



**CLINICAL GUIDELINES ON
MANAGEMENT AND CONTROL
OF INFECTIOUS FOODBORNE DISEASES
IN SOUTH AFRICA**

2011

PREFACE

The Department continues to receive reports of foodborne disease outbreaks. In the process of investigating and managing these diseases, numerous challenges are experienced. These include a lack of clear clinical guidelines for health care workers and poor utilisation of the laboratory for confirming diagnosis. To address these challenges, the Department has developed clinical guidelines on the management and control of foodborne diseases in South Africa. These guidelines emphasize the importance of complete investigation, including laboratory confirmation of pathogens in the management of these cases.

These guidelines are therefore aimed at improving management of foodborne diseases in the field and especially within health care facilities.

I trust that the information will enlighten all health care providers and that proper management of foodborne disease and their outbreaks will be strengthened, and in this way the Department will be able to reduce the associated morbidity and mortality.



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The Department emphasizes the importance of multidisciplinary and multisectoral collaboration, particularly in policy development and implementation of strategies for controlling communicable diseases. The clinical guidelines on management and control of foodborne diseases in South Africa was developed by the Department of Health in collaboration with several stakeholders.

On behalf of the Department I would also like to thank members of the working group that refined this document. The working group was represented by members from the following organizations:

- National Department of Health
- World Health Organisation (WHO)
- Communicable Diseases, KwaZulu-Natal Province
- National Health Laboratory Services (NHLS) - Medunsa Campus
- National Institute for Communicable Diseases (NICD)
- Public Health (Communicable Diseases), City of Johannesburg
- Infection Control, Limpopo Province

I would like to thank provinces, academic institutions, and researchers for their continued valuable contribution. I am confident that all health care providers both within and outside the Department of Health will find this document useful in improving quality of health care delivery.



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1. Introduction

Foodborne illnesses following the ingestion of contaminated food are a known reality that has been documented for centuries. These illnesses continue to form part of the major public health threats throughout the world. There has been an increase in the number of risk factors and populations at risk both in developed and developing countries over the years. In recent years, South Africa has been reporting numerous incidents of foodborne diseases.

There are more than 250 known foodborne diseases. Bacteria are the main cause, followed by viruses, and parasites. Some diseases are caused by the organism itself, toxins released by organisms, while others by systemic reactions to the organism. People infected with foodborne pathogens may have no symptoms or may develop symptoms ranging from mild intestinal discomfort, severe dehydration and bloody diarrhoea to neurological symptoms. Recent global concern over bioterrorism has made public health, agriculture, and environmental health officials more aware of the need to ensure that food and water supply are kept safe. Natural and manufactured chemicals in food products also can result in severe morbidity and mortality.

Because of the absence of foodborne disease surveillance systems in some countries or weakness in existing programs, reliable information on the magnitude of the problem is not available. It is estimated that the reported incidence of foodborne diseases represents less than 10%, or maybe less than 1%, of the real incidence. Surveys in a few countries indicate that foodborne diseases may be 300-350 times more frequent than the reported cases tend to indicate.

Foodborne disease reporting is not only important for disease prevention and control, but also to ensure accurate estimations of disease burden in the community. The challenge is that foodborne diseases commonly occur without being reported and South Africa is no exception. Poor detection and reporting mechanisms contribute largely to the lack of reliable data.

These guidelines are focused only on foodborne diseases associated with ingestion of microbial pathogens and their toxins. Health care workers, who are the initial contacts with patients, have a critical role to play in identifying, recording and reporting, prevention and control of potential foodborne outbreaks. These guidelines are aimed at assisting health care workers with practical, user-friendly and concise information on the diagnosis, treatment, and reporting of foodborne diseases.

1.1 Legislative Framework

a) The National Health Act (Act 61 of 2003)

Section 3 (1) (c) of the Act, gives the Minister of Health the responsibility to, within the limits of available resources determine the policies and measures necessary to protect, promote and maintain the health of the population.

In addition, the Act empowers the Director General: Health, to:

- Ensure the implementation of national health policy in so far as it relates to the national Department (section 21, (1) (a)).
- Issue guidelines for the implementation of national health policy (section 21, (1) (b)).
- Issue, and promote adherence to, norms and standards on health matters (section 21, (2) (b)), including;
 - i) Nutritional interventions
 - ii) Environmental conditions that constitute health hazards
- Coordinate health and medical services during national disasters (section 21, (2) (e)).
- Facilitate and promote the provision of health services for the management, prevention and control of communicable and non-communicable diseases (section 21, (2) (k)).

Section 23 (a)

(ix) The National Health Council advises the Minister on “epidemiological surveillance and monitoring of national and provincial trends with regard to major diseases and risk factors for diseases”.

Provincial and District health councils also have similar functions on communicable disease control coordinators.

