

**REPUBLIC OF RWANDA**



**RWANDA FDA**  
Rwanda Food and Drugs Authority

**GUIDELINES FOR INVESTIGATION AND CONTROL OF  
FOOD BORNE DISEASES**

**MAY, 2019**

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**Abbreviations**

AIDS	-	Acquired Immunodeficiency Syndrome
WA	-	Water Activity
EDTA	-	EhtlylineDiaminneTetraceticacid
FBD	-	Food Borne Diseases
GHPs	-	Good Hygiene Practices
GAPs	-	Good Agricultural Practices
GVPs	-	Good Veterinary Practices
GMP	-	Good Manufacturing Practices
GMO	-	Genetically Modified Organisms
OCT	-	Outbreak Control Team
RR	-	Relative Risk
HIV	-	Human Immunodeficiency Virus
Rwanda FDA	-	Rwanda Food and Drugs Authority
WHO	-	World Health Organization

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## Foreword

The Rwanda Food and Drugs Authority (RWANDA FDA) is a regulatory body established by the Law N° 003/2018 of 09/02/2018. One of the functions of RWANDA FDA is to regulate matters related to quality and safety of food for the purpose of protecting the public from health hazards associated with the consumption of food, especially in its article 8.

Food borne diseases (FBDs) is one of the public health concerns not only to our country but all over the world. It is believed to be responsible for many deaths. The magnitude of the problem is not known due to difficulties associated with investigation of FBDs and their reporting. This has contributed to lack of data that are important for planning and controlling FBDs outbreaks and other economic woes.

RWANDA FDA recognizes the need to establish a system that will assist in the surveillance, investigation, control and reporting of FBDs. This will enhance among other things, collection of data and other information related to food borne diseases, in order to institute timely interventions that will control present and prevent future disease outbreaks through adequate food safety management.

It is my sincere hope that these guidelines will assist health workers in conducting surveillance, investigation and control of food borne disease, and collecting data for the purpose of making appropriate interventions.



DIRECTOR GENERAL  
RWANDA FOOD AND DRUGS  
AUTHORITY

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**Definition of Terms**

- Acute Signs** : means severe manifestation of a food bornedisease.
- Cross contamination** : means transfer of biological, physical or chemical hazards to food products by contact with other raw food products, previously cooked food, dirty contact surfaces or the dirty hands of a food-handler.
- Demographic Profile** : means the number of cases by age group and sex
- Epidemiology** : means the branch of medicine that deals withthe study of causes, distribution and control of diseases in the population
- Epidemic Curve** : means a histogram or graph that provides a visual depiction of the outbreak over time.
- Foodborne Disease** : means any disease of an infectious or toxic nature caused or hought to be caused by consumption of food
- Food borne Disease outbreak:** means two or more linked cases of the same illness believed to have resulted from ingestion of food.
- Food Safety Control Officer:** means Officer responsible for food control activities.
- Food Specific Attack Rate** : means the percentage of people who became ill after eating a specific food.
- Food** : means any substance or product whether processed, partially processed, or unprocessed, intended to be, or reasonably expected to be ingested by humans. “Food” also includes drink, chewing gum, and any substance, including water, intentionally incorporated into the food during its manufacture, preparation or treatment.
- Furthermore, Food, as defined for this guideline, shall include functional foods (foods which claim to have special properties valuable to health, but which do not have a medicinal product license), fortified foods, food ingredients and derivatives such as, Genetically modified organisms (GMOs) and food additives; Food shall not include: feed, live animals unless they are prepared for placing on the market for human consumption, medicinal products, cosmetics, tobacco and tobacco products narcotic or psychotropic substances within the meaning of the United Nations Single Convention on Narcotic Drugs 1961, and the Nations Convention on Psychotropic Substances, 1971, residues and contaminants
- High Risk Foods** : means foods with a high potential of causing food borne diseases because of their relatively high ability to support microbial growth

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or have inherent toxic substances.

- Median Incubation Period** : means time taken for 50% of the cases to get sick after exposure to FBD agent.
- Notification** : means the process of informing health officials on an outbreak of food borne disease.
- Outbreak/Epidemic** : means one or more cases resulting from ingestion of a common food. The term “epidemic” is often reserved for crises or situations involving large numbers of people over a wide geographical area.
- Relative Risk** : means the percentage of people who become ill after eating a certain food divided by the percentage of people who become ill after not eating a specific food.
- Symptom Profile** : means list of symptoms as presented by a patient.
- Surveillance** : means systematic collection, analysis and interpretation of data essential to the planning, implementation and evaluation of public health promotion and protection practices and timely dissemination of this information for public health action.

**1.0 Introduction**

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### **Background of Food Borne Diseases**

Food borne disease (FBD) is any disease of infectious or toxic in nature caused or thought to be caused by consumption of food. Agents in foods responsible for FBD include pathogenic microorganisms, poisonous chemicals substances, parasites, etc.

FBD can manifest itself in a mild or acute form sometimes ending in death; therefore it can result in socio-cultural and economic consequences to the society such that it may impair its development.

The magnitude of FBD in Rwanda is not known because there is no established system for its surveillance and investigation hence most FBD cases go undiagnosed and unreported. Since awareness on Good Hygiene Practices by many people is still low and vaccines for most food borne diseases are not available, the magnitude of the problem is likely to be high.

Taking into consideration that food consumers may be exposed to high risks in relation to food borne diseases, Rwanda FDA recognizes that developing an investigation, control and surveillance system could significantly help in collection of relevant data and making appropriate and timely interventions.

The investigation and control of food borne disease outbreaks are multi- disciplinary tasks requiring skills in the areas of clinical medicine, epidemiology, laboratory medicine, food microbiology and chemistry, food safety and food control, and risk communication and management. Many outbreaks of food borne disease are poorly investigated, if at all, because these skills are unavailable or because a field investigator is expected to master them all single-handedly without having been trained.

These guidelines have been written for public health practitioners, food and health inspectors, district and medical officers, laboratory personnel and others who may undertake or participate in the investigation and control of food borne disease outbreaks.

The objectives of preparing these guidelines are to assist in the reporting, surveillance and investigation of food borne diseases in order to:

- i) Identify high-risk foods and new food-borne pathogens and toxins.
- ii) Identify and remove from the market food products contaminated with a foodborne disease (FBD) agents. Correct food preparation, processing, handling and practices that permit contamination with FBD agents.
- iii) Make the epidemiological data available for use to take appropriate intervention.

It is emphasized that all health workers dealing with patients or food control activities have a cardinal role to play for the guidelines to bear intended results. Nonetheless, Health workers have the role to report FBD outbreaks. At national, Province and district levels, the guidelines will assist decision makers in identifying and coordinating resources and in creating an environment appropriate for the successful management of Food borne disease outbreaks. These guidelines are, therefore, intended to enhance investigation, surveillance, control and prevention of food borne diseases.

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**1.1 Causes of Food borne Diseases**

Food borne diseases may be caused by infectious or poisonous substances of which the principal categories are listed below:

- i) Pathogenic bacteria and their toxins
- ii) Viruses and rickettsiae
- iii) Fungi and their toxins
- iv) Blue-green algae;
- v) Dinoflagellates and their toxins;
- vi) Protozoa
- vii) Cestodes, Nematodes and Trematodes
- viii) Arthropods - Larvae of Linguatula or of flies:
- ix) Naturally occurring toxins marine biotoxin (ciguatera poisoning, shellfish and scombroid poisoning, phytohaemagglutinin (red kidney bean poisoning), grayanotoxin (honey intoxication) and other food animals;
- x) Plant toxicants
- xi) Poisonous chemicals (Pesticides, Toxic metals (e.g Cd, Cu, Hg, Sn),
- xii) Others including Radionuclides, Flouride, Zinc, Nitrite (Food preservatives), Monosodium glutamate

The list of food borne diseases, their characteristic symptoms, incubation period, causal agents and specific control measures are as indicated in ANNEX I.

**1.2 Reservoirs and Sources**

Humans are the reservoirs of some causal agents of Food borne diseases. Food producers, handlers, cooks, bearers and housewives, all have opportunity to introduce pathogenic agents at some points of food chain. They may carry pathogens in the alimentary canal, on the hands and the rest of the body surfaces. Other sources include water, soil (dust), flies, ants, cockroaches, pets, wild animals, birds and vermin.

Another reservoir is the variety of food animals that may carry zoonotic infections such as microorganisms and larvae of tapeworms or roundworms.

Food plants or windfall fruits may carry pathogenic microorganisms especially if they are grown on polluted soil or irrigated with polluted water (raw sewage, etc.). On the other hand toxic residues of pesticides and veterinary drugs may remain on the plants and in the animals, respectively.

**1.3 Transmission of FBDs**

Food borne diseases are transmitted by vectors that carry disease causing agents from their reservoirs or sources to humans. These vectors include; humans, animals, insects and rodents. Contaminated foods and food contact surfaces can also transmit food borne disease agents.

**1.4 Epidemiology**

The problem of Food Borne diseases and their prevention are closely linked to several environmental, technological and social factors that influence one or more links in the food chain. Among these factors the role played by community hygiene and food habits is one of the most important in determining the incidence and prevalence of FBDs. Therefore, knowledge of

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Good Hygiene Practices (GHPs) and food habits which minimizes chances of disease outbreaks can significantly lower occurrence and magnitude of FBDs.

Incidences of FBD can be investigated using data collecting tools and carrying out laboratory analysis. The data collected will reveal the magnitude of the problem that can be used as the basis for taking appropriate interventions, including prevention of future outbreaks of the disease. One of the areas of interventions includes provision of effective and persuasive health education.

When there is failure to identify or specify food borne disease causing agent through laboratory analysis of samples and specimen because of various reasons the investigator will focus on exploring epidemiological factors leading to the outbreak and therefore concluding on the most likely causative agent. The procedure facts and reasons considered must clearly be shown in a summary sheet.

### **2.0 Surveillance of Food Borne Diseases**

Regular food borne diseases surveillance is essential for identifying potential risks in order to plan for appropriate interventions and strategies to prevent outbreak of FBDs.

The surveillance of food borne diseases includes the collection and analysis of information on disease outbreaks, causal agents and their source. An important part of this activity is the monitoring of food borne pathogens and other hazards found in food, food animals or the environment. Food borne disease surveillance should be geared to Sectors achieving the following:

- i) Monitor FBD trends
- ii) Predict and detect FBD outbreaks
- iii) Provide early alert
- iv) To generate causal hypothesis
- v) To identify appropriate intervention
- vi) To audit the impact of intervention

### **2.1 Routine Surveillance**

This should be done by Food safety surveillance officer, Laboratory personnel and Clinicians on their daily activities as indicated here under:-

#### **i) Clinicians**

Clinicians are responsible for

- a) Filling in Food Borne Diseases Surveillance form DIS/FOM/020 for patients (**Annex II**)
- b) Request laboratory analysis for specimen from patients who clinically presents the following symptoms;
  - Diarrhea
  - Nausea
  - Vomiting
  - Abdominal colics

#### **ii) Laboratory Personnel**

Laboratory personnel are responsible for conducting analysis of specimen and samples as requested by clinicians and/or Food safety surveillance officer.

#### **iii) Food Safety Surveillance Officer**

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Food safety surveillance officer are responsible for:

- a) Conducting periodical environmental and food sampling
- b) Reconciliation of clinical diagnosis and laboratory results
- c) Collect, analyse and disseminate FBD data, Compile and submit weekly, monthly and quarterly FBD report in a form DIS/FOM/021 specified in ANNEX III.

### **2.2 Detection of FBD outbreaks**

Detecting Food borne disease outbreaks requires efficient mechanisms to capture and respond to a variety of data sources. The main data sources for detecting food borne disease outbreaks include: The public, media, and reports of clinical cases from health care providers, surveillance data, disease notifications and food service facilities.

Other sources may alert public health authorities to the occurrence of outbreaks. Often, some creativity is needed to detect outbreaks as many of these sources were created for other purposes. Examples include reports of increased absenteeism from the workplace, schools or child-care facilities, pharmacy reports of increased drug sales, e.g. of anti-diarrhea medications, and consumer complaints to health departments or food regulators. Outbreaks may be anticipated after an increased risk of population exposure has been detected, for example contaminated drinking water or contamination of a commercially available food product.

There are causes other than outbreaks that may lead to increased number of observed or reported cases. These are referred to as “pseudo-outbreaks”; examples include changes in local reporting procedures or in the case definition for reporting a specified disease, increased interest as a result of local or national awareness, changes in diagnostic procedures, or heightened concern among a specific population (e.g. “psychogenic” outbreaks). In areas subject to sudden changes in population size such as resort areas, college towns, farming areas with migrant workers changes in the numerator (number of reported cases) may only reflect changes in the denominator (population size).

### **3.0 Investigation of Food-Borne Diseases Outbreak**

Food borne disease outbreaks are investigated to prevent both ongoing transmissions of disease and similar outbreaks in the future. Specific objectives include: Control of ongoing outbreaks, detection and removal of implicated foods, identification of specific risk factors related to the host, the agent and the environment, identification of factors that contributed to the contamination, growth, survival and dissemination of the suspected agent, prevention of future outbreaks and strengthening of food safety policies, acquisition of epidemiological data for risk assessment of food borne pathogens, stimulation of research that will help in the prevention of similar outbreaks.

