

## Introduction to Enteric Illness Investigation

When enteric illness is identified (e.g. through laboratory testing or clinical history) in an individual or a cluster of individuals, a comprehensive investigation is carried out. The purpose of this local investigation is to identify the factors that contributed to a person contracting the illness. This investigation will provide the information needed by public health officials to implement appropriate public health measures to prevent further illness.

Investigations are carried out by field investigators who work under the direction of the Regional Medical Officer of Health (RMOH). In Newfoundland and Labrador the routine investigations of food and waterborne illness are completed by Environmental Health Officers (EHO) who work for the Government Service Centre (GSC), Department of Government Services. In some situations the Public Health Nurse or Infection Control Practitioner may be asked to participate in field investigations, such as when an outbreak occurs in a healthcare facility.

### **Part 1: Single Case Investigation**

Single cases of enteric illness should be investigated thoroughly by investigators. The information obtained from single cases could be important in preventing the case from suffering similar illness in the future, preventing others from becoming ill and identifying enteric illness outbreaks.

To ensure that information is collected consistently throughout the province, the **Food/Water/Enteric Illness Questionnaire** (Appendix A) has been developed for use by investigators of single cases of enteric illness. The questionnaire has been adapted from forms C1 and C2 of the *Procedures to Investigate Foodborne Illness*, IAFP, 5<sup>th</sup> Edition, 2007.

Upon completion of the single case investigation, the completed **Food/Water/Enteric Illness Questionnaire** should be forwarded to the Regional Health Authority.

Investigations must include the assessment for specific risk groups. The type of work or school attendance may impact the individual's ability to attend work or school when they have an enteric illness. Specific risk groups include:

- Food Handlers
- Health Care or Child Care Staff
- Children below the age of five years
- Older children and adults with inability to attend to personal hygiene

Single case investigations may lead the investigator to suspect an enteric illness outbreak. When this occurs, the investigator shall immediately notify the Regional Health Authority by telephone and begin the outbreak investigation as per the procedures outlined in Part 2 below.

### **Part 2: Outbreak Investigation**

#### **Regional Outbreak**

When an outbreak is limited to one region an investigation team, lead by the RMOH, should be assembled to carry out the investigation of an outbreak or suspected outbreak

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of enteric illness. A rapid and thorough response to an outbreak may control the magnitude of the outbreak and prevent future outbreaks from occurring. The investigation team should carry out the investigation in accordance with the internationally recognized procedures provided in the most recent editions of the documents:

1. *Procedures to Investigate Foodborne Illness*; and
2. *Procedures to Investigate Waterborne Illness*

Note: These documents are available from the International Association for Food Protection at [www.foodprotection.org](http://www.foodprotection.org).

An investigation team should consist of but not limited to the following members:

- RMOH
- Communicable Disease Control Nurse
- Environmental Health Program Manager
- Lead EHO Field Investigator
- GSC Manager

Please note that a Communication Consultant may be assigned to the team

To facilitate the collection of information during an outbreak or suspected outbreak, the ***Food/Water/Enteric Illness Questionnaire*** (Appendix A) may be used or an outbreak specific questionnaire may be developed by the investigation team. The questionnaire can be modified as new information is gathered during the course of the investigation. If the outbreak is of a national nature a questionnaire is often developed by Public Health Agency of Canada.

Following the completion of the outbreak investigation a written report should be prepared by the Lead EHO Field Investigator and submitted to the regional health authority. The RMOH sends a copy of the report to the Public Health Division. The written report will be a record of the events of the outbreak and may serve to enhance public health protection if the report's recommendations are followed. (Appendix A) The content of the report should include Summary, Introduction, Background, Methods, Results, Discussion, and Recommendations.

### **Provincial Outbreak**

If an outbreak occurs in more than one region the Public Health Division of the Department of Health and Community Services will become involved in the coordination of the outbreak. Regions will require the outbreak team and this team, or a team lead, will work with the Province to ensure a consistent and coordinated approach.

## **Roles and Responsibilities**

The role and responsibilities of the Medical Officer of Health:

- Ensure case/cases are investigated
- Ensure that appropriate public health measures have been activated
- If outbreak, assemble outbreak team

The role and responsibilities of the Investigator:

- Start the investigation upon receipt of a report of illness
- Complete food/waterborne/enteric illness questionnaires
- Conduct outbreak investigations in accordance with the procedures to investigate foodborne and waterborne illnesses
- Implement public health measures
- Report investigation to the RMOH

The role and responsibilities of the Family Physician:

- Patient Education, follow-up, and culture for special risk contacts
- Facilitate specimen collection
- Exclusions

The role and responsibilities of the Laboratory:

- Report positive tests in writing
- Telephone Reporting

Procedure for exclusion:

- Inform client
- Inform place of employment/child care centre

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## Botulism

## List A

### Case Definition

#### **Confirmed case**

A confirmed case requires laboratory definitive evidence with clinical evidence<sup>1</sup> **or, in the case of foodborne botulism**, clinical evidence and consumption of the same suspect food as an individual that has laboratory confirmed botulism.