This piece of legislation requires provinces and health districts to compile Strategic and Annual Performance Plans, which should be made up of components that include Disaster Management plans.

b) Foodstuffs, Cosmetics and Disinfectants Act (Act 54 of 1972)

These guidelines are also based on the principles of the Foodstuffs, Cosmetics and Disinfectants Act, Act 54 of 1972, which states that subject to the provisions of subsection (2) and section 6, any person shall be guilty of an offence if he sells, or manufactures or imports for sale, any foodstuff or cosmetic which is contaminated, impure or decayed, or is in terms of any regulation deemed to be harmful or injurious to health (section 2, (1) (b) (1))

2. Aims and objectives of the guidelines

The overall aim of these guidelines is to provide information primarily to health care workers to encourage appropriate case management and prompt reporting of cases. Specific objectives of the guidelines are:

- To assist health care workers to recognize and identify potential etiological agents of foodborne illnesses in patients presenting at health care facilities
- To increase awareness on clinical manifestations of various foodborne diseases (e.g. gastrointestinal, neurological and hemorrhagic)
- To emphasize the importance of collection of appropriate environmental and clinical specimens, e.g. food, water, stool and vomitus, for identification of causative organism
- To emphasize that prompt/immediate reporting of suspected cases to appropriate public health officials is of utmost importance for rapid response and prompt control
- To encourage health care workers to discuss with patients and the community the various ways to prevent and control foodborne diseases

3. Epidemiology

The actual incidence of foodborne diseases is unknown due to lack of reliable data and under estimation of the magnitude of the problem throughout the world. The World Health Organisation (WHO) reports over a thousand foodborne outbreaks annually, and the etiological agents are isolated only in around 80% of these outbreaks. According to the WHO, foodborne diseases may be 300-350 times more frequent than what the reported cases indicate. It is believed that millions of people suffer from diseases caused by contaminated food. Developing countries suffer the most from a wide range of water and foodborne diseases including cholera, campylobacteriosis, *Escherichia coli* infections, salmonellosis, botulism, shigellosis, brucellosis, and hepatitis A infections.

Civil wars and national conflicts resulting in displaced populations can exacerbate the magnitude of the problem. South Africa also reports foodborne diseases outbreaks. However, data on the number of cases and deaths is scarce.

3.1 Common Foodborne Diseases

3.1.1 Staphylococcal disease results from eating food contaminated with toxins produced by enterotoxin producing strains of *Staphylococcus aureus*, resulting in diarrhoea and vomiting. Staphylococci grow in food, in which they produce their toxins.

Thus, staphylococcal food poisoning does not result from ingesting the bacteria but rather from ingesting the toxins that are already present in the contaminated food. Typical contaminated foods include custard, cream-filled pastry, processed meat and fish. The risk of an outbreak is high when food handlers with skin infections or known to be carriers of *Staphylococcus aureus* (toxin producing) contaminate food left at room temperature. Symptoms usually begin abruptly with severe nausea and vomiting starting about 2-8 hours after the contaminated food is eaten. Other symptoms may include abdominal cramps, diarrhoea, and sometimes headache and fever.

3.1.2 *Clostridium perfringens* disease results from eating food contaminated by the bacterium *Clostridium perfringens*. Once in the small intestine, the bacterium releases a toxin that often causes diarrhoea. Some strains cause a mild to moderate disease that gets better without treatment; other strains cause severe gastroenteritis that can result in damage to the small intestine and sometimes lead to death. The gastroenteritis is usually mild, although it can cause abdominal pain, abdominal distension from gas, severe diarrhoea, dehydration, and a severe decrease in blood pressure (shock). Contaminated meat is usually responsible for outbreaks of *Clostridium perfringens* food poisoning.

3.1.3 *Bacillus cereus* disease may occur when food is prepared and held without adequate refrigeration for several hours before serving. *Bacillus cereus* is a bacterium commonly found in soil, on vegetables, and in many raw and processed foods. Food incriminated in past outbreaks includes cooked meat and vegetables, boiled or fried rice, vanilla sauce, custards, soups and raw vegetable sprouts.

Two types of illnesses have been attributed to the consumption of foods contaminated with *Bacillus cereus*. The first and better known is characterised by abdominal pain and diarrhoea. It has an incubation period of 4-16 hours and symptoms last for 12-24 hours. The second, which is characterised by an acute attack of nausea and vomiting, occurs within 1-5 hours after consumption of contaminated food and diarrhoea is not a common feature of this type of illness.

3.1.4 *Salmonellosis* is a major problem in most countries. Salmonellosis is caused by the *Salmonella* bacteria and symptoms include nausea, vomiting, abdominal pain, diarrhoea, fever, and headache. Examples of foods involved in outbreaks of salmonellosis are eggs, poultry and other poorly cooked meat, raw milk and chocolate.

3.1.5 Campylobacteriosis is a widespread disease that occurs more commonly than is reported and as a result the extent of the disease is not known in South Africa. This is particularly because of the challenges in laboratory diagnosis and the commonly short duration of the illness. It is caused by certain species of *Campylobacter* bacteria, and in some countries the reported number of cases surpasses the incidence of salmonellosis. Foodborne illnesses mainly occur following ingestion of food such as raw milk, raw or undercooked poultry and unpurified drinking water. Acute health effects of campylobacteriosis include severe abdominal pain, fever, nausea and diarrhoea. In 2-10% of cases the infection may lead to chronic health problems, including reactive arthritis and neurological disorders notably Guillian Barre Syndrome.

3.1.6 Escherichia coli gastrointestinal diseases

i) Enterohaemorrhagic *E. coli* (EHEC), e.g. *E. coli* O157, associated gastrointestinal disease, has emerged as an important disease over the last decade and can result in huge outbreaks even though not so common. Although its incidence is relatively low, it is severe and sometimes has fatal health consequences, particularly among infants, children and the elderly. EHEC produces a potent (vero-) toxin that results in haemorrhage in the colon, therefore, resulting in bloody diarrhoea or life-threatening complications such as kidney failure. EHEC outbreaks have been mainly related to beef, but sprouts, lettuce and juice have also caused some of the outbreaks.

ii) Enterotoxigenic *E. coli* (ETEC) associated gastrointestinal disease

ETEC is an important cause of dehydrating diarrhoea in infants and children in less developed countries. It is also a major cause of travellers' diarrhoea in people from industrialised countries who visit less developed countries. Enterotoxigenic strains may behave like *Vibrio cholerae* in producing profuse watery diarrhoea without blood or mucus. Abdominal cramps, vomiting, acidosis, prostration and dehydration can occur, and low-grade fever may or may not be present. The symptoms usually last less than 5 days. ETEC outbreaks have been related to contaminated water and food such as cheese.