The investigation of a food borne disease outbreak will normally include: epidemiological, environmental, food and laboratory investigations.

#### **3.1 Outbreak Control Team**

This is a multidisciplinary team at district, Province and National level which is responsible for conducting rapid reactions on FBD outbreak. Members of the team will vary according to circumstances but the OCT normally includes:

- Public health practitioner or epidemiologist answerable to the respective officer in charge

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at each level.

- Medical Officer in Charge, members of a hospital infection control group.
- a food safety control officer;
- a specialist in laboratory medicine (microbiologist, toxicologist, or other as appropriate);
- Secretarial and logistic support.
- Health Management Team

An OCT should be convened when any of the following has occurred:

- i) The outbreak poses an immediate health hazard to the local population;
- ii) There are many cases e.g known fatal disease like taeniasis
- iii) The disease is important in terms of its severity or its propensity to spread;
- iv) Cases have occurred over a widespread area without obvious point source;
- v) Cases have occurred in high risk establishments (schools, daycare centers, hospitals, food premises, etc.).

### **3.2 Epidemiological Investigations**

The epidemiological investigation includes determining causes, distribution and control of food borne diseases in the population by involving the following procedures of notification, preliminary assessment, descriptive and analytical epidemiology.

#### **3.2.1 Notification**

A food borne illness complaint may be taken via telephone, in person, by mail or any other means available. Details of the complaints are to be recorded by an inspector in a form DIS/FOM/022 prescribed in **Annex IV**. However, reported data will be verified later in the investigation. All notifications should be sent to the nearby health offices or Rwanda FDA offices.

Any food sample taken in relation to the incidence should be refrigerated but not frozen because some sensitive micro-organisms might die in freezing condition.

#### **3.2.2 Preliminary Assessment of the Situation**

Investigation of a potential food borne disease outbreak starts with the assessment of all available information in order to confirm or refute the existence of an outbreak. This assessment must be initiated quickly and completed promptly in order to prevent further illnesses, and should include:

- i) To consider whether or not the cases have the same illness (or different manifestations of the same disease).
- ii) Determine whether there is a real outbreak by assessing the normal background activity of disease.
- iii) Conduct in-depth interviews with initial cases.
- iv) Collect clinical specimens from cases.
- v) Identify factors common to all or most cases.
- vi) Conduct site investigation at implicated premises.
- vii) Collect food specimens when appropriate.
- viii) Formulate preliminary hypothesis.
- ix) Initiate control measures as appropriate.
- x) Decide whether to convene a formal outbreak control team (OCT).

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xi) Make a decision about the need for further investigation.

Once the validity of the reporting source has been verified, a group of the initial cases perhaps 5-10 persons should be identified and interviewed as soon as possible. The interviews should be open and comprehensive and should capture information indicated in the form DIS/FOM/023 (**Annex V**).

With the initial information from case interviews, the laboratory and the environmental inspection, describe the event in simple epidemiological terms and form preliminary hypothesis about the cause of the outbreak.

Generally, specific control measures can be implemented only when the source and the mode of transmission are unknown which provides a convincing argument for continuing with the investigations. The likely reasons for continuing investigation may include the following:

- i) The outbreak poses an immediate health hazard to the local population.
- ii) There are many cases.
- iii) The disease is important in terms of its severity or its rapid spread.
- iv) Cases have occurred over a widespread area without an obvious point source.
- v) Cases have occurred in high-risk establishments (schools, street vending facilities, daycare center, hospitals, housing or long-term care facilities for the elderly, food premises, etc.).
- vi) There is a high level of public concern.
- vii) There are potential legal implications.
- viii) An investigation would generate new knowledge, e.g. in the area of food safety and risk assessment.
- ix) An investigation would provide valuable learning opportunities for investigators.

If, on the other hand, a decision is taken to halt the investigation, the reasons for this decision should be carefully documented and included in the final investigation report

### **3.2.3 Descriptive Epidemiological Investigations**

Careful description and characterization of the food borne outbreak is an important first step in any epidemiological investigation. Descriptive epidemiology provides a picture of the outbreak in terms of the three standard epidemiological parameters such as time, place and person.

The steps of descriptive epidemiology include: establishing a case definition, case identification, analyses of data by time, place and person characteristics, develop hypothesis about exposure or vehicle caused the disease, compare hypothesis with facts and deciding whether analytical results are needed to test hypothesis.

### **3.2.4 Establishing a Case Definition**

A case definition is a set of criteria for determining whether a person should be classified as being affected by the disease under investigation. It should be simple and practical and should include the following four components:

- i) Clinical and laboratory criteria to assess whether a person has the illness under

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investigation; the clinical features should be significant or hallmark signs of the illness.

- ii) Defined period of time during which cases of illness are considered to be associated with the outbreak.
- iii) Restriction by "place" for example, limiting the group to patrons of a particular restaurant, employees of a particular factory or residents of a particular town.
- iv) Restriction by "person" characteristics limiting the group to, for example, persons over one year of age, persons with no recent diarrheal disease, etc.

There are no rules about how sensitive or specific a case definition should be. In the early stage of an outbreak investigation the aim is to detect as many cases as possible; this requires a sensitive case definition (e.g. a person with three or more loose stools in a 24 hours period).

Because a single case definition that suits all needs is rare, it is quite common for case definitions to change during an investigation or for different case definitions to be used for different purposes. Other times use the following (or similar) case definitions in parallel:

- Confirmed cases have a positive laboratory result (isolation of the causative agent or positive serological test). This case definition has high specificity.
- Probable cases have the typical clinical features of the illness but without laboratory confirmation.
- Possible cases have fewer or atypical clinical features. This case definition has high sensitivity.

#### **Box 1. Example of case definition used in the investigation of an Escherichia coli O157 outbreak**

A case is defined as gastrointestinal illness in any resident of Area A within five days of attending the Area A Fair in June 2003. Cases may be further categorized as:

- Confirmed case:** gastrointestinal illness with microbiological confirmation of E. coli O157
- Probable case :** bloody diarrhoea or haemolyticuraemia syndrome without microbiological confirmation
- Possible case :** non-bloody diarrhoea without microbiological confirmation

#### **3.2.5 Identifying Cases**

The cases that prompt an outbreak investigation often represent only a small fraction of the total number of people affected.

Determine the full extent of the problem and the population at risk of illness, an active search for additional cases should be undertaken. Methods for finding additional cases will vary from outbreak to outbreak and may include the following:

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- i) Many food borne disease outbreaks involve clearly identifiable groups (for example, persons all attending the same wedding party), so that case finding is relatively straight for Sector. In other outbreaks, particularly those involving diseases with a long incubation period and/or with mild or asymptomatic illness, case finding may be quite difficult.
- ii) Directly contacting physicians, hospitals, laboratories, schools or other populations at risk may help to identify unreported cases.
- iii) The Authority decide to alert the public directly. For example, in outbreaks caused by a contaminated commercial food product, announcements in the media can alert the public to avoid the implicated product and to see a medical practitioner if they have symptoms typical of the disease in question.
- iv) Cases themselves may know other people with the same condition particularly among household members, work colleagues, classmates, friends or neighbors.
- v) Conduct a survey of the entire affected population. If an outbreak affects a restricted population (e.g. students in a school or factory workers) and if a high proportion of cases are unlikely to be diagnosed. Questionnaires may be administered to determine the true incidence of clinical symptoms.
- vi) Review of laboratory surveillance data can help to find people with similar infections, assuming the cause of the outbreak is known.

Cases that may be epidemiologically linked to an outbreak can often be identified through a unique subtype or biochemical or molecular feature of the causative organism, which may be particularly helpful in an outbreak caused by a widely distributed food product that crosses jurisdictional or even international boundaries.

#### **3.2.6 Interviewing Cases, Medical and Health Personnel**

Once cases are identified, information about them should be obtained in a systematic way by use of form DIS/FOM/024 in **ANNEX VI**. This is in contrast to the preliminary phase of the investigation during which the interviews may be more wide-ranging and open-ended to allow for generation of hypotheses.

Regardless of the disease under investigation, the following types of information should be collected about each case; Identifying information, demographic information, clinical information, risk factor information (Questions will address both food-related and personal risk factors). Data should also be collected on the number and size of meals eaten, and the source and handling of suspected foods should be noted.

Gather information about all meals and snacks eaten 24 hours before onset of disease. The type of illness will sometimes provide a clue on causative agent. If the first and predominant symptoms are nausea and vomiting concentrate questions on foods that have been most recently eaten. If the first and predominant symptoms are diarrhoea and abdominal cramps, be suspicious of food eaten 6-20 hours before onset of disease.

If diarrhea and fever predominate, be suspicious of food eaten 12-72 hours before

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onset of disease. Remember these suggestions relates to common food borne disease. The more unusual diseases often present different clinical patterns.

Persons to be interviewed include all people who were ill and all persons who consumed an implicated meal. **It is important to interview people who are not ill and people who are ill.**

Interview medical and hospital personnel to obtain diagnosis of the disease and discuss findings obtained during the initial investigations. Information required will be as provided in ANNEX VI.

**3.2.7 Collecting Data**

Once the interview is completed, the information taken should be collected promptly to provide insight into the distribution of clinical symptoms and other factors among cases. The data can be summarized in a line listing form DIS/FOM/025 provided in Annex VII.

**3.3 Environmental and Food Investigations**

Environmental investigations (often also referred to as food or sanitary investigations) are conducted in parallel with epidemiological and laboratory investigations to find out how and why an outbreak occurred and, most importantly, to institute corrective action to avoid similar occurrences in the future. The specific objectives include: identifying the source, mode and extent of the food contamination, assessing the likelihood that pathogens survived processes designed to kill them or to reduce their numbers, assessing the potential for growth of pathogens during food processing, handling or storage, identifying and implementing corrective interventions.

Records that may be useful in an investigation include: menus, recipes or product formulations, processing records, purchasing and inventory records, shipping records and other documentation relating to the source of an implicated product, Hazard Analysis and Critical Control Points (HACCP) plans and records, records of corrective action, flow diagrams, floor plans of the establishment, complaint records, cleaning records, food laboratory testing results, past inspection records, personnel records (including who was working when, and absenteeism).

**3.3.1 Inspection of Suspected Premises**

An inspection of the premises where the implicated food was prepared is an absolute necessity in all complaints regarding food borne diseases. Clearly state the purpose of the visit and explain that the main concern is to try and discover the cause of the outbreak and prevent further occurrences.

The inspection needs to embrace the following aspects:

- i) Collect samples of suspect foods or any foods available from the suspect lot.
- ii) Collect samples of potentially hazardous foods so as to ascertain its safety.
- iii) Obtain a copy of the relevant menu if the investigation concerns a meal or functions.

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- iv) Carry out a routine inspection of the premises paying particular attention to the factors that cause food borne illnesses such as time/temperature of storage or processing, cross contamination, poor food hygienic handling.
- v) Determine any history of illness amongst the staff either before or after the outbreak.
- vi) In case an outbreak occurred in food establishment, interview managers and food handlers
- vii) Assess water system and supply
- viii) Make arrangements to collect faecal specimens from food handlers who are ill and advise them not to work in the area of food for sale until cleared by medical certificate.
- ix) Observe the skin of food handlers and note infected cuts, boils and inappropriate bandages.
- x) Establish the food preparation history, applicable to the implicated food or meal. Particular attention should be given to time and temperature storage and processing condition and the source of all raw and other ingredients.
- xi) Be on alert during the interviews for inconsistencies of different persons
- xii) Explain to the management the results of your investigation including recommendations to prevent recurrence.

#### **3.3.2 Inspection of Suspect Food**

When the role of a suspect food is investigated, the complete processing and preparation history should be reviewed, including sources and ingredients, persons who handled the specific foods, the procedures and equipment used, potential sources of contamination, and time and temperature conditions to which foods were exposed.

##### **3.3.2.1 Product Description**

The suspect food should be fully described in terms of:

- i) All raw materials and ingredients used (menus, recipes, formulations);
- ii) Sources of the ingredients.
- iii) Physical and chemical characteristics, including pH, water activity ( $a_w$ ).
- iv) Use of returned, reworked or leftover foods in processing.
- v) Intended use (e.g. home use, catering, for immediate consumption, for vulnerable groups).

##### **3.3.2.2 Observation of Procedures from Receipt to Finish**

Observations must cover the entire range of procedures, focusing on actual processes and work practices and including cleaning methods, schedules, personal hygiene of food-handlers and other relevant information. The temperature history (temperature and duration) of the suspect food should be recorded as completely as possible, including the conditions in which the food was stored, transported, prepared, cooked, heat-processed, held warm, chilled or reheated. Observation of food-handling practices may be valuable for small-scale operations and in the domestic setting as well as in commercial operations.