#### **Foodborne Botulism (Either 1 or 2)**

- 1 Laboratory confirmation of intoxication with clinical evidence:
  - detection of botulinum toxin in serum, stool, gastric aspirate or foodOR
  - isolation of *C. botulinum* from stool or gastric aspirate
- 2 Clinical evidence and indication the client ate the same suspect food as an individual with laboratory confirmed botulism.

#### **Wound Botulism**

- Laboratory confirmation of infection:
  - lab detection of botulinum toxin in serumOR
  - isolation of *C. botulinum* from a woundAND
  - presence of a freshly infected wound in the 2 weeks before symptoms and no evidence of consumption of food contaminated with *C. botulinum*.

#### **Infant Botulism**

- Laboratory confirmation with symptoms compatible with botulism in a person less than one year of age:
  - detection of botulinum toxin in stool or serumOR
  - isolation of *C. botulinum* from the patient's stool, or at autopsy

#### **Probable case**

##### **Foodborne**

A probable case requires clinical evidence and consumption of a suspect food item in the incubation period (12-48 hours).

Clinical evidence<sup>1</sup>

**Foodborne:** Clinical illness is characterized by blurred vision, dry mouth and difficulty swallowing and speaking. Descending and symmetric paralysis may progress rapidly, often requiring respiratory support.

**Wound:** Clinical illness is characterized by diplopia, blurred vision, and bulbar weakness. Symmetric paralysis may progress rapidly.

**Infant:** Clinical illness in infants is characterized by constipation, loss of appetite, weakness, altered cry and loss of head control

### Clinical Presentation

Botulism is a rare but serious neuroparalytic illness. Regardless of the route of

intoxication the same classic syndrome appears. It is characterized by symmetric, descending flaccid paralysis always beginning with the cranial nerves. The symmetric descending nature of the paralysis with a lack of fever and a normal mental status help to differentiate it from other neurological diseases. In addition it may have clinical features associated with the route of transmission: foodborne illness is associated with nausea and diarrhea; infant botulism is often accompanied by constipation; and wound botulism would result from visible wounds.

### **Epidemiology**

**Occurrence:** Worldwide outbreaks occur primarily in areas which food products are not processed by methods to prevent toxin formation. In Canada botulism is a rare disease with an average of seven cases per year reported between 2001 and 2004. There has recently been an upsurge of cases of wound botulism in injecting drug users, especially those that use skin or muscle “popping”; the drug is injected subcutaneously or intramuscularly.

**Reservoir:** Botulism is caused by a nerve toxin, botulin, produced by the bacterium *Clostridium(C) botulinum*. Botulin is the most lethal substance known with less than one microgram sufficient to cause fatal human disease. *C. botulinum*, commonly found in soil, form spores which allow them to survive in a dormant state until exposed to conditions that can support their growth.

**Transmission:** There are four mechanisms for botulism toxin to enter the body: foodborne, cutaneous, colonization of the gastrointestinal tract, and inhalational. Foodborne botulism results when food contaminated with spores of *C. botulinum* are ingested. Food contamination can occur if foods are preserved or stored under conditions that allow toxin production. Wound botulism results when *C botulinum* contaminates the wound and produces toxin. Infant botulism occurs when ingested spores colonize the intestinal tract with subsequent absorption of the toxin. Inhalational cases rarely occur naturally but it is the likely route in a large-scale bioterrorism event.

**Incubation Period:** In foodborne botulism the symptoms usually occur between 12-36 hours after ingestion of the contaminated food with the range from 6 hours – 10 days. Wound botulism has a longer incubation period, usually 4 -14 days. In infant botulism the incubation period is estimated at 3 to 30 days.

**Communicability:** No incidence of person to person transmission has been documented.

**Diagnosis:** Clinical signs and symptoms must be confirmed by laboratory findings.

### **Control Measures**

**Management of Case:** Routine practices are recommended when caring for persons with botulism. Treatment is supportive with severe cases usually requiring ventilatory and nutritional support. Passive immunization with antitoxin has been shown to decrease mortality. Antitoxin must be administered as quickly as possible on suspicion of disease without waiting for confirmation. The antitoxin is available from the provincial vaccine depot through the Medical Officer of Health (MOH) or on call MOH (1-866-270-7437). Antitoxin requires completion of the Health Canada Special Access Program form which is available at phone number: 613-941-2108 or fax 613-941-3194 or email address:

[http://www.hc-sc.gc.ca/dhp-mps/acces/drugs-droques/index\\_e.html](http://www.hc-sc.gc.ca/dhp-mps/acces/drugs-droques/index_e.html)

In children less than one year (< 1 year) human-derived botulism immune globulin

(BabyBIG®) is indicated. BabyBIG® is not a licensed product in Canada. To obtain BabyBIG® the following steps are required:

- The physician must first contact the California Department of Health Services (DHS) Infant Botulism Treatment and Prevention Program on call physician at 510-231-7600 to review the indications for such treatment
- Product is obtained the California DHS at 510-540-2646
- The use of an unlicensed product in Canada requires approval through Health Canada's SAP (numbers listed above)

**Management of Contacts:** In the event of suspected exposure asymptomatic persons must be monitored for symptoms and given antitoxin immediately on development of any symptoms. Post exposure prophylaxis is not recommended.