3.1.7 Cholera is a major public health problem in developing countries, also causing enormous economic losses. The disease is caused by the bacterium *Vibrio cholerae*. In addition to contaminated water, contaminated food can also be the vehicle of infection. Different types of food, including rice, vegetables, millet, gruel and various types of seafood have been implicated in outbreaks of cholera. Symptoms including abdominal pain, vomiting and profuse watery diarrhoea, may lead to severe dehydration and possibly death, unless fluid and salt are promptly and adequately replaced.

3.1.8 Listeriosis caused by *Listeria monocytogenes* has a high fatality rate amounting up to 30%. Immunocompromised and pregnant women are susceptible and the frequent effects are abortion or meningitis of the foetus or newborn. Many types of food have been implicated in listeriosis, often where there is a prolonged refrigeration period. Feta cheese is one of the foods that have been reported to be the source in some outbreaks.

3.1.9 Botulism caused by *Clostridium botulinum* is known for its high case fatality rates. Cases are reported mainly after ingestion of canned food, particularly expired, rusted containers and homemade canned food. Reported cases usually present with ptosis followed by progressive paralysis of the whole body.

Listeriosis and botulism although uncommon, are associated with high morbidity and mortality.

3.2 Risk Factors for Foodborne Diseases

Different factors such as pathogenicity of the infectious agent, host susceptibility and environmental risk factors contribute to disease manifestation or occurrence.

3.2.1 Microbial Factors

Factors related to microbial ability to cause disease include the pathogens' ability to survive and/or multiply in food, produce enzymes and/or toxins in food or in the host or under different environmental conditions and disrupt physiological function of the host's cell.

3.2.2 Host Factors

The population at risk for severe morbidity and mortality is mainly the infants, elderly persons and immunocompromised individuals. Other host factors contributing to the frequent foodborne illnesses and outbreaks include socio-economic status, food preferences and lack of knowledge on food safety and personal hygiene.

3.2.3 Environmental Factors

Lack of appropriate food preparation, storage, access to and consumption of contaminated or discarded food products, as well as contaminated water and poisonous chemicals contribute to foodborne diseases and should be regarded as a vehicle for transmission of diseases.

Changes in food production, distribution systems and global food trade as well as increase in travel have also contributed to the spread of foodborne pathogens together with poor governance, limited public health resources and infrastructure, population displacement (due to natural disasters, unrest) and overcrowding.

4. Diagnosis

4.1. General Considerations

It is critical that health workers have a high index of suspicion for foodborne diseases. Patients may present with gastrointestinal, hepatic, hemorrhagic or neurological manifestations. Fatalities may occur depending on the cause, however, timely and appropriate interventions can save lives. In determining the cause of disease, detailed history, including contributing factors such as: food consumed; interaction with sick patients (with similar disease); travel in outbreak or endemic areas; hospitalisation; involvement with child care centers; etc, should be determined. For patients presenting with neurological symptoms, recent ingestion of seafood, dairy products, canned food and mushrooms should be specifically enquired about. Immediate telephonic notification by both clinicians and laboratories when foodborne disease outbreak is suspected is critical. A report should follow either by fax or e-mail to the nearest district or provincial office (See Annexure A for Contact Details).

4.2 Foodborne Disease Outbreak Definition

A foodborne disease outbreak including food poisoning is defined as:

Two or more linked patients presenting with acute gastrointestinal, neurological, hepatic or hemorrhagic manifestation after having a shared/common meal/ beverage during the past 72 hours. It is important to note that every outbreak may begin with an index patient who may not be severely ill. Also that for a severe disease like botulism a single case that may be an index case should trigger an outbreak response.

Reporting of foodborne diseases occurrence to Environmental Health/Port Health Sections is critical to ensure rapid initiation of sampling of suspected food products or water. Such a network will provide an operational framework to link the expertise and skills needed from Environmental Health Practitioners (EHPs) to detect, verify rapidly and respond appropriately to epidemic-prone diseases and emerging disease threats when they arise in order to minimize their impact on communities and health facilities.

4.3 Clinical Diagnosis

There are various etiological agents responsible for foodborne illnesses, and establishing a diagnosis can be difficult, particularly in patients with persistent symptoms, concomitant diseases or underlying illnesses. The following symptoms and signs may occur alone or in combination, especially in the young, elderly or immunocompromised patients:

- Bloody diarrhoea
- Watery diarrhoea, often leading to dehydration
- Vomiting
- Sudden abdominal pain or cramps
- Fever
- Nausea
- Neurological involvement, e.g. parasthesia, motor weakness, cranial nerve palsies

Additional information on history taking for determining etiological agents should include:

- Onset of Symptoms
- Duration of illness
- Population at risk
- Possible contributing factors, e.g. underlying illness/past medical history
- Seasonality
- Possible cause of illness, e.g. food/beverages
- Place where food/beverage was consumed, e.g. funeral, gatherings, restaurants
- Travel history

4.4 Differential Diagnosis

Differential diagnosis of gastrointestinal tract disease includes inflammatory bowel diseases such as Crohn's disease or ulcerative colitis, malignancy, side effects of drugs, complications of gastrointestinal tract surgery, malabsorption syndromes and immune deficiency related diseases.