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### **3.3.3 Interviewing Food-handlers**

- i) Interview all food handlers by obtaining information about the exact flow of the suspect food, its condition when received by each food-handler, the manner in which it was prepared or handled, and any unusual circumstances or practices prevailing during the relevant period.
- ii) Note down all recent illnesses of food-handlers (before, during or after the date of the outbreak exposure) and times of absence from work.
- iii) Obtain Specimens for microbial analysis from any food handlers who are ill. If any employee is found to be infected with the agent of concern, it is essential to determine whether he or she is a potential source of the problem or is infected because of having eaten the same food. At every step of the process, data should be evaluated with respect to contamination, growth/proliferation and survival factors associated with the suspected pathogen(s).

### **3.3.4 Taking Appropriate Measurements**

Estimate food processing conditions at the time the implicated foods were produced. Product temperatures during processing and storage and time sequences of operations should be measured and recorded as appropriate. This includes:

- i) Time and temperature conditions to which suspect foods were exposed;
- ii) Water activity (aw), water content and pH of suspect foods;
- iii) Size of containers used in procedures, depth of food in containers, etc.

Attempt to understand actual conditions at the time that implicated foods were prepared is paramount.

### **3.3.5 Drawing a Flowchart of the Operations**

All information and measurements should be entered on a flowchart to facilitate assessment of factors that may have contributed to the outbreak. The flowchart should be based on actual practices at the time of the outbreak and, as applicable, should show: (bullet form) exact flow of operations for the suspect food(s), name of persons performing operations, equipment used, results of measurements taken, and other relevant information. If practices at the time of the outbreak can no longer be reconstructed, a flowchart of current practices may be useful.

### **3.3.6 Conducting an Outbreak Hazard Analysis**

Hazard analysis in an outbreak situation should address the following questions at each step of the processing of potentially implicated foods:

- Could pathogens have been introduced at any stage?
- Could pathogens already present have been able to grow at any stage?
- Could pathogens have survived processes designed to kill them?

This analysis also include observation of the food handling environment, assessing such factors as the location and availability of sinks and appropriate hand-washing facilities, and determining whether separate areas are maintained for the preparation of raw and ready-to eat foods.

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**3.4 Laboratory Investigation**

Most outbreaks of foodborne disease are microbiological in origin and their investigation will usually require a microbiology laboratory. Outbreaks caused by chemically contaminated food also occur, although they are much less common than microbiological events. District and Province laboratories should be equipped with the basic equipments to enable analysis of samples and specimen from suspected FBD cases. These include but not limited to Biosafety Cabinet level II, Autoclave, Incubator and Culture Media for common FBD pathogens (*Salmonella*, *Shigella*, *Campylobacter*, *E. coli*). The laboratory test request form DIS/FOM/026 is provided in **Annex VIII**. Information on collection, storage and transport of clinical specimen and food sample is provided in **ANNEX IX**.

**3.4.1 Food and Environmental Sampling**

If laboratory facilities are available, appropriate food and environmental samples should be taken as early as possible since the amount of physical evidence will diminish with time. The laboratory should be alerted in advance of sample collection and can provide sampling materials appropriate to the type and quantity of specimens to be collected, their storage, packing and transport.

**3.4.1.1 Food Samples**

Food samples that may be appropriate for collection and testing include: Ingredients used to prepare implicated foods, leftover foods from a suspect meal, foods from a menu that has been implicated epidemiologically, foods known to be associated with the pathogen in question, foods in an environment that may have permitted the survival or growth of microorganisms.

If the victim or other exposed persons have any leftovers from foods or beverages that were consumed during the last 72 hours or any ingredients that were used in such foods, samples should be taken for laboratory examination.

Samples should be collected aseptically using sterile apparatus and put into sterile jars or plastic bags. If foods are to be examined for organophosphate pesticides or heavy metals glass containers should be used.

A sample weighing approximately 200 - 450 g or measuring 200 - 1000 ml is enough for laboratory analysis. If it is in adequate all of it should be collected. Packaged foods should be sampled in their original containers if feasible. All relevant details including the name of the manufacturer, batch number and expiry dates should be obtained. Labels and empty packages may also be useful if retained.

Each sample container should be labeled with the complaint number of the outbreak and sample number. The inspector should seal the container with adhesive tape, masking tape, gummed paper tape or paper covered with a clear tape in such a way that the container cannot be opened without breaking the seal. He should write the date, time of sealing and his own name on the tape.

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Samples of perishable foods that are not frozen at the time of collection should be rapidly chilled to a temperature below 4°C and kept at this temperature until they can be examined. Refrigerated or frozen samples should be transported to the laboratory in an insulated container appropriately packed to maintain the temperature.

Laboratory identification of a food borne disease causative agent is very important as it allows confirmation of the type of food borne illness, taking into account epidemiological data collected. Samples and specimens should be taken in a manner that will not impair quality of the laboratory results.

### 3.4.1.2 **Environmental Samples**

The purpose of collecting environmental samples is to trace the sources of, and evaluate the extent of contamination that may have led to, the outbreak. Samples may be taken from work surfaces, food contact surfaces of equipment, containers, and other surfaces such as refrigerators, door handles, etc. Environmental samples may also include clinical specimens (such as faecal specimens, blood or nasal swabs) from food workers and water used for food processing.

### 3.4.1.3 **Clinical Specimen**

Diagnosis of most infectious diseases can be confirmed only if the etiological agent is isolated and identified from ill persons. This is particularly important when the clinical diagnosis is difficult to make because signs and symptoms are nonspecific, as is the case with many foodborne diseases

Clinical specimens should be obtained at the time of initial interview or as soon as possible thereafter because some pathogens remain in the intestinal tract for only few days after the onset of illness.

In large outbreaks, specimens should be obtained from at least 10-20 individuals (ideally 15-20% of all cases) who manifest illness typical of the outbreak and from some exposed, but not ill, persons. In smaller outbreaks, specimens should be collected from as many cases as practicable.

Take vomitus specimen if the person is vomiting, stool specimen or rectal swab if the person has diarrhoea, blood and urine if the person has a generalized infection and fever, or if poisoning suspected; and blood and either stool or rectal swabs if botulism is suspected. (Medical personnel should take rectal swabs and any other clinical specimens whenever possible).

Care should be taken during sampling, handling and storage of specimens so that the causative agents are not affected. All containers should be labeled with a waterproof marking pen before or immediately after collection with the patient's name, identification, date and time of collection, and any other information required by the laboratory.

The following should be observed when taking specimens:

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- i) Collect 15 - 20 grams of whole stool, 10 - 15 ml. of diarrheal stool or 3 - 4 rectal swabs with a visible amount of fecal material from each person.
- ii) Collect 10-15 ml of vomitus.
- iii) Collect fresh stool specimens as soon as possible after onset of illness.
- iv) The optimum time for collecting specimens is the first three to four days of illness (although stools for virus isolation can be collected up to four weeks after onset).
- v) Collect fresh stool specimens from as many people as you can. The criteria for confirming that an outbreak was caused by a specific agent depend on isolating the agent from at least two people involved in the outbreak.
- vi) Keep fresh stool specimens cold from the time they are produced until the time they reach the laboratory. Refrigeration temperature (4°C) prevents the proliferation of normal intestinal flora.

#### 3.4.1.4 **Chemical Investigation**

The features of important chemical foodborne illnesses are summarized in **ANNEX I**. In acute chemical exposures, most toxins or their metabolites are rapidly cleared from easily accessible specimens such as blood; prompt collection and shipment of specimens is therefore of critical importance.

When collecting samples for chemical analyses it is important to closely collaborate with the analytical laboratory, make arrangements in advance for chemical samples to be analysed and to seek advice about what specimens should be collected and how.

The types of specimens to be collected will depend on the suspected chemicals as indicated in **ANNEX IX**. In an emergency where it is impossible to contact the laboratory, biological specimens (whole blood, serum, urine, vomitus) should be collected as soon as possible, sealed in a clean container and sent to the laboratory promptly. Because care must be taken to avoid cross contamination, contamination free materials (such as specialized collection containers) may be provided by the laboratory to ensure that the extraneous contamination is kept to a minimum. Consultation with the testing laboratory is important in accurately interpreting

### 3.5 **Evaluation**

Evaluate all data collected during the investigation and the results of the examination of food and other specimens. The evaluation will include:

- i) Foods implicated in the outbreak
- ii) Suspect premises
- iii) Possible causes
- iv) Action necessary to prevent recurrence
- v) The necessity to alert the public
- vi) The necessity to implement food recall plan

After conclusion of the investigation and evaluation of data information should be summarized in a form DIS/FOM/027 indicated as Annex X and the report submitted to relevant Authority in the format DIS/FMT/026 indicated in Annex XI.

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#### 4.0 Data Analysis and Interpretation

Results of data analysis obtained during investigation are used as an input in identifying possible FBD. Areas that are considered during data analysis are: symptom profile, demographic profile, epidemic curve, median incubation period, food specific attack rate and relative risks.

##### 4.1 Symptoms Profile (Frequency of Signs and Symptoms among Cases).

Prepare a table listing the symptoms, the number of people who suffered each particular symptom and the percentage of people who suffered each particular symptom as shown in Table below.

**Table1: Example of Symptoms profile (sample size =30)**

Symptoms and Signs	Number of cases	Percentage
Vomiting	25	83
Nausea	23	77
Diarrhoea	14	47
Feyer	9	30
Abdominal pains	5	17
e.t.c		

This information helps to determine the causative agents as the symptoms can be used in conjunction with the time between consumption of suspected food and onset of symptoms. Identification of a causative agent can greatly assist in subsequent investigation as it can identify implicated foods. Also it helps in determining whether outbreak was caused by intoxication, an enteric infection or a generalized illness.

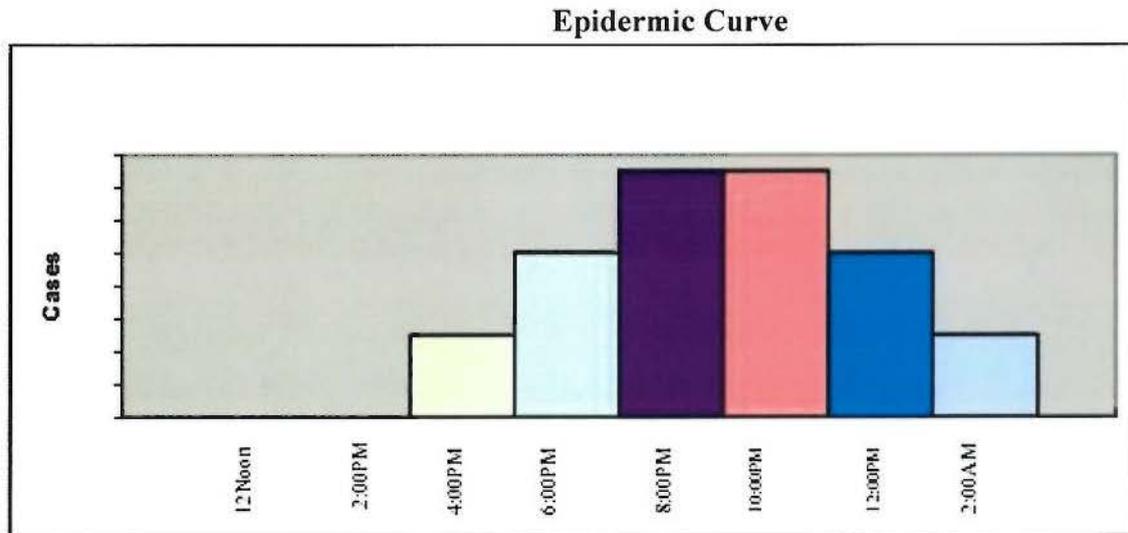
##### 4.2 Epidemic Curve

The time of onset of illness is most important as different causative agent appear at different times after ingestion. As a general guide chemical agents cause illness very quickly within a range of 1 minute to 1 hour, bacterial toxins quite quickly 1 hour to 6 hours, bacterial infections more slowly usually 5 - 72 hours and can be longer as the case of *Campylobacter* and viral infections. Based on the time of onset of illness and number of cases an epidemic graph can be prepared. The graph may help in:

- i) Confirming the existence of an epidemic;
- ii) Forecasting of the further evolution of the epidemic;
- iii) Identifying the mode of transmission;
- iv) Determining the possible period of exposure and/or the incubation period of the disease under investigation;
- v) Identifying outliers in terms of onset of illness, which might provide important clues as to the source.

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Table 2 :Graph of number of FBDs Victims and times of Onset



**4.3 Median Incubation Period**

Determine the median time to gain useful data regarding the causative agent. E.g. if the range was 8 - 16 hours and the median time was 12 hours it would appear to implicate *Bacillus cereus*. The median time can be obtained from the epidemic curve. Note: The median time of onset is the value of a list of individual time and is not the average time, or is a measure of central tendency which is not influenced by very short or very long incubation period.

**4.4 Food Specific Attack Rate**

Prepare an attack rate table from case history questionnaires. The attack rate table will usually quickly identify the implicated food. (Example of attack rate table is attached as ANNEX XII). Attack rate tables are important as most of the people who ate the implicated food will get ill whilst most of the people who did not eat the implicated food will stay unaffected. However, not all people who ate the implicated food will get ill and some people who did not eat the implicated food will get ill. Reasons for anomalies include poor memory, inaccurate answers, illness from other causes and infective doses. By plotting against age group it may help to determine who is at risk of becoming ill. This rate is the key factor in the formulation of hypothesis.

