practices. In particular:
- Messages should be spread through home visits, health facilities, schools, religious leaders and the mass media.
- Messages must be carefully prepared, simple and targeted, taking into consideration the local terminology, cultural sensitivities, traditions and beliefs.
- The team responsible for conducting health education sessions should include at least one member familiar with the community and consist of paramedical staff, health educators, water and sanitation staff and community health workers.

8.7. Food safety

Contaminated food source may also be a risk for continuation of the outbreak of dysentery. Without ensuring food safety, merely improving sanitation and ensuring safe water supply would not stop the transmission of the outbreak.

Therefore, food should be boiled or otherwise made safe before it is consumed or used as an ingredient in food. While contamination can always occur at all points of the food chain, inadequate washing, handling and cooking of food just before consumption are still a prime cause of concern.

Surveillance should be continued to ensure the effectiveness of control measures undertaken, during the course of the outbreak, in order to curb the transmission of the disease. Once the outbreak of dysentery has been confirmed, the laboratory surveillance should aim at systematically collecting stool samples from 20 to 30 patients from the community where the outbreak has occurred in order to check whether *Shigella dysenteriae* type 1 (Sd1) or any other *Shigellae* pathogens are circulating.