4.5 Laboratory Diagnosis

Clinical specimens from patients (stool, vomitus and blood) should be collected aseptically by the health care worker and sent to the laboratory to determine the causative agent.

NB: Contact nearest microbiology laboratory for more information, as some complex tests may only be available from specific public health laboratories. Specimens must

be labeled correctly, and requisition forms must be filled completely before specimens are dispatched. Information pertaining to all specimens should also be recorded in the logbook. The following information should appear on the form.

- Patient's name/ID number
- Hospital name
- Patient ward/address
- Date and time of collection
- Nature of specimen
- Investigation requested
- Patient medical details if required
- Medical aid details
- Name and address of doctor requesting investigation
- Pager, telephone or cell number of doctor
- Provisional diagnosis

4.5.1 Recommendations for Specimen Collection During a Suspected Foodborne Disease Outbreak (As adapted from NHLS/NICD standard operating procedure)

A. Stool and Vomitus Samples

1. A fresh stool (not a rectal swab) and vomitus samples should be collected from all patients presenting with diarrhoea and/or vomiting, preferably before any antibiotics are given.
2. Sample should be placed in a sterile, leak proof universal container and the lid must be secured.
3. Each patient must have a specimen label attached to the specimen bottle. Ensure that all the required patient and doctor information is filled in on the label and attached to the specimen container.
4. Fill in the required tests i.e. microscopy, culture and sensitivity, viruses and parasites

NB: Label each specimen as outbreak specimen and transport the specimen to the laboratory as soon as possible (preferably within one hour)

If a delay in processing by the laboratory is expected of more than 2 hours, place the stool specimen in Cary-Blair transport medium if available (see instructions below) and place in fridge (4°C) until collected by the messenger/courier. Do not freeze the sample.

Method of Placing Stool in Cary-Blair Transport Medium

1. Collect a small amount of stool by inserting a sterile cotton swab into the stool container and rotating it.
2. If mucus and shreds of intestinal epithelium are present, these should be sampled with the swab.
3. Immediately insert the swab into the transport medium, break off top portion of swab.
4. Replace screw cap and tighten firmly
5. Place labels on the bottle of the transport medium and the initial container in which the stool was collected and send both to the laboratory.
6. Place the Cary-Blair medium and the container in a refrigerator or cold box until collected.

B. Rectal Swab

NB: a rectal swab should only be taken if it is impossible to obtain a stool sample, as the laboratory is unable to test for viruses and parasites on rectal swabs.

Method of Collecting Rectal Swabs

1. Moisten the swab in sterile transport medium (Cary-Blair)
2. Insert swab gently into the rectal sphincter 2-3 cm and rotate to sample anal crypts. Remove swab and check for visible faeces.
3. Immediately insert the swab into the transport medium and send to the laboratory promptly. If delays are anticipated, the swab in transport medium can be refrigerated.

NB: Transport the specimen to the laboratory as soon as possible (preferably within one hour)

C. Blood Samples

1. Blood culture specimen to be collected e.g. when enteric fever is suspected
2. Urea and electrolyte (U and E) blood sample for monitoring fluid and electrolyte imbalance
3. Full blood count (FBC) to monitor white cell count may be indicated e.g. in severe/complicated disease.

Table 1, outlines the standard operating procedures for collection of clinical specimens.

TABLE 1: STANDARD OPERATING PROCEDURE FOR COLLECTION AND TRANSPORT OF CLINICAL SPECIMENS FOR FOODBORNE DISEASE INVESTIGATIONS

Adapted from: National Institute for Communicable Diseases (NICD) – Outbreak Manual for Laboratories

Outbreak type	Relevant contact details	Specimens	Transport details	Comments
Diarrhoeal disease: including suspected food-borne outbreaks, toxigenic food poisoning, typhoid fever, salmonellosis, shigellosis, campylobacteriosis; dysenteric syndromes e.g. EHEC, shigellosis, amoebiasis	NICD: Enteric Diseases Reference Unit	Stool, vomit (for bacteriological, virological and parasitological investigations) Blood culture if enteric fever suspected If foodborne outbreak suspected: refrigerate all remaining food items for further testing if necessary	Refrigerate & submit with minimum delay for culture and examination for pathogens and/or toxins If amoebiasis suspected: do not refrigerate; stool must reach lab within 20 minutes	Primary isolation and susceptibility testing will be carried out at the local/regional NHLS laboratory
Diarrhoeal disease: suspected cholera	NICD: Enteric Diseases Reference Unit	Stool or rectal swabs	Submit stool in leak proof screw-cap containers Submit rectal swabs in suitable transport medium, e.g. Cary Blair; swab should be pushed completely into the tube of transport medium Send stool or rectal swabs in a cooler box	Primary isolation will be carried out in local/regional NHLS laboratory Isolates should be referred to NICD for confirmation and typing

4.5.2. Standard Operation Procedures for Food and Environmental Sampling

Refer to Guidelines for an Environmental Health officer (EHO) engaged in food poisoning investigations, 2000. National Department of Health. Pretoria. South Africa

During disasters such as major floods, prevention of and management of foodborne diseases will become critical and the roles of Environmental Officers, both under the jurisdiction of Municipalities (Municipal Health Services) and Provincial Health Departments need consideration and clarification.