Experience has shown that attack rate table may lead to a false assumption in the following circumstances:

- Only part of a particular type of a food may have been contaminated so people may be consuming a particular food with different results.
- A contaminated food may contaminate a part of another food through cross contamination.

**4.5 Explanatory Hypotheses**

Develop explanatory hypotheses which address the source of the agent, mode and vehicle

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of transmission and specific exposure that caused the disease.

### 4.6 Relative Risks (RR)

The relative risk is a measure of strength of association between the exposure and disease. Its value provides indication of the suspect food in relation to FBD. Food product having the highest value is suspected of being the cause of the FBD as indicated in example in ANNEX XII.

Data derived from epidemiological studies can be used in risk assessment, a process of evaluating known or potential adverse health effects resulting from human exposure to foodborne hazards. Risk assessment for foodborne pathogen have become an important tool for responding to increasing scientific, legal and political demands in the area of food safety. Epidemiological data can be valuable in risk assessment for foodborne pathogen, particularly if data collection follows a standardized protocol.

NB: Statistical significant can be used to determine probability that this Relative Risk could have occurred by chance alone or not.

### 5.0 Record Keeping

From the beginning of an outbreak it is essential that all information received and all decisions taken by the OCT and others be recorded reliably and with the appropriate level of confidentiality. This means that:

- Individual members of the OCT keep records of all activities performed during investigation of the outbreak;
- Minutes are kept and distributed;
- Action notes are agreed upon and distributed immediately after OCT meetings;
- Notes and other records collected during all environmental, epidemiological and laboratory investigations are maintained;
- Copies are kept of all communications with the public, including letters, fact sheets, public notices and media reports.

### 6.0 Confidentiality

- i) Data about individuals collected for outbreak investigations are strictly confidential and therefore, data collection is the sole responsibility of public health officials.
- ii) If it is necessary to provide patient-specific information in a written report other than the case interview forms and disease investigation forms, the name of the patient should be coded.

### 7.0 Control Measures

The primary goal of Foodborne diseases outbreak investigations is to control ongoing public health threats and to prevent future outbreaks. Prevention of FBD requires prevention of entry of causative agents to food or detecting and eliminating them before consumption by susceptible human beings. Different methods are employed in controlling further spread of FBD as indicated below:

- i) Closing food premises or prohibiting the sale or use of foods
- ii) Removing implicated foods from the market (food recall, food seizure),

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iii) Modifying a food production or preparation process.

At the same time, specific interventions such as recalling a food product or closing food premises can have serious economic and legal consequences and must be based on accurate information. Thus the implementation of control measures is often a balancing act between the responsibility to prevent further cases and the need to protect the credibility of an institution.

### **7.1 Control of Source**

#### **7.1.1 Closing Food Premises**

If site inspections reveal a situation that poses a continuing health risk to consumers, the premises should be closed down until the problem has been solved. Once premises have been closed they should be monitored by the responsible authorities and remain closed until appropriate authorities approve their reopening.

#### **7.1.2 Modifying a Food Production / Preparation Process**

Once food investigations identify faults in production or preparation processes that may have contributed to the outbreak, corrective action must be taken immediately to avoid recurrences. Examples of corrective actions are modification of a recipe or of a process, reorganization of working practices, change in storage temperatures, or modification of instructions to consumers.

#### **7.1.3 Removing Implicated foods from the Market**

The objective of food recall and food seizure is to remove implicated foods as efficiently, rapidly and completely as possible from the market. A food recall is undertaken by any business responsible for the manufacture, wholesale, distribution or retailing of the suspect food from large corporations or partnerships to family-owned businesses and may be initiated by the business itself or undertaken at the request of an appropriate health authority.

Food seizure is the process by which an appropriate authority removes a food product from the market if the business does not comply with the request to recall. Rwanda FDA will often have an active role in removing implicated foods from distribution. In many situations, company recalls of products are carried out voluntarily at the suggestion of Rwanda FDA or other government authorities.

Once investigations implicate a suspect food, a decision is needed on whether that food should be removed from the market. This decision may rest with agencies represented on the OCT or involve other bodies concerned with food safety. Rwanda FDA must decide:

- Whether the information available justifies removal of the food from the market;
- Whether the product is still on the market;
- Whether the product is likely to be in the homes of the consumer even though sold out at retail level;
- Whether there is an ongoing risk to the consumer; How likely it is that the product

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can be recovered.

Rwanda FDA or OCT may be faced with presumptive findings that would justify a recall but without corroborative evidence. In such situations, a decision must be based on all factors in the particular case.

Once the Rwanda FDA have decided to recall a food product, they should:

- Communicate with, and ensure the cooperation of the business(es), involved in the recall;
- Directly advise local health authorities of the recall and any enforcement action required;
- Ensure appropriate public notification;
- Monitor the progress and effectiveness of the recall;
- Ensure that corrective actions are taken by the recalling business.

Means of notification will depend on the urgency of the situation and may include press releases, faxes, letters, telephone calls, and announcements on radio or television. Efficient recall of a widely distributed product requires that a manufacturer can identify a product by production date or lot number and that distribution records for finished products are maintained for a period of time that exceeds the shelf-life of the product.

**7.1.3.1 Communication with the Public**

Public should be alerted on the existence of FBD and implicated foods so that they refrain from using them. Even though the business may have already issued a press release, the OCT or Rwanda FDA may decide to notify the public. Ideally, this should be done on the same day that the decision is taken to recall a food product. Information to the public should include:

- Actions that consumers should take to prevent further exposure and illness; Name and brand of the food product (including labeling) being recalled;
- The nature of the problem, the reason for recall of the product, and information about how the problem was discovered;
- Name and location of the producing establishment and point of contact; Locations where the product is likely to be found;
- Numbers, amounts, and distribution;
- A description of common symptoms of the illness associated with the suspected pathogen or contaminant;
- Appropriate food-handling information for consumers;
- Actions that consumers should take if illness occurs.

**7.1.3.2 Post-recall Reporting by the Business**

After implementation of a food recall, the business should provide the

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Rwanda FDA or other appropriate authorities with interim and final reports about the recall, which should contain the following information:

- Copy of recall notice, letters to customers, retailers, etc;
- Circumstances leading to recall;
- Action taken by the business;
- Extent of distribution of the batch of food that was recalled;
- Result of recall (percentage of stock recovered or accounted for);
- Method of disposal or reprocessing of recovered stock;
- Difficulties experienced during recall;
- Action proposed for the future to prevent a recurrence of the problem.

### **7.2 Control of Transmission**

#### **7.2.1 Public Education**

If a contaminated food product cannot be controlled at its source, steps need to be taken to eliminate or minimize the opportunities for further transmission of the pathogen. Depending on the situation, appropriate public advice may be issued during a period of hazard, for example:

- Boiling of microbiologically contaminated water or avoidance of chemically contaminated water;
- Advice on proper preparation of foods;
- Advice to dispose of foods;
- Emphasizing personal hygiene measures

#### **7.2.2 Exclusion of Infected Persons from Work and School**

The risk of infection being spread by infected individuals depends on their clinical picture and their standards of hygiene. People with diarrhoea are far more likely to spread infection than asymptomatic individuals with subclinical illness.

Decisions about exclusion from work must be made by health authorities in accordance with local laws and regulations. In general, the following groups with diarrhoea or vomiting should stay away from work or school until they are no longer infectious:

- Food-handlers whose duties involve touching unwrapped foods to be consumed raw or without further cooking or other forms of treatment;
- People who have direct contact with highly susceptible patients or persons in whom gastrointestinal infection would have particularly serious consequences (e.g. the young, the elderly, the immune-compromised);
- Children aged under 5 years;
- Older children and adults with doubtful personal hygiene or with unsatisfactory toilet, hand-washing or hand-drying facilities at home, work or school.

Even if clinically well, no person with any of the following conditions should handle unpackaged food:

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- Excreta of *Salmonella typhior Salmonella paratyphi*;
- Excreta of the etiological agents of cholera, amoebic dysentery or bacillary dysentery; Hepatitis A or hepatitis E and all other forms of acute hepatitis until diagnosed as other than hepatitis A or hepatitis E ;
- *Taeniasolium*(pork tapeworm) infection;
- Tuberculosis (in the infectious state).

If an ill food-handler was implicated in an outbreak, recommendations should be made for preventing such problems in the future, such as ensuring that mechanisms are in place for routine screening to prevent ill persons from working.

#### 7.2.3 Education on Personal Hygiene

Investigator should issue education on personal hygiene to all individuals withgastrointestinal disease and should include the following:

- i) Avoid preparing food for other people until free from diarrhoea or vomiting.
- ii) Thoroughly wash hands after defecation, urination and before meals. Thorough hand washing with soap in warm running water and drying is the most important factor in preventing the spread of enteric diseases.
- iii) Use your own separate towels to dry hands. Institutions, particularly schools, should use liquid soaps and disposable towels or hand-dryers.
- iv) Clean toilet seats, flush handles, hand-basin taps and toilet door handles with disinfectant after use. If young children are infected, these cleaning procedures must be undertaken on their behalf. Similar arrangements may also be necessary in schools and residential institutions (if temporary exclusion is not possible).
- v) If employed in food preparation activities, scrub your nails with soap and a brush.

#### 7.2.4 Infection Control Precautions

Infection control precautions for hospitalized and institutionalized persons with infectious diarrhoea (in particular, easily transmissible infections such as *Salmonella typhi*, *Shigella*, etc.) include:

- i) Isolation of patients (e.g. in a private room with separate toilet if possible);
- ii) Barrier-nursing precautions;
- iii) Strict control of the disposal or decontamination of contaminated clothing and bedding;
- iv) Strictly observe personal hygiene measures (see above).

#### 7.2.5 Protecting Risk Groups

Certain groups are at particularly high risk of severe illness and poor outcomes after exposure to a foodborne disease. Safe food-handling practices, including strict adherence to thorough hand-washing, should be particularly emphasized to such people. Specific advice for risk groups may be considered in some circumstances. Examples include advice to:

- i) Pregnant women against consumption of unpasteurized milk, unpasteurized cheeses, and other foods potentially contaminated with *Listeria*;

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- ii) Immunocompromised persons, such as those with HIV/AIDS, to avoid eating unpasteurized milk products, raw fish, etc;
- iii) Persons with underlying liver disease to avoid consumption of raw oysters and other food that may transmit *Vibrio* bacteria;
- iv) Persons with underlying chronic viral hepatitis B or C or other liver disease to be vaccinated against hepatitis A if appropriate;
- v) Personnel of day-care centres about receiving vaccination or immunoglobulin during a hepatitis A outbreak in the institution (although this is more likely to protect against secondary spread than against foodborne transmission).

**7.2.6 Education on good Practices**

Information and education should be provided to farmers, manufacturers and food handlers on importance of adherence to Good Agricultural Practices (GAPs), Good Veterinary Practices (GVPs), Good Manufacturing Practices (GMPs) and Good Hygiene Practices (GHPs).

Depending on circumstances, this may include educating food workers, managers, patients, or the public at large about adequate cooking, adequate holding temperatures, how to avoid cross-contamination, and the importance of good hand washing practices.

**7.2.7 Legal Measures**

Legal measures should be applied to persistent non compliance to GHPs

**7.2.8. Condemnation and Disposal of Unfit Food**

Foods implicated in outbreaks of FBDs should not be used but should be disposed of in a manner that will not affect human and animal health and the environment.

**8.0 FBD Reporting**

**8.1 Levels of FBD Reporting**

Notification of incidences by medical practitioners shall be mandatory. Reporting of FBDs from Sector to National level is required to be prepared to allow consolidation of investigation and inspection results which can be used for future control and prevention strategies.

FBD reports are part of food control activities reports normally submitted by Province Administration and Local Authorities to Rwanda FDA. There should be a Food Borne Diseases Register format DIS/FMT/027, as illustrated in Annex XIII. The information required to be submitted is contained in form DIS/FOM/028 (Annex XIV). FBD alert from any level to a superior one will however be copied to Rwanda FDA on the same day.

Province Administration will conduct supervision functions in line with the Province Administration and Local Government Authorities.

**8.2 Responsibilities at each Level**

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FBD functions will be done at the following levels namely; National, Province, District and Sector. Functions undertaken at each level will be as indicated hereunder.

### **8.2.1 Healthy Community Office**

- i) Establish and run community FBD file
- ii) To receive notification on FBD from medical personnel or individuals
- iii) Investigate FBD in the Sector
- iv) Solicit technical assistance and co-operation in investigating FBD from district Medical office
- v) Report FBD outbreaks to the District Medical Office
- vi) Share FBD information with other Sectors and interested parties at local and district levels
- vii) Sector Health Committee will act as Outbreak control team (OCT) for control of FBD outbreaks.
- viii) Disseminate information and give feedback to query sources on FBD
- ix) Foster establishment of, and consultation with food consumer groups
- x) Disseminate public health education
- xi) Incorporate FBD reports in the general monthly, quarterly and annual food control reports.

### **8.2.2 District Medical Office**

- i) Establish and run a district FBD data bank
- ii) Distribute within the district, data capturing forms.
- iii) Investigate and provide technical assistance in the investigation of FBD to Sectors
- iv) Collect, analyse, interpret FBD data, predict outbreaks and issue early alerts on FBD in the district
- v) Solicit technical assistance and co-operation in investigating FBD from Rwanda FDA and Province level.
- vi) Report FBD outbreaks to the Rwanda FDA and Province level.
- vii) Relay information on FBDs to and from Sectors
- viii) Share FBD information with other districts and interested parties at the district and Province level.
- ix) Disseminate information and give feedback to query sources on FBD.
- x) Foster establishment of, and consultation with food consumer groups
- xi) Disseminate public health education
- xii) Train FBD surveillance personnel.
- xiii) Incorporate FBD reports in the general monthly, quarterly and annual food control reports.

### **8.2.3 Province Medical Office**

- i) Compile districts FBD reports
- ii) Relay information to and from districts and the Rwanda FDA
- iii) Collect, analyse, interpret FBD data, predict outbreaks and issue early alerts on FBD in the Region

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- iv) Provide technical assistance in the investigation of FBD to Districts
- v) Seek technical assistance and co-operation in supervision on FBD matters from Rwanda FDA
- vi) Report FBD outbreaks to the Rwanda FDA
- vii) Share FBD information with other regions and interested parties at local and National levels
- viii) Train FBD surveillance personnel

**8.2.4 Ministry of Health (Rwanda FDA)**

- i) Establish and run a national FBD data bank
- ii) Review guidelines on FBD in line with emerging, re-emerging FBDs and new scientific developments.
- iii) Collect, analyse, interpret FBD data, predict outbreaks and issue early alerts on FBD
- iv) Investigate and provide technical assistance to Province Administration and Local Authorities in the investigation of FBD
- v) Co-operate and solicit technical assistance from relevant International Organizations in matters related to FBD
- vi) Submit FBD reports to the Ministry responsible for Health
- vii) Share FBD information with other interested parties at national and international levels
- viii) Establish an Outbreak control team(OCT) for FBD control
- ix) Disseminate information and give feedback to information or query sources on FBD
- x) Train FBD surveillance personnel
- xi) Foster establishment of, and consultation with food consumer groups
- xii) Improve public awareness on FBDs
- xiii) Write quarterly and annual reports on FBD

**8.2.5 Outbreak Final Report**

An interim report should be made available by the OCT 2-4 weeks after the end of the investigations, followed by a written final report. The final report should be comprehensive, protect confidentiality and be circulated to appropriate individuals and authorities. The report should follow the usual scientific format of an outbreak investigation report (ANNEX XI) and include a statement about the effectiveness of the investigation, the control measures taken and recommendations for the future.

In addition, a summary report should be completed and forwarded to the appropriate authorities at national level for collation, analysis and, when appropriate, reporting to the international level (e.g. SalmNet, EnterNet, WHO, etc.).

**9.0 Co-ordination of FBD Functions**

**9.1 Health Community Workers**

The incharge of Health community workers will be responsible for Coordination and

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reporting. However, all health workers responsible for clinical screening of patients, laboratory work, etc will play their roles as related to FBD Surveillance and furnish the information to the Coordinator who will submit such report to the District.

**9.2 Hospital/health Centre Level**

The Drug Therapeutic Committee will be the Coordinator of FBD matters.

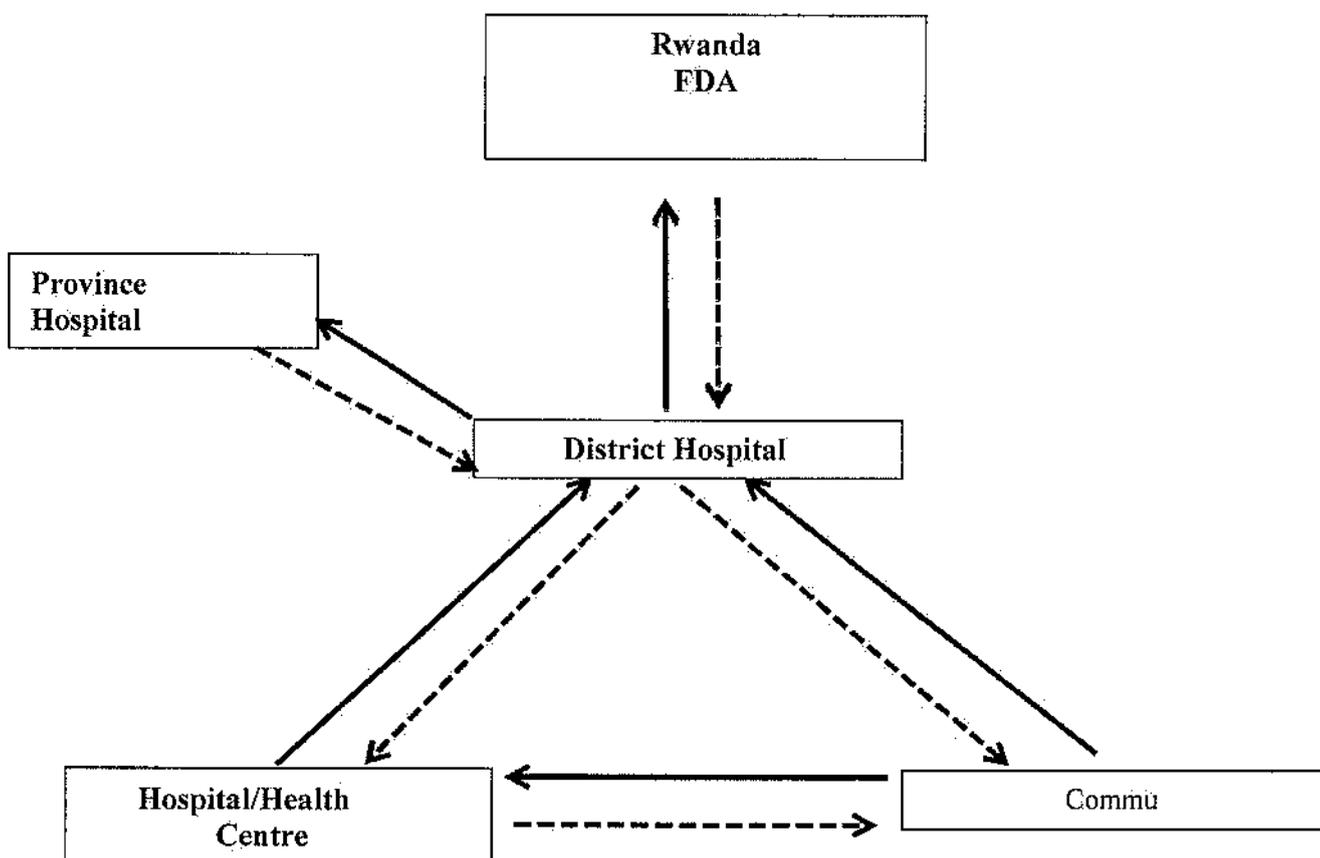
**9.3 Province level**

At Province level the committee responsible for health matters will also be responsible for supervision of FBD activities at Province level.

**9.4 National level**

At the National level Rwanda FDA will be the overall co-coordinator on FBD matters. The Director General will appoint an officer to coordinate FBD matters.

**Figure 2: Reporting level of FBDs**



**10.0 Review of Outbreak**

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The OCT should formally decide when an outbreak is over and issue a statement to this effect. A structured review should follow all outbreaks for which an OCT is convened and should include a formal debriefing meeting with all parties involved in the investigation. The aims of debriefing are to:

- Ensure that control measures for the outbreak are effective;
- Identify long-term and structural control measures and plan their implementation;
- Assess whether further scientific studies should be conducted;
- Clarify resource needs, structural changes or training needs to optimize future outbreak response;
- Identify factors that compromised the investigations and seek solutions; Change current guidelines and develop new materials as required; Discuss legal issues that may have arisen;
- Arrange for completion of the final outbreak report.

### 11.0 **Future Studies, Research**

Further studies may be conducted after completion of the initial investigations, particularly if new or unusual pathogens were involved or additional information for risk assessment of a particular pathogen is required. The need to catch up on routine work delayed by the outbreak investigation often makes it difficult to conduct such follow-up studies. Nevertheless, it is important that these opportunities be considered following each outbreak - either by OCT members themselves or by others who may be in a better position to do this. Details of the outbreak may also be published in an international journal in order to inform the scientific community at large.

Economic evaluations of outbreaks and associated control efforts can be important in assessing the cost-effectiveness of outbreak investigations and food safety measures. Foodborne outbreaks will incur costs to:

- Health care providers (diagnostic and curative services);
- The population (medication, time missed from school or work, reduced activity as a consequence of long-term sequelae, death);
- The food industry (closure, adverse publicity, recall, litigation); Agencies, laboratories and other persons and organizations involved in the investigation, response and control activities.
- Costs associated with outbreaks can be enormous, and quantifying them may help to increase the commitment of the food industry and other agencies to food safety.

### 12.0 **Reference**

WHO: Foodborne disease outbreak-Guideline for investigation and Control  
[www.who.int/foodsafety/en](http://www.who.int/foodsafety/en)

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**ANNEX I :Common Food Borne Diseases Caused by Different Agents.**

**1. Common Food-borne Diseases caused by Bacteria**

<b>Disease (causative agent)</b>	<b>Incubation period</b>	<b>Principal symptoms</b>	<b>Typical foods</b>	<b>Mode of contamination</b>	<b>Prevention of disease</b>
<i>Bacillus cereus</i> food poisoning, diarrheal	8-16hr (12-24hr)	Diarrhea, abdominal cramps occasional vomiting	Meat products, soups, sauces, vegetables	From soil or dust	Thorough heating and rapid cooling of foods
<i>Bacillus cereus</i> food poisoning, emetic	1-5hr (6-24hr)	Nausea, vomiting, sometimes diarrhea and abdominal cramps	Cooked rice and pasta	From soil or dust	Thorough heating and rapid cooling of foods
Botulism; food poisoning (heat labile toxin of <i>Clostridium botulinum</i> )	12 - 36 hr (months)	Fatigue, weakness, double vision, slurred speech, respiratory failure, sometimes death	Types A & B: Vegetables, fruits, meat, fish, and poultry products, condiments: Type E: fish and fish products	Types A & B from soil or dust; type E: water and sediments	Thorough heating and rapid cooling of foods
Botulism; food poisoning infant infection	3-30 days (variable)	Constipation, weakness, respiratory failure, sometimes death	Honey, soil	Ingested spores from soil, dust or honey colonize intestine	Do not feed raw or pasteurized honey to infants
Brucellosis; <i>Brucellamelitensis</i>	Commonly 1 – 2 months but range from 5 – 60 days.	Fever, sweats, headaches, backpains, and physical weakness	Unpasteurized dairy products (milk, cheese and ice-cream), undercooked meat	Infected food source (dairy products and meat)	Do not consume unpasteurized milk, cheese, ice-cream. Cook meat thoroughly
Campylobacteriosis ( <i>Campylobacter jejuni</i> )	3-5 days (2-10 days)	Diarrhea, abdominal pain, fever, nausea, vomiting	Infected food source animals	Chicken, raw milk	Cook chicken thoroughly; avoid crosscontamination, irradiate chickens; pasteurize milk

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Cholera ( <i>Vibrio cholerae</i> )	2 - 3 days hours to days	Profuse, watery stools; sometimes vomiting, dehydration; often fatal if untreated.	Raw or undercooked seafood	Human feces in marine environment	Cook seafood thoroughly; general sanitation
( <i>Clostridium perfringens</i> ) food poisoning	8 - 22 hr (12 - 24 hr)	Diarrhea, abdominal cramps, rarely nausea and vomiting	Cooked meat and poultry	Soil, raw foods	Thorough heating and rapid cooling of foods
( <i>Escherichia coli</i> ) foodborne infection: enterohemorrhagic	12 - 60 hr (2-9 days)	Watery, bloody diarrhea	Raw or undercooked beef, raw milk	Infected cattle	Cook beef thoroughly; pasteurize milk
( <i>Escherichia coli</i> ) enteroinvasive	At least 18 hr (uncertain)	Abdominal cramps diarrhea, fever, dysentery	Raw foods	Human fecal contamination, direct or contamination via water	Cook foods thoroughly, general sanitation
( <i>Escherichia coli</i> ) foodborne infection: enterotoxigenic	10 - 72hr (3-5 days)	Profuse watery diarrhea; sometimes abdominal cramps, vomiting	Raw foods	Human fecal contamination, direct or contamination via water	Cook foods thoroughly, general sanitation
Listeriosis ( <i>Listeria monocytogenes</i> )	3 - 70 days	Meningoencephalitis; still births; septicemia or meningitis in newborns	Raw milk, cheese and vegetables	Soil or infected animals, directly or via manure	Pasteurization of milk; cooking
Salmonellosis ( <i>Salmonella species</i> )	5 - 72 hr (1-4 days)	Diarrhea, abdominal pain, chills, fever vomiting, dehydration	Raw and undercooked eggs; raw milk, meat and poultry	Infected food source animals; human feces	Cook eggs, meat and poultry thoroughly; pasteurize milk; irradiate chickens