4.5.3 Identification and Confirmation of Agents Associated with Foodborne Diseases

A presumptive clinical diagnosis is usually made and management is initiated without confirmation of the etiological agent. However, it is critical to always ensure that adequate numbers of clinical and food samples are immediately collected, to identify the etiologic agent. Table 2 outlines a combination of factors that helps in reaching accurate diagnosis.

TABLE 2: GUIDELINES FOR IDENTIFICATION AND CONFIRMATION OF AGENTS ASSOCIATED WITH FOODBORNE DISEASES

Adapted from: Centres for Disease Control and Prevention. Diagnosis and Management of Foodborne Illness: A Primer for Physicians. Morbidity and Mortality Weekly Report, January 2001. CDC, (Atlanta), USA

Etiologic agent	Incubation period	Clinical syndrome	Confirmation	Associated Food	Treatment
Bacterial					
<i>Bacillus anthracis</i>	2 days to wks	Nausea, vomiting, malaise, bloody diarrhoea, abdominal pain		Insufficiently cooked contaminated meat	Penicillin Ciprofloxacin
<i>Bacillus cereus</i>					Supportive Care Self Limiting
Vomiting toxin	1-6 hrs	Vomiting; diarrhoea; fever uncommon	Isolation of organism from stool of two or more ill persons Isolation of 10 organisms/g from implicated food	Meats, stew, gravies, vanilla sauce	
Diarrhoeal toxin	6-24 hrs	Diarrhea, some patients; fever uncommon	Isolation of organism from stool of two or more ill persons Isolation of 10 ⁵ organisms/g from implicated food	Improperly refrigerated cooked rice and meat	
<i>Brucella</i>	5 days to more than 60 days	Weakness, fever, headache, sweats, chills, arthralgia, weight loss, splenomegaly	Two or more ill persons and isolation of organism in culture of blood or bone marrow; greater than fourfold increase in standard agglutination titer (SAT) over several wks, or single SAT 1:160 in person who has compatible clinical symptoms and history of exposure	Raw milk, cheese from unpasteurised milk, meats	Rifampicin Doxycycline Infection with complication use combination of Rifampicin, tetracycline and aminoglycoside

Etiologic agent	Incubation period	Clinical syndrome	Confirmation	Associated Food	Treatment
Bacterial					
<i>Campylobacter jejuni/coli</i>	2-10 days; usually 2-5 days	Diarrhoea (often bloody), abdominal pain, fever	Isolation of organism from clinical specimens from two or more ill persons	Raw and uncooked poultry, unpasteurised milk and contaminated water	Supportive Care For severe cases, use erythromycin and quinolones
			Isolation of organism from epidemiologically implicated food		
<i>Clostridium botulinum</i>	2 hrs-8 days; usually 12-48 hrs	Diplopia, blurred vision, bulbar, weakness; paralysis	Detection of botulinum toxin in serum, stool, gastric contents, or implicated food	Home or improperly canned food	Supportive Care Botulinum Antitoxin
			Isolation of organism from stool or intestine		
<i>Clostridium perfringens</i>	6-24 hrs	Diarrhoea, abdominal cramps; vomiting and fever uncommon	Isolation of 10 ⁵ organisms/g from stool of two or more ill persons	Meats, poultry, gravy, dried or precooked foods	Supportive Care
			Demonstration of enterotoxin in the stool of two or more ill persons		
			Isolation of 10 ⁵ organisms/g from epidemiologically implicated food		

Etiologic agent	Incubation period	Clinical syndrome	Confirmation	Associated Food	Treatment
Bacterial					
Enterohemorrhagic (<i>E. coli</i> O157:H7 and others)	1-10 days; usually 3-4 days	Diarrhoea (often bloody), abdominal cramps (often severe), little or no fever	Isolation of <i>E. coli</i> O157:H7 or other Shiga-like toxin-producing <i>E. coli</i> from clinical specimen from two or more ill persons Isolation of <i>E. coli</i> O157:H7 or other Shiga-like toxin-producing <i>E. coli</i> from epidemiologically implicated food	Undercooked beef, unpasteurised milk/juice, raw fruits and vegetables, contaminated water	Supportive Care Monitor haemoglobin and platelets Antibiotics may be harmful
Enterotoxigenic <i>E. coli</i> (ETEC)	6-48 hrs	Diarrhoea, abdominal cramps, nausea; vomiting and fever less common	Isolation of organism of same serotype, demonstrated to produce heat-stable (ST) and/or heat-labile (LT) enterotoxin, from stool of two or more ill persons	Contaminated water or food	Supportive Care Severe cases, antibiotic include TMP-SMX and quinolones
Enteropathogenic <i>E. coli</i> (EPEC)	Variable	Diarrhoea, fever, abdominal cramps	Isolation of organism of same enteropathogenic serotype from stool of two or more ill persons		
Enteroinvasive <i>E. coli</i> (EIEC)	Variable	Diarrhoea (might be bloody), fever, abdominal cramps	Isolation of same enteroinvasive serotype from stool of two or more ill persons		