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Shigellosis ( <i>Shigella species</i> )	12 - 96 hr (4-7 days)	Diarrhea fever, nausea; sometimes vomiting, abdominal cramps	Raw foods	Human fecal contamination, direct or contamination via water	General sanitation; cook foods thoroughly
Staphylococcal food poisoning (heat stable enterotoxin of <i>Staphylococcus aureus</i> )	1 - 6 hr (6-24hr)	Nausea, vomiting, diarrhea, abdominal cramps	Ham, meat and poultry products, cream filled pastries, whipped butter, cheese	Food Handlers with colds, sore throats or infected cuts, food slicers	Thorough heating and rapid cooling of foods
Streptococcal foodborne infection ( <i>Streptococcus pyogenes</i> )	1 - 3 days (varies)	Various, including sore throat, erysipelas, scarlet fever	Raw milk, deviled eggs	Food Handlers with sore throats, other "strep" infections	General sanitation, pasteurize milk
<i>Vibrio parahaemolyticus</i> foodborne infection	12-24hr (4-7 days)	Diarrhea, abdominal cramps, sometimes nausea, vomiting, fever, headache	Fish and seafood	Marine coastal environment	Cook fish and seafood thoroughly
<i>Vibrio vulnificus</i> foodborne infection	In person with high serum iron: 1 day	Chills, fever, prostration, often death	Raw oysters and clams	Marine coastal environment	Cook shellfish thoroughly
Yersiniosis ( <i>Yersinia enterocolitica</i> )	3-7 days (2-3 weeks)	Diarrhea, pains mimicking appearance of appendicitis fever, vomiting, etc	Raw or undercooked pork and beef; tofu packed in spring water	Infected animals especially swine; contaminated water	Cook meat thoroughly, chlorinate water

**2. Common food-borne diseases caused by viruses**

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<b>Disease (causative agent)</b>	<b>Latency period (duration)</b>	<b>Principal symptoms</b>	<b>Typical foods</b>	<b>Mode of contamination</b>	<b>Prevention of disease</b>
Hepatitis A (Hepatitis A virus)	15 - 50 days (weeks to months)	Fever, weakness nausea, discomfort, often jaundice	Raw or undercooked shellfish, sandwiches, salads, etc.	Human fecal contamination, via water or direct	Cook shellfish thoroughly, general sanitation
Viral gastroenteritis (Norwalk-like viruses)	1-2 days	Nausea, vomiting, diarrhea, pains, headache, mild fever	Raw or undercooked shellfish, sandwiches, salads, etc.	Human fecal contamination, via water or direct.	Cook shellfish thoroughly, general sanitation
Viral Gastroenteritis (rotaviruses)	1-3 days (4-6 days)	Diarrhea, especially in infants and children	Raw or mishandled food	Probably human fecal contamination	General sanitation

**3. Food-borne diseases caused by Fungi other than mushrooms**

<b>Disease (causative agent)</b>	<b>Latency period (duration)</b>	<b>Principal symptoms</b>	<b>Typical foods</b>	<b>Mode of contamination</b>	<b>Prevention of disease</b>
Aflatoxicosis ("aflatoxins" of <i>Aspergillus flavus</i> and related moulds)	Varies with dose	Vomiting, abdominal pain, liver damage, liver cancer (mostly Africa and Asia)	Grains, peanuts, milk	Moulds grow on grains and peanuts in field or storage; cows fed mouldy grain	Prevent mould growth; don't eat or feed mouldy grain or peanuts; treat grain to destroy toxins
Alimentary toxic aleukia ("trichothecene" toxin of <i>Fusarium</i> moulds)	1-3 days (weeks to months)	Diarrhea, nausea, vomiting; destruction of skin and bone marrow; sometimes death	Grains	Mild growth on grain, especially if left in the field through winter	Harvest grain in the fall; don't use mouldy grain

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Ergotism (toxins of <i>Claviceps purpurea</i> )	Varies with dose	Gangrene (limbs die and drop off); or convulsions and dementia; abortion	Rye; or wheat, barley, and oats	Fungus grows on grain in the field; grain kernel is replaced by a "sclerotium"	Remove sclerotia from harvested grain
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4. Food-borne diseases caused by protozoa and parasites

Disease (causative agent)	Latency period (duration)	Principal symptoms	Typical foods	Mode of contamination	Prevention of disease
(PROTOZOA) Amoebic dysentery ( <i>Entamoeba histolytica</i> )	2-4 weeks (varies)	Dysentery, fever, chills; sometimes liver abscess	Raw or mishandled foods	Cysts in human feces	General sanitation; thorough cooking
Cryptosporidiosis ( <i>Cryptosporidium parvum</i> )	1-12 days (1-30 days)	Diarrhea; sometimes fever, nausea and vomiting	Mishandled foods	Oocysts in human feces	General sanitation; thorough cooking
Giardiasis ( <i>Giardia lamblia</i> )	5-25 days (varies)	Diarrhea with greasy stools, abdominal cramps, bloat	Mishandled foods	Cysts in human and animal feces, directly or via water.	General sanitation; thorough cooking
Toxoplasmosis ( <i>Toxoplasma gondii</i> )	10-9 days (varies)	Resembles mononucleosis; fetal abnormality or death	Raw or undercooked meats; raw mild; mishandled foods	Cysts in pork or mutton, rarely beef; oocysts in cat feces	Cook meat thoroughly; pasteurize milk; general sanitation

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(ROUNDWORMS, Nematodes) Anisakiasis ( <i>Anisakis simplex</i> , <i>pseudoterranova decipiens</i> )	Hours to weeks (varies)	Abdominal cramps; nausea, vomiting	Raw or undercooked marine fish, squid or octopus	Larvae occur naturally in edible parts of seafood	Cook fish thoroughly or freeze at 40°F for 30 days
Ascariasis( <i>Ascaris lumbricoides</i> )	10 days - 8 weeks (1-2 years)	Sometimes pneumonitis, bowel obstructions	Raw fruits or vegetables that grow in or near soil	Eggs in soil, from human feces	Sanitary disposal of feces; cooking food
Trichinosis ( <i>Trichinella spiralis</i> )	8 -15 days 9 weeks, months)	Muscle pain, swollen eyelids, fever; sometimes digestive disturbances	Raw or undercooked pork or meat or carnivorous animals (e.g bears)	Larvae encysted in animal's muscles	Thorough cooking of meat; freezing pork at 50°F for 30 days; irradiation
(TAPEWORMS, Cestodes) Beef tapeworm ( <i>Taenia saginata</i> )	10 - 14 weeks (20 - 30 years)	Worm segments in stool; sometimes digestive disturbances	Raw or undercooked beef	"cysticerci" in beef muscle	Cook beef thoroughly or freeze below 90°F
Fish tapeworm ( <i>Diphyllobothrium latum</i> )	3-6 weeks (years)	Limited: sometimes vitamin B-12 deficiency	Raw or undercooked fresh-water fish	"plerocercoids" in fish muscle	Heat fish 5 minutes at 133°F or freeze 24 hours at 0°F
Pork tapeworm ( <i>Taenia solium</i> )	8 weeks - 10 years (20 - 30 years)	Worm segments in stool; sometimes "cysticercosis" of muscles, organs, heart or brain.	Raw or undercooked pork; any food mishandled by a <i>T. solium</i> carrier.	"Cysticerci" in pork muscle; any food human feces with <i>T. solium</i> eggs	Cook pork thoroughly or freeze below 32°F general sanitation.

**5. Food-borne Diseases caused by chemicals and metals**

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<b>Disease (causative agent)</b>	<b>Latency period (duration)</b>	<b>Principal symptoms</b>	<b>Typical foods</b>	<b>Mode of contamination</b>	<b>Prevention of disease</b>
(TOXINS IN FIN FISH) ciguatera poisoning (ciguatoxin, etc)	3-4 hr (rapid onset) 12-18 hr (days - months)	Diarrhea, nausea, vomiting, abdominal pain numbness and tingling of face; taste and vision aberrations, sometimes convulsions, respiratory arrest and death (1-24hrs)	"Reef and island" fish: grouper, surgeon fish, barracuda, pompano, snapper, etc.	(Sporadic); food chain, from algae	Eat only small fish
Fugu or pufferfish poisoning (tetrodotoxin, etc)	10 - 45 min to ≥ hrs	Nausea, vomiting, tingling lips and tongue, ataxia, dizziness, respiratory distress/arrest and sometimes death	Pufferfish, "fugu" (many species)	Toxin collects in gonads, viscera	Avoid pufferfish (or their gonads)
Scombroid or histamine poisoning (histamine, etc)	Minutes to few hours (few hours)	Nausea, vomiting, diarrhea, abdominal cramps, flushing, headache, burning in mouth	"scombroid" fish (tuna, mackerel etc): mahimahi, others	Bacterial action	Refrigerate fish immediately when caught
(TOXINS IN SHELLFISH) amnesic shellfish poisoning (domoic acid)		Vomiting, abdominal cramps, diarrhea, disorientation, memory loss; sometimes death	Mussels, clams	From algae	Heed surveillance warnings
Paralytic shellfish poisoning (saxitoxin, etc)	<2 hrs to ≥24 hr)	Vomiting, diarrhea, paresthesias of face, sensory and motor disorders; respiratory paralysis, death	Mussels, clams, scallops, oysters	From "red tide" algae	Heed surveillance warnings

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(MUSHROOMS TOXINS) mushroom poisoning (varies greatly among species)	<2 hrs to ≥3 hr)	Nausea, vomiting, diarrhea, profuse sweating, intense thirst, hallucinations, coma death	Poisonous mushrooms	Intrinsic	Don't eat wild mushrooms
(PLANT TOXINS)Cyanide poisoning (cyanogenic glycosides from plants)	(large doses) 1 - 15 min	Unconsciousness, convulsions, death	Bitter almonds, cassava, some lima bean varieties, apricot kernels	Intrinsic, natural	Proper processing; avoid some so-called foods
(METALS) Cadmium	Depends on dose	Nausea, vomiting, diarrhea, headache, muscular aches, salivation, abdominal pain, shock, liver damage, renal failure	Acid foods, food grilled on shelves from refrigerator	Acid or heat mobilizes cadmium plating	Select foods contact surfaces carefully
Cooper poisoning	Depends on dose (24-28 hr)	Nausea, vomiting, diarrhea	Acid foods, foods contacting copper, soda fountains, beverages	Acid mobilizes copper	Select food contact surfaces carefully
Lead poisoning	Depends on dose	Metallic taste, abdominal pain, vomiting, diarrhea, black stools, oliguria, collapse coma (also chronic effects)	Glazes, glasses, illicit whiskey	Lead dissolves in beverages and foods	Test glazes and glasses; avoid illicit whiskey
Mercury poisoning	Depends on dose	Metallic taste, thirst, abdominal pain, vomiting, bloody diarrhea, kidney failure	Treated seeds (fungicide): fish	International; food chain	Eat only seeds intended for food

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Zinc poisoning	Depends on dose (24-48hr)	Nausea, vomiting, diarrhea	Acid foods in galvanized containers	Acid mobilizes zinc plating	Select food contact surfaces carefully
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**ANNEX II :Food Borne Disease Surveillance Form for Patients**



(To be filled by Medical Practitioners)  
(Fill under each item as appropriate)

1. Hospital----- District----- Province -----
2. Patient name----- Reg. No. -----  
Age ----- Sex (Male/Female) -----
3. Physical address-----Postal address-----
4. Disease sign and symptoms-----
5. Istheillnessresultfromconsumptionoffoodordrink?Yes/No----- If yes  
give the name of food or drink-----Time  
consumed-----place consumed-----Time  
of first signs of illness-----
6. Hasthepatientsufferedthesameillnessbefore?Yes/No----- If yes  
which date -----
7. Didthepatientgetmedicaltreatment?Yes/No  
If yes describe the type of treatment-----
8. Is the patient referred to the Laboratory for screening? -----  
If yes state specimen taken -----  
Code No. ----- date drawn-----date submitted-----  
Date analyzed----- aetiological agent found -----  
Load/concentration-----
9. Conclusion as to the causative agent -----  
-----
10. Doctor/Clinician Code or Name-----

Date ----- time -----Signature-----

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ANNEX IV :Suspected Food Borne Disease Notification Form



**Patient details**

Name..... Tel. No.....  
Age..... Sex .....

Address: .....

E-mail: ..... Fax .....

Occupation .....

Suspected premises (there may be more than one)  
.....  
Address.....  
Tel. No. ....  
E-mail..... Fax .....

**Foods eaten**

1. ....
2. ....
3. ....
4. ....
5. ....
6. ....

**Beverages**

**Additional information**

Time and date food consumed .....

**First symptoms**

.....

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.....  
.....  
Time &Date.....

Description:  
.....  
.....

.....  
Have you been to the doctor?Yes/No.  
Have stool samples been taken?Yes/No.

Symptoms ceased.  
Time &Date.....

Illness in other family members  
.....  
.....  
.....

Date: ..... Notified by ..... Tel. ....  
E-mail ..... Fax .....