Etiologic agent	Incubation period	Clinical syndrome	Confirmation	Associated Food	Treatment
Bacterial					
<i>Listeria monocytogenes</i>	2-6 wks	Invasive disease: Meningitis, neonatal sepsis, fever	Isolation of organism from normally sterile site	Fresh soft cheese, unpasteurised milk, meats, hot dogs	Supportive Care and Antibiotics Intravenous ampicillin, penicillin or TMP-SMX for invasive disease
	Unknown	Diarrhoeal disease: Diarrhoea, abdominal cramps, fever	Isolation of organism of same serotype from stool of two or more ill persons exposed to food implicated or from which organism of same serotype has been isolated		
Non-typhoidal <i>Salmonella</i>	6 hrs-10 days; usually 6-48 hrs	Diarrhoea, often with fever and abdominal cramps	Isolation of organism of same serotype from clinical specimens from two or more ill persons Isolation of organism from epidemiologically implicated food		Supportive Care Ampicillin, Gentamycin, TMP-SMX or quinolones
<i>Salmonella Typhi</i>	3-60 days; usually 7-14 days	Fever, anorexia, malaise, headache, and myalgia; sometimes diarrhoea or constipation	Isolation of organism from clinical specimens from two or more ill persons Isolation of organism from epidemiologically implicated food	Contaminated eggs, poultry, unpasteurised milk/juice, cheese, contaminated fruit and vegetables, contaminated water and food	Supportive Care Ampicillin, Gentamycin, TMP-SMX or quinolones

Etiologic agent	Incubation period	Clinical syndrome	Confirmation	Associated Food	Treatment
Bacterial					
<i>Shigella spp.</i>	12 hrs-6 days; usually 2-4 days	Diarrhoea (often bloody), often accompanied by fever and abdominal cramps	Isolation of organism of same serotype from clinical specimens from two or more ill persons Isolation of organism from epidemiologically implicated food	Food or water contaminated with faecal matter,	Supportive Care Nalidixic Acid or Quinolones
<i>Staphylococcus aureus</i>	30 min-8 hrs; usually 2-4 hrs	Vomiting, diarrhoea	Isolation of organism of same phage type from stool or vomitus of two or more ill persons Detection of enterotoxin in epidemiologically implicated food Isolation of 10 ⁵ organisms/g from epidemiologically implicated food	Improperly or unrefrigerated meats, vegetables, eggs and cream	Supportive Care
<i>Streptococcus, group A</i>	1-4 days	Fever, pharyngitis, scarlet fever, upper respiratory infection	Isolation of organism of same M- or T-type from throats of two or more ill persons Isolation of organism of same M- or T-type from epidemiologically implicated food		Supportive Care

Etiologic agent	Incubation period	Clinical syndrome	Confirmation	Associated Food	Treatment
Bacterial					
<i>Vibrio cholerae</i>					
O1 or O139	1-5 days	Watery diarrhoea, often accompanied by vomiting	Isolation of toxigenic organism from stool or vomitus of two or more ill persons	Contaminated water, fish, shellfish, and street-vended food	Supportive Care Antibiotics only in very severe cases
			Isolation of toxigenic organism from epidemiologically implicated food		
non-O1 and non-O139	1-5 days	Watery diarrhoea	Isolation of organism of same serotype from stool of two or more ill persons		Supportive Care Antibiotics only in very severe cases
<i>Vibrio parahaemolyticus</i>	4-30 hrs	Diarrhoea	Isolation of Kanagawa-positive organism from stool of two or more ill persons	Undercooked or raw seafood	Supportive Care Antibiotics only in very severe cases
<i>Vibrio vulnificus</i>	1-7 days	Vomiting, diarrhoea, abdominal pain, bacteremia	Isolation of 10 ⁵ Kanagawa-positive organisms/g from epidemiologically implicated food, provided specimen is properly handled		
<i>Yersinia enterocolitica</i>	1-10 days; usually 4-6 days	Diarrhoea, abdominal pain (often severe)	Isolation of organism from clinical specimen from two or more ill persons	Undercooked pork, unpasteurised milk, contaminated water	Supportive Care Self Limiting In septicemia or invasive, use gentamicin, cefotaxime, doxycycline and ciprofloxacin
			Isolation of pathogenic strain of organism from epidemiologically implicated food		

Etiologic agent	Incubation period	Clinical syndrome	Confirmation	Associated Food	Treatment
Parasitic					
<i>Cryptosporidium parvum</i>	2-28 days; median: 7 days	Diarrhoea, nausea, vomiting; fever	Demonstration of organism or antigen in stool or in small-bowel biopsy of two or more ill persons Demonstration of organism in epidemiologically implicated food	Contaminated water, vegetables, fruits and unpasteurised milk	Supportive Care Self Limiting Paromomycin
<i>Cyclospora cayetanensis</i>	1-11 days median 7 days	Fatigue, diarrhoea	Demonstration of organism in stool of two or more ill persons	Contaminated water, lettuce and imported berries	TMP-SMX
<i>Entamoeba histolytica</i>	2-3 days	Boody diarrhoea, abdominal pain		Contaminated water or food	Metronidazole and Iodoquinol
<i>Giardia lamblia</i>	3-25 days; median: 7 days	Diarrhoea, gas, cramps, nausea, fatigue	Two or more ill persons and detection of antigen in stool or demonstration of organism in stool, duodenal contents, or small-bowel biopsy specimen	Contaminated water and food	Metronidazole