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ANNEX V: INITIAL CASE REPORT FORM



Health facility: ..... District:..... Province: .....

Information on person affected

Last name:.....
First names: ..... Sex:.....
Occupation:.....
Address, telephone number:.....
Daytime contact details (work address, phone): .....

Clinical details

Date & time of onset of symptoms: .....
Date & time when symptoms stopped:.....Predominant symptoms (severity, duration).....
Doctor consulted? (if yes, provide name and details).....
Hospital attended? (if yes, provide name and details).....
Laboratory specimen taken? (if yes, provide details).....
Diagnosis available .....
Suspect food? (if yes, provide source of food, preparation mode, when consumed) .....

Table with 3 columns: Doc. No.: DIS/GDL/004, Revision No.:0, Revision Date:06/05/2019, Effective Date:13/05/2019, Review Due Date:13/05/2022

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*Guidelines for investigation and control of food borne diseases*

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Suspect meal, event, place? (if yes, describe; provide, name, date, address, telephone number)

.....  
.....  
.....

Person attending suspect ill/well Address & telephone meal/event

Other relevant information.....

Name of officer filling form: .....

Title:

.....

Signature: .....

Date:.....

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**ANNEX VI :FOOD BORNE DISEASE CASE HISTORY FORM**



**Health facility:** ..... **District:** ..... **Province:** .....  
 (Use addition sheet of paper if space provided is not adequate)

1. Date of notification.....
2. Date of investigation.....
3. Name of complainant.....  
 Age.....  
 Address.....  
 Tel. No..... E-mail.....
4. Place where the outbreak occurred.....  
 Street.....  
 Village.....  
 Sector.....  
 Division.....District .....
5. When did the outbreak start.....
6. How many people were ill? .....
7. How many people ate the suspect meal were not ill? .....
8. What was the suspect food(s)?  
 .....  
 .....
9. If some people who ate the suspect meal were not ill, what food they didn't eat or they ate in small amounts?  
 .....  
 ...
10. How soon after the last meal did illness begin?  
 No. of hours ..... date .....

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11. What were signs and symptoms of illness? (Tick where appropriate).

- |  |   |
|--|---|
| <input type="checkbox"/> Nausea                    | <input type="checkbox"/> Constipation               |
| <input type="checkbox"/> Vomiting                  | <input type="checkbox"/> Fever                      |
| <input type="checkbox"/> Burning sensation (mouth) | <input type="checkbox"/> Headache                   |
| <input type="checkbox"/> Rash                      | <input type="checkbox"/> Numbness                   |
| <input type="checkbox"/> Abdominal cramps          | <input type="checkbox"/> Paralysis                  |
| <input type="checkbox"/> Diarrhoea                 | <input type="checkbox"/> Dizziness                  |
| <input type="checkbox"/> Bloody                    | <input type="checkbox"/> Reversesensation(hot/cold) |
| <input type="checkbox"/> Mucoid                    | <input type="checkbox"/> Itching                    |

12. How long did the illness last:

(a) Acute signs?

.....  
 .....

(b) Before feeling well again?

.....  
 .....

13. List the total foods and drinks ingested at the last meal (or snack)

.....  
 .....  
 .....

14. List the foods eaten during the four previous meals

.....  
 .....  
 .....

15. List foods consumed in the previous 72 hours indicating place and time. (In case Campylobacter is the suspect causative agent list other high risk foods consumed in previous 10 days).....

16. Did the complainant think any particular food was abnormal? (e.g “spoiled”, “off-flavour” etc)Yes/No.

If yes mention the food.....

17. What treatment had this suspected food received? (If applicable).....

- i. Was it fresh purchased? .....
- ii. If canned, how long since opening the can? .....
- iii. Was it Frozen food? .....
- iv. Was it Prepared at home .....
- v. A “warmed-up” preparation? .....
- vi. How long since preparation/cooking? .....
- v. Was it continuously refrigerated? .....
- vi. 18. What was the method of cooking? .....

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- 19. Did the person who prepared the food suffer from infected cuts, boils, cold, sore throat, diarrhoea?
- 20. Are remnants of the suspect food available? (If so take sample).
- 21. Were specimen taken from the patient? Yes/No.  
If yes, what was the laboratory results  
.....
- 22. Was patient hospitalized?  
Yes/No If yes,  
Name of hospital:  
.....  
Date of admission: ...../...../.....  
Date of discharge: ...../...../.....
- 23. What was the diagnosis? .....
- 24. Investigator's remarks:  
.....  
.....  
.....  
.....  
.....  
.....  
.....

Name of investigator.....  
Signature:.....  
Title.....  
Address.....

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ANNEX VII LINE LISTING



Facility: ..... District: ..... Province: .....

ID	Name	Age	Sex	Date & time of onset of illness	Major signs & symptoms	Laboratory tests	
						specimen	Result

Name of the officer filling form: .....

Title: .....

Signature: .....

Date: .....

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**ANNEX VIII LABORATORY TEST REQUEST FORM**



Customer's name and address

.....  
 Customer code number (if applicable).....  
 .....

**Sample Information**

Product name (including brand name, form and strength if applicable).....

Description (appearance of container & contents):

.....  
 .....

Batch number..... Expiry date..... Manufacturing date

Manufacturer

Sample size (quantity):..... Submission date.....

Reason(s) for requesting the analysis

S/N	Test requested	S/N	Test requested

**Analysis fees and charges**

.....

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**Customer name:** ..... **Signature:** ..... **Date:** .....

I accept/reject to carry out tests specified above Laboratory Director (LD) Remarks (In case of rejection).....

**LD name:** .....

**Division:** .....

**Signature:** .....

**Date:** .....

**Subcontractin**

Agreement for sub-contracting work: yes /no (tick as appropriate) If no give reason(s).....

**Customer signature**..... **Date**.....

**LD signature**.....

**Date**.....

Test request amendment/additional test(s) (when applicable).....

**Customer signature**.....

**LD Signature**.....

**Date**.....

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**ANNEX IX PROCEDURES AND EQUIPMENT FOR SPECIMEN COLLECTION**



**Clinical specimens**

**General**

Enclose specimens in a secure container and label the container with a waterproof pen. Place this container in a waterproof bag with tissue, towels or other blotting material to absorb any leakage. Put all specimen containers in an insulated box packed with ice or frozen refrigerant packs and deliver them to the laboratory as soon as possible. If sending specimens by post or courier ensure that they are delivered during business hours on a weekday.

Address the package clearly, including the name and telephone number of the receiving laboratory. Write instructions as appropriate, for example “Medical specimens. Call addressee on arrival. Hold refrigerated.”

**Faeces**

Collect stool specimens as soon as possible, since delay may impede identification of the causative agent. Ideally, swabs of fresh stool or rectal swabs should be collected for bacteriological examination, large volumes of diarrhoeal stool (at least 30g) for viral examination, and fresh bulk stool (with preservative) for parasite examination.

**Bacteria**

Collect at least two rectal swabs or swabs of fresh stools (less than one hour old) from each case:

- If possible refrigerate Cary-Blair transport medium in advance, so that the swabs can be placed into a cool medium.
- Insert swab into Cary-Blair medium to moisten it. Insert swab 3-5 cm into rectum and rotate gently.
- Remove swab and examine it to ensure that the cotton tip is stained with faeces. Insert swab immediately into tube of transport medium.
- Push the swab to the bottom of the tube.
- Repeat procedure with the second swab and place in same tube as the first. Break off top parts of sticks, tighten screw-cap firmly.

If specimens will arrive at the laboratory within the 48 hours after collection,

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they can be refrigerated at 4 °C. Pathogens can still be recovered from refrigerated samples up to 7 days after collection, although the yield decreases after the first 2 days. During transport, refrigeration for up to 36 hours can be achieved by shipping in a well-insulated box with frozen refrigerant packs or wet ice.

If it is impossible for specimens to reach a laboratory within 2 days, they can be frozen at -20 °C (home-type freezer) although freezing at -70 °C (ultra-low freezer) is preferable. Frozen specimens should be shipped with dry ice, observing the following precautions:

- Protect specimens from direct contact with dry ice, as intense cold can crack the glass tubes.
- Protect specimens from carbon dioxide by sealing screw-caps with tape or by sealing tubes in plastic bags.
- Ensure that container is at least one-third full of dry ice.

### **Viruses**

Obtain a large quantity (as much as possible but at least 10 ml) of diarrhoeal stool that has not been mixed with urine in a clean, dry, leak-proof container. To permit diagnosis of certain viral agents, specimens must be collected during the first 48 hours of illness. Immediately refrigerate the specimen at 4 °C (do not freeze) and send as soon as possible to the laboratory.

### **Parasites**

Obtain fresh bulk-stool that has not been mixed with urine and place in a clean container. Then add preservative solution (10% formalin or 10% polyvinyl alcohol) at a ratio of 1 part stool to 3 parts preservative. If there is a delay in obtaining the preservatives, refrigerate untreated stool specimens at 4 °C (do not freeze) for up to 48 hours. Once preserved, the specimens can be stored and transported at room temperature or refrigerated.

### **Vomit**

If the person is still vomiting at the time of the investigation, collect vomitus. Let the patient vomit directly into a specimen container that has been thoroughly cleaned and boiled in water. Take the specimen directly to the laboratory. If this is not possible refrigerate (but do not freeze) the specimen.

### **Serum**

In the investigation of foodborne disease outbreaks, serological examination is sometimes useful to detect the development of antibodies as a result of infection.

Blood should be obtained only by a person legally qualified to undertake the procedure; check appropriate laws. If possible, obtain blood specimens from the same patients from whom stool samples were obtained.

Submit two serum specimen one acute-phase and one convalescent-phase - for each patient thought to have illness caused by viruses or bacteria. Obtain the acute phase serum specimen as close to the time of onset of illness as possible (at most, within a week after onset of illness). The convalescent-phase serum specimen should be obtained 3 weeks - or, if a viral agent is suspected, 6 weeks after the onset of illness.

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Collect blood specimens from adults (15 ml) and from children (3 ml) in tubes that do not contain anticoagulants. For antibody studies the specimens need not be refrigerated during the day of the collection (unless the weather is extremely hot) but should be kept out of direct sunlight. Centrifuge the blood and send only the serum for analysis. If no centrifuge is available, store the blood specimens in a refrigerator until a clot has formed; then remove the serum and pipette it into an empty sterile tube. Refrigerate the tubes of spun or unspun serum and ship them refrigerated.

### **Urine**

Clean the area around the urethral orifice with a pad that has been pre-moistened with a 4% tincture of iodine or other appropriate antiseptic. Begin to urinate into the toilet and collect 30ml of midstream urine. The specimen should be refrigerated but not frozen.

### **Other clinical specimens (food-handlers)**

Skin lesions (boils, lesions, abscesses, secretions)

- Clean skin with normal saline or weak disinfectant to prevent contamination of the specimen with saprophytic organisms.
- Apply pressure to the lesion using sterile gauzes and collect specimen on sterile swab, trying to obtain as much secretion as possible.
- If the lesion is closed, disinfect skin and extract specimen using sterile syringe. Transport immediately to laboratory at ambient temperature. If this is not possible, the specimen can be left for up to 24 hours, at which time the swab should be placed in a container of ice.
- Oropharynx and nostrils
- Collect specimen with a sterile swab and immediately place in transport medium (Stuart's).
- Transport immediately to laboratory at ambient temperature. If this is not possible, the specimen can be left for up to 24 hours, at which time the swab should be placed in a container of ice.

### **Food and environmental specimens**

Equipment

- Sterile sample containers
  - Disposable plastic bags
  - Wide-mouth jars (100-1000 ml) with screw-caps
  - Bottles for water samples
  - Foil or heavy wrapping paper
  - Metal cans with tightly fitting lids
- Sterile and wrapped instruments for sample collection
  - Spoons, scoops, tongue depressors
  - Butcher's knife
  - Forceps, tongs, spatula
  - Drill bits
  - Metal tubes (1.25-2.5 cm in diameter, 30-60 cm in length)
  - Pipettes, scissors
  - Moore swabs (compact pads of gauze made of 120 x 15 cm strips, tied in the centre with a long, sturdy twin or wire for samples taken from sewers, drains, pipes, etc.)
  - Sponges
- **Sterilizing agents**
  - 95% ethanol
  - Propane torch

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• **Refrigerants**

Refrigerant in plastic bags

Heavy-duty plastic bags or bottles that can be filled with water and frozen Heavy-duty plastic bags for ice

• **Food temperature measurement**

Bayonet-type thermometers (-20 °C to 110 °C), between 13 and 20 cm length Bulb thermometer (-20 °C to 110 °C)

• **General**

Marking pen (waterproof) Adhesive tap

Cotton

Peptone or buffered distilled water (5 ml in screw-capped tubes) Electric drill (if frozen foods to be sampled)

Distilled water

Insulated chest or polystyrene box

**General**

- Collect samples aseptically. Put them into sterile jars or plastic bags to avoid any cross contamination.
- If samples are to be examined for organophosphate pesticides or heavy metals, plastic containers should not be used. Chemicals from the plastic may leach into the food and interfere with the analysis.
- Obtain samples of approximately 200 grams or 200 ml.
- Take packaged foods to the laboratory in their original containers. Empty containers can be used to identify micro-leaks, or rinsings from these containers can be used to detect pathogens.
- Check original packages or containers for code numbers that can be used to identify the place and time of processing. Include any unopened packages or cans belonging to the same batch.
- Keep all packages not sent for laboratory examination until the end of the investigation. Refrigerate samples of perishable foods at 4 °C until they can be examined. Do not freeze food samples as certain pathogens (e.g. Gram-negative bacteria, vegetative forms of *Clostridium perfringens*) die off rapidly when frozen but foods that were frozen when collected should be kept frozen until examined.
- Enrichment broth and dry materials require no refrigeration.

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### **Solid foods or mixture of two foods**

- Cut or separate out a portion of food, using a sterile knife or other utensil if necessary.
- Collect sample aseptically and put into a sterile plastic bag or wide-mouth jar.
- Collect samples from top centre, and elsewhere, as necessary, refrigerate.

### **Liquid food or beverages**

Stir or shake. Collect samples using one of the following methods:

- Using a sterile utensil, transfer approximately 200 ml into a sterile container; refrigerate
- Place a long sterile tube into liquid, cover the opening with finger. Transfer liquid to the sterile container; refrigerate.
- Dip a Moore swab in the liquid or into the pipe so that liquid circulates around it. Leave in place for several hours, if possible. Transfer swab to a jar containing enrichment broth. Refrigeration is not usually necessary.
- If the liquid is not too thick, pour 1 to 2 litres through a membrane filter. Transfer the filter pad aseptically to a jar containing enrichment broth. Refrigeration is not usually necessary. **Frozen**

### **foods**

Keep frozen, using dry ice as necessary. Transport or ship the specimen in an insulated container. Use one of the following methods:

- Send or take small frozen samples to the laboratory, without thawing or opening.
- Break frozen material into pieces using a sterilized hammer and chisel and collect pieces using a sterilized utensil.
- Using a large-diameter sterilized drill, drill from one side at the top of the container diagonally through the centre down to the bottom of the opposite side. Repeat on the other side until sufficient material has been collected.

### **Raw meat or poultry**

Use one of the following methods:

- Using a sterile utensil or sterile glove, place poultry carcass or large piece of meat in a large sterile plastic bag. Add 100-300 ml enrichment broth. Remove sample and seal the bag.
- Wipe a sterile sponge over a large section of the carcass or piece of meat. Place swab in a jar containing enrichment broth.
- Moisten a swab in buffered distilled water or 0.1% peptone water. Wipe the swab over a large section of the carcass or piece of meat. Place swab in enrichment broth.
- Using a sterile glove wipe the carcass or the piece of meat with sterile gauze pads and place the pads in a jar containing enrichment broth.
- Aseptically cut a piece of meat or skin from different parts of the carcass or large piece of meat, or remove part of the carcass. Place at least 200g of sample in a sterile plastic bag or glass jar; refrigerate.

### **Dried foods**

- Insert a sterile hollow tube near one edge at the top of the container diagonally through the

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centre down to the bottom of the opposite side.

- Keep the top part of the sample and transfer to sterile container.
- Repeat the procedure on the other side of the container until a sufficiently large sample has been collected.
- Alternatively, use sterile spoon, spatula, tongue depressor or similar utensil to collect sample. Transfer to sterile jar.
- Keep in water- and airtight container.

### **Scrapings from food equipment, pipes, filters etc.**

- Cut or collect sufficient amount of material with a sterile tongue depressor, spatula, spoon or similar utensil and place in sterile bags or wide-mouth jars.
- Refrigerate as required (depending on material, see above).

### **Environmental swabs**

- Moisten swab with 0.1% peptone water or buffered distilled water and wipe over contact surfaces of equipment or environmental surfaces. Place in enrichment broth.
- **Air:** Touch plate or liquid with the device for sampling air, or let airborne particles settle on broth or agar plates obtained from microbiology laboratory. Seal with insulation tape. Refrigerate liquid samples.
- **Water:** Collect water from suspected areas, including from bottles in refrigerators, ice cubes, basins, etc. When taking water from a tap, let the water run for 10 seconds before collecting the sample. To sample water that has not been standing in proximal pipes, let water run for 5 minutes. Place sterile jar under running water and let it fill to 2.5 cm from the top. Collect 1-5 litres. Alternatively, membrane filters can be used. Moore swabs may be used to collect water samples from streams or plumbing; they should be left in place for up to 48 hours and then transferred to sterile jars containing enrichment broth.

### **Specimen collection for suspected chemical toxicants**

- Avoid contamination at all cost.
- Refrigerate or freeze specimens as rapidly as possible.
- Used only screened collection material if possible. This material has been tested for extraneous contaminants, and is specially washed and packaged. If unscreened material is used, randomly select at least three of each of the containers being used (collection cup, vacutainer, etc), seal them in a clean bag and submit them with the other samples to the laboratory. This may allow evaluation of possible extraneous contaminants from the collection material at hand.
- Urine is the preferred specimen if the suspected toxicant is an inorganic chemical (e.g. lead, arsenic, mercury). Urine should also be collected if the toxicant is unknown. Freeze promptly.

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<b>Suspected toxicant</b>	<b>Preferred specimen (in decreasing order)</b>	<b>Adults and children &gt;10 years (children &lt; 10 years)</b>
Organic	Serum	Two(one) 10-ml silicon-free vacutainers; freeze
	Urine	50-100ml(25-50ml) prescreened collection cup;store in wheaton glass bottle, freeze
	Wholeblood(usuallyheparinised)	One-two(one)10mltubes;Refrigerate
Inorganic	Urine	50-100ml (25-50ml) in prescreened collection cup;(no preservative if frozen promptly
	Whole blood (usually with EDTA) Serum	One2-3-ml pre-screened container; refrigerate.One 7ml trace elements vacutainer; freeze
Unknown	Serum	Three (one 0 10-ml silicon free vacutainers;
	Urine	50-100ml Prescreened collection cup; store in wheaton glass bottle, freeze.
	Whole blood (usually EDTA)	One 3-ml rescreened container; refrigerate
	Whole blood(heparin)	One 7-10-ml (5-ml) heparin vacutainer;
	Tissues, stomach content	10-50g, no preservatives; seal in small zip-lock bag, freeze
	Food	As much as possible, place in large ziplock bag, freeze

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**ANNEX X: OUTBREAK SUMMARY SHEET**



(This form is to be filled by the investigation team at the conclusion of the control operations).

**Facility:** ----- **District:** ----- **Province:** -----

**Date:** -----

1. Outbreak Code Number-----
2. Locality/Area where it Occurred -----
3. Dates of commencement and End of the outbreak-----
4. Confirmed aetiological agent(s) involved -----
5. Confirmed vehicle of transmission-----
6. Source of infection/contamination-----
7. Method of confirmation used = Laboratory/ epidemiological or both (Delete appropriately) -----  
-----  
-----

8. Cases and deaths recorded by age and sex

Age	Cases		Deaths	
	Males	Females	Males	Females
0 -1 yrs				
1-5 yrs				
5-10 yrs				
10-25 yrs				
25-45 yrs				
45 yrs				
<b>TOTAL</b>				

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9. APPLIED CONTROL MEASURE(S) THOUGHT TO BE MOST EFFECTIVE IN ARRESTING THE OUTBREAK.

-----  
-----

10. Any other remarks from the investigation team. (Use extra sheet if space provided is inadequate).

-----  
-----  
-----  
-----

Names and Signatures of the Investigator (s)

-----

Name

Signature

Date

-----  
Address

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**ANNEX XI :INVESTIGATION REPORT FORMAT**



**Outline of an outbreak investigation report**

**Cover page**

- Title of report

Indicate whether this is a preliminary or a final report. Keep the title short and memorable, but include information on the type of problem under investigation, the location and date.

- Date of report
- Names and affiliations of the main authors and investigators

**Abstract**

The abstract should be written after the report has been completed. It should stand alone and contain the most relevant data and conclusions. All data mentioned in the abstract must also appear in the main section of the report. Sentences from the Discussion section can be used verbatim in the abstract.

**Report**

- Introduction

Statement of the problem and its public health importance.

Details and time frame regarding initial source of information. Reasons for investigating event. Type of investigations conducted and agencies involved.

- Background

Generally available information to help the reader interpret epidemiology and data presented in the report (e.g. population size, socioeconomic status of community, ethnicity, etc.)

If outbreak occurred in a food premises, description of premises (e.g. size of restaurant, usual practices and operations, etc.).

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Description of the problem.

Sequence of events leading to the study or investigation. Brief statement of the working hypothesis.

### •Objectives

Specify targets to be achieved by the investigations.

Keep objectives concise and follow a logical, sequential pattern. The objectives may include hypotheses, if any, to be tested. Methods

Epidemiology:

- description of study population
- type of study conducted
- case definition
- procedures for case-ascertainment and selection of controls (if any)
- methods of data collection, including questionnaire design, administration and contents
- methods of data analysis.

Medical laboratory testing:

- methods of specimen collection and processing - name of laboratory carrying out tests
- laboratory techniques employed and methods of data analysis.

Food and food testing:

- description of inspection process
- methods of food and environmental sampling - name of laboratory carrying out tests
- laboratory techniques employed and methods of data analysis.

## Results

Present all pertinent results from clinical, laboratory, epidemiological and environmental findings. Present results in same order as described in the methods section. Do not interpret or discuss the data in this section.

Epidemiology:

- number of cases, overall attack rate
- clinical details of illness (symptoms, duration, hospitalization, outcome, etc.)
- descriptive epidemiology by time (epidemic curve), place and person (age, sex, race, specific characteristics) expressed as rates
- risk factor exposures
- further data analysis and data presentation depending on specific studies undertaken (e.g. cohort or case-control study).

Laboratory (microbiology, chemical, toxicological): -number of specimens collected

- findings by type of laboratory analysis. Food investigation and

food testing:

- findings of food inspections

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## *Guidelines for investigation and control of food borne diseases*

- results of laboratory tests performed on food and environmental samples.

### **Discussion**

The discussion is the most important part of the report and should cover:

- summary of the major findings
- likely accuracy of the results
- conclusions with justification for those conclusion and rejection of alternative explanations
- relationship of these results to other studies and the literature
- implications of the findings
- an assessment of control measures
- needs for future research.

### **Recommendations**

Initial recommendations and those for future prevention and control should be listed numerically.

### **Appendices**

Questionnaires and/or other survey forms Appropriate field reports Any other relevant documents, including press releases.

### **References**

Select appropriate references, including reviews in major scientific journals. Follow a standard style of referencing (e.g. Vancouver style), numbering the references in the order in which they appear in the text.

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ANNEX XII Example of Attack Rate Table

Type of Food	Group A				Group B				Relative Risk
	Persons who ate specified Food				Persons who did not eat specified food				
	Ill	Not ill	Total	Attack rate %	ill	Not ill	Total	Attack rate %	
Baked beans	32	20	52	62	19	14	33	58	1.07
Spinach	24	15	39	62	18	10	28	64	0.97
Cooked potato	20	11	31	65	20	11	31	65	1.00
Cabbage	15	11	26	58	25	16	41	61	0.95
Bread	20	12	32	63	30	22	52	58	1.09
Milk	4	4	8	50	46	29	75	61	0.82
Coffee	20	13	33	61	28	18	46	61	1.00
Water	12	10	22	55	32	17	49	65	0.85
Cakes	30	16	46	65	21	18	39	54	1.20
Ice cream	45	13	58	78	5	20	25	20	3.90
Juice	5	2	7	71	38	9	61	62	1.15

To compute the attack rate in percentage divide the number who became ill by the number who ate the food item and multiply by 100. (In the above example the attack rate for milk was  $(4/8) \times 100 = 50\%$ ). The suspect food will show the greatest difference between the two attack rate percentages. The suspect food should have a highest attack rate in group A and the lowest attack rate in group B. For example, in the table above, the attack rate for persons who ate ice cream (suspect food) was 78% while the attack rate for persons who did not eat ice cream was 20%. The disparity between the persons in the group A and group B is the important point for consideration. To compute the relative risk divide the attack rate of people who ate specified food and fell sick by the attack rate of people who did not eat the specified food and fell sick. For example for ice cream  $78\%/20\% = 3.9$

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ANNEX XIII FOOD BORNE DISEASES REGISTER



Name of Facility :.....

District:.....

Province:.....

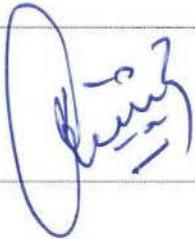
ID	Date (dd/mm/yy)	Particulars of the patient			Locality		Clinical diagnosis		laboratory Testing		Remarks
		Name	Age	Sex	Sector	Street/village	Major signs and symptoms	Suspected Disease	Specimen	Result	

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*Guidelines for investigation and control of food borne diseases*

	<b>Author</b>	<b>Authorised by</b>	<b>Approved by</b>
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Name	NTIRENGANJA LAZARE	ALEX GISAGARA	Dr. Charles Kavanagh
Signature			
Date	13/05/2019	13/05/2019	13/05/2019



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