Etiologic agent	Incubation period	Clinical syndrome	Confirmation	Associated Food	Treatment
Parasitic					
<i>Taenia solium</i>	Eggs appear in stool 8-12 weeks after infection with adult <i>T. solium</i>	Symptoms of cysticercosis may appear from weeks to more than 10 years.	Identification of proglottids (segments), eggs or antigens of the worm in the faeces or on anal swabs. Specific serological tests should support clinical diagnosis.	Raw or undercooked infected pork	Intestinal infections: Praziquantel. Central nervous system cysticercosis: Praziquantel or Albendazole
<i>Trichinella spp.</i>	1-2 days for intestinal phase; 2-4 wks for systemic phase	Fever, myalgia, periorbital oedema, high eosinophil count	Two or more ill persons and positive serologic test or demonstration of larvae in muscle biopsy	Raw or uncooked contaminated meat	Supportive Care Mebendazole
			Demonstration of larvae in epidemiologically implicated meat		
<i>Toxoplasma gondii</i>	6-10 days			Contaminated food or raw meat	Spiramycin or pyrimethamine + sulfadiazine
Viral					
<i>Hepatitis A</i>	15-50 days; median: 28 days	Jaundice, dark urine, fatigue, anorexia, nausea	Detection of immunoglobulin M anti-hepatitis A virus in serum from two or more persons who consumed epidemiologically implicated food	Contaminated water, raw food, shellfish	Supportive Care Immunisation

Etiologic agent	Incubation period	Clinical syndrome	Confirmation	Associated Food	Treatment
Viral					
Norwalk-like viruses (NLV)	15-77 hrs; usually 24-48 hrs	Vomiting, cramps, diarrhoea, headache, fever	Detection of viral RNA in stool or vomitus - by reverse transcriptase-polymerase chain reaction (RT-PCR)	Poorly cooked shellfish, salads, cookies and fruit	Supportive Care Bismuth Sulfate
			Visualization of small, round-structured viruses (SRSV) that react with patient's convalescent sera but not acute sera - by immune-electron microscopy		
			More than fourfold rise in antibody titer to Norwalk virus or Norwalk-like virus in acute and convalescent sera in most serum pairs		
Astro, Rota, Calci, Adeno, Parvoviruses	15-77 hrs; usually 24-48 hrs	Vomiting, cramps, diarrhoea, headache	Detection of virus antigen - by enzyme immunoassay (EIA)	Contaminated foods	Supportive Care
			Detection of viral RNA in stool or vomitus - by reverse transcriptase-polymerase chain reaction (RT-PCR)		
			Visualization of viruses with characteristic surface morphology - by electron microscopy		



5. Treatment of Foodborne Diseases

Treatment of patients with foodborne diseases is mainly supportive, since most foodborne gastrointestinal diseases are self-limiting. Administration of adequate fluids to replace fluid lost as a result of diarrhoea and vomiting is the mainstay of treatment. Oral rehydration is usually adequate, however intravenous rehydration is necessary in severely dehydrated individuals or in patients who cannot retain oral fluids.

Antibiotics may be necessary in selected patients as outlined in table 2. Selection of appropriate antimicrobial agents depends on laboratory identification of the responsible pathogen. Commencement of empirical antimicrobial therapy may be instituted based on clinical signs and symptoms by the attending physician while waiting for confirmation of the causative organisms. Treatment should be reviewed following laboratory results.

Immediate notification of the district health authorities should be done.

6. Prevention

Infection control officers are responsible for monitoring disease trends through reports from clinical cases or laboratories. Health education based on the collected information is critical to prevent further foodborne diseases. Health care workers should educate affected and high-risk patients (e.g. immunosuppressed patients) on events that may expose them to foodborne infections and should also assist with provision of information on preventive measures to be taken.

In most instances, foodborne diseases are avoidable. These are some measures to prevent being infected by most foodborne microbes:

- Wash hands thoroughly before preparing food and eating
- Wash hands, cutting boards, utensils, and kitchen surfaces with hot soapy water after touching raw meat or poultry
- Cook beef, poultry, fish, eggs and their products, especially hamburgers, adequately
- Eat cooked food promptly and refrigerate leftovers within 2 hours after cooking.
- Wash fruits and vegetables thoroughly, especially those that will be eaten raw
- Drink only pasteurised, certified or boiled milk
- Drink only adequately treated or boiled water
- Wash hands thoroughly after using the bathroom, changing infant diapers, or cleaning up animal faeces
- Avoid eating food from bulging/blown, dented or rusted cans
- Avoid eating uncooked food (e.g. salads) when traveling and during large gatherings



THE WHO PROGRAMME RELATING TO THE FIVE KEYS TO SAFER FOODS FURTHER PROMOTES THE FOLLOWING FOOD SAFETY PRINCIPLES DURING THE HANDLING/ PREPARATION THEREOF, AIMED AT THE PREVENTION OF FOOD BORNE DISEASE:

a. Keep clean

- Wash your hands with soap before handling food and often during food preparation
- Wash your hands with soap after using the toilets
- Wash and sanitise all surfaces and equipment used for food preparation
- Protect kitchen areas and food from insects, pests and other animals

b. Separate raw and cooked

- Separate raw meat, poultry and seafood from other foods
- Use separate equipment and utensils such as knives and cutting boards for handling raw foods
- Store food in containers to avoid contact between raw and prepared foods

c. Cook thoroughly

- Cook food thoroughly, especially meat, poultry, eggs and seafood
- Bring foods like soups and stews to boiling to make sure that they have reached 70°C. For meat and poultry, make sure that juices are clear, not pink. Ideally, use a thermometer
- Reheat cooked food thoroughly
- Avoid overcooking when frying, grilling or baking food as this may produce toxic chemicals

d. Keep food at safe temperatures

- Do not leave cooked food at room temperature for more than 2 hours
- Refrigerate promptly all cooked and perishable food (preferably below 5°C)
- Keep cooked food piping hot (more than 60°C) prior to serving
- Do not store food too long even in the refrigerator
- Do not thaw frozen food at room temperature

e. Use safe water and raw materials

- Use safe water or treat it to make it safe
- Select fresh and wholesome foods
- Choose foods processed for safety, such as pasteurized milk
- Wash fruits and vegetables, especially if eaten raw
- Do not use food (perishable) beyond its expiry date

7. Surveillance and Notification

All health care workers are legally obligated to notify food poisoning and other foodborne illnesses that are notifiable as stated in Health Act No. 61 of 2003. Early reporting and notification triggers a rapid response and assists in abating outbreaks through appropriate and timely interventions. This therefore results in prevention of spread of communicable diseases in the country. The quality of data is determined by the completeness, timeliness and accuracy of reporting, making it essential to report properly.

Notifications are done using GW17/5 forms available from the various Departments of Health. These forms should be completed as fully as possible. If an outbreak is suspected, immediately contact your district/provincial health authority Outbreak Response Office telephonically and in writing (Annexure A).

8. Investigation of a Foodborne Disease Outbreak Incident

A multidisciplinary team with clear roles and responsibilities and with good communication skills should be responsible for managing and controlling these outbreaks.

For more detailed information on investigation and control of foodborne disease outbreaks, please refer to the following documents:

1. World Health Organisation (WHO) publication – ***Foodborne Disease Outbreaks: Guidelines for investigation and control***

Foodborne disease outbreaks: Guidelines for investigation and control

http://www.who.int/foodsafety/publications/foodborne_disease/outbreak_guidelines.pdf

2. Department of Health, Directorate: Food Control - ***Guidelines for Environmental Health Officers Engaged in Food Poisoning Investigations***

http://www.doh.gov.za/department/dir_foodcontr-f.html



9. References

1. National Department of Health, South Africa [home page on the internet]. Guidelines for Environmental Health Officers engaged in Food Poisoning Investigations; 2000 [database on the internet]. Available from: <http://www.doh.gov.za/docs/factsheets/guidelines/foodpoison.pdf>
2. National Department of Health, South Africa [homepage]. Guidelines for Environmental Health Practitioners on Food Safety Control at Special Events; 2003 [database on the internet]. Available from: <http://www.doh.gov.za/department/foodcontrol/docs/specialevents/index.html>
3. United States Centres for Disease Control and Prevention [homepage on the internet]. Diagnosis and Management of Foodborne Illness: A Primer for Physicians. MMWR [serial on internet] January 2001; 50 (RR02): 1 – 69. Available from: <http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5002a1.htm>
4. World Health Organisation [homepage on the internet]. Foodborne Disease: a focus for health education;1999 [database on the internet]. Available from: <http://www.who.int/foodsafety/publications/capacity/fbd/en/index.html>

10. Annexure A: Communicable Disease Control Offices

PROVINCE	ADDRESS	TEL. NO.	FAX. NO.
National	Department of Health Private Bag x828, Pretoria, 0001	012- 395 8096	012-395 8905/6
Northern Cape	Department of Health, Northern Cape Province Private Bag x5049, Kimberly, 8301	053-830 0526/29	053-830 0065
Limpopo	Department of Health, Limpopo Province, Private Bag x9302, Polokwane, 0700	015-293 6062/3	015-293 6281
North West	Department of Health, North West Province Private Bag x2068, Mmabatho, 0273	018-397 2600/2353	018-397 2627/2656
Western Cape	Department of Health Western Cape Province P.O. Box 2060, Cape Town, 8001	021-483 5707/3156	021-483 2682
Eastern Cape	Department of Health, Eastern Cape Province Private Bag x0038, Bisho, 5605	040-608 1175	040- 609 4255/3597
Free State	Department of Health, Free State Province P.O. Box 517, Bloemfontein, 9300	051-408 1595/1794	051-408 1961/1074
Gauteng	Department of Health, Gauteng Province Private Bag x085, Marshalltown, 2107	011-355 3867	011-355 3171/3338
Mpumalanga	Department of Health, Mpumalanga Province Private, Bag x1128, Nelspruit, 1200	013-766 3411/3078	013-766 3474/3

To order copies of these guidelines, fax this form to:



health

Department:
Health
REPUBLIC OF SOUTH AFRICA

Director-General

National Department of Health
Directorate: Communicable Disease Control

Private Bag X828
Pretoria, 0001
Republic of South Africa

Telephone
(012) 395 8000

Fax
(012) 395 8905/6

CLINICAL GUIDELINES ON MANAGEMENT AND CONTROL OF INFECTIOUS
FOODBORNE DISEASES IN SOUTH AFRICA

NAME:

ADDRESS:

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CODE: NUMBER OF COPIES REQUESTED:

KwaZulu-Natal	Department of Health, KwaZulu-Natal Province Private Bag x9051, Pietermaritzburg, 3200	033-395-2051	033-342 5830
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To order copies of these guidelines, fax this form to:

Director-General

National Department of Health
 Directorate: Communicable Disease Control
 Sub-Directorate: Emerging and Re-Emerging Infectious Diseases
 8th Floor, North Tower, Civitas Building
 Private Bag X828
 Pretoria, 0001
 Republic of South Africa

Telephone (012) 395 8000	Fax (012) 395 8905/6
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