**Management of Outbreaks:** An outbreak management team should be established to address infection prevention and control measures.

### **Preventive Measures**

- Wash hands prior to and after preparing food
- Keep all work surfaces, food, utensils, equipment clean during all stages of food preparation especially for canning processes
- Date and label preserves and canned goods and follow proper canning requirements strictly
- Refrigerate all foods labeled "keep refrigerated"
- Never eat food from cans that are dented, leaking or have bulging ends. The food may not look or smell spoiled but it may still contain the toxin
- Do not feed honey (even pasteurized honey) to children under one year old. The bacterium cannot grow or make toxins in the honey, but it may grow and make toxins in the baby's body
- Make available information on complications of non medicinal use of intravenous drugs
- Distribute information on bioterrorism associated botulism if public health officials deem it a concern
- Provide fact sheet available at <http://www.inspection.gc.ca/english/fssa/concen/cause/botulisme.shtml>

### **Reporting Requirements and Procedure**

- Physicians and laboratories report notifiable diseases immediately for list A and within 4 days for list B, aggregate weekly for list C to the Regional Medical Officer of Health (RMOH)
- The RMOH office initiates coordinated response including contact tracing as indicated for a specific disease
- The RMOH office reports to the Provincial Public Health through electronic reporting system
- If an outbreak has been identified an outbreak report is completed and sent to Provincial Public Health
- The RMOH office will notify local health professionals and others deems as necessary
- Provincial Public Health
  - Reports cases to Public Health Agency of Canada
- Provides analysis and reports to RHAs in the Communicable Disease Report

## Campylobacteriosis

## List B

### Case Definition

#### **Confirmed case**

Laboratory confirmation of infection with or without symptoms:

- isolation of *Campylobacter* sp. from an appropriate clinical specimen

#### **Probable case**

Clinical illness<sup>1</sup> in a person who is epidemiologically linked to a confirmed case

<sup>1</sup>Clinical illness is characterized by diarrhea, abdominal pain, malaise, fever, nausea and/or vomiting

### Clinical Presentation

Most people who become ill with campylobacteriosis get diarrhea, cramping, abdominal pain, and fever within 2 to 5 days after exposure to the organism. The diarrhea may be bloody and can be accompanied by nausea and vomiting. Some persons who are infected are asymptomatic. In persons with compromised immune systems, *Campylobacter* occasionally spreads to the bloodstream and causes a serious life-threatening infection. These patients are more likely to experience recurrences and to become chronic carriers.

### Epidemiology

**Occurrence:** Globally, 5-14% of reported cases of diarrhea are caused by infection with *Campylobacter*. In industrialized countries the illness affects predominantly children younger than 5 years of age and young adults. Virtually all cases occur as isolated, sporadic events, not as a part of large outbreaks. Most human illness is caused by one species, called *Campylobacter jejuni*. The mean incidence rate in Canada for 2000 – 2004 was 35.7 per 100,000. In Newfoundland Labrador the mean incidence rate for the same period was 12.2 per 100,000 population.

**Reservoir:** Many chicken flocks are silently infected with *Campylobacter*; that is, the chickens are infected with the organism but show no signs of illness. The organism can be easily spread from bird to bird through a common water source or through contact with infected feces. When an infected bird is slaughtered, *Campylobacter* can be transferred from the intestines to the meat. Unpasteurized milk can become contaminated if the cow has an infection with *Campylobacter* in her udder or the milk is contaminated with manure. Surface water and mountain streams can become contaminated from infected feces from cows or wild birds. Animals can also be infected, and some people have acquired their infection from contact with the infected stool of an ill dog or cat.

**Transmission:** Fecal-oral spread is the most common mode of transmission. This occurs by ingestion of contaminated food such as improperly cooked poultry or meat, or drinking unpasteurized milk and contaminated water. Person-to-person transmission is uncommon but has been reported among young children and in families.

**Incubation Period:** The incubation period is from two to five days with a range of 1-10 days

**Communicability:** Communicability is uncommon but is greatest during the acute phase of the disease.

**Diagnosis:** Clinical signs and symptoms must be confirmed by laboratory findings.

## **Control Measures**

**Management of Cases:** Treatment is support with rehydration being the most important consideration. Antibiotic therapy may shorten the duration of illness and prevent relapse if given early in the infection. Contact precautions should be used for hospitalized children and for hospitalized adults who have poor hygiene or incontinence. Emphasis should be placed on attention to hand hygiene practices and education on other preventive measures. Exclusion is recommended for symptomatic individuals who work handling food, or who work with infants, the elderly, the immunocompromised and institutionalized patients or residents. Advise work restrictions until the case has been symptom free for 48 hours.

**Management of Contacts:** Symptomatic contact should seek medical attention and should have stool cultures done. Asymptomatic contacts do not need to be tested but should be given advice regarding preventative measures.

**Management of Outbreaks:** An outbreak management team should be established to address infection prevention and control measures.

## **Preventive Measures**

- Report cases to public health
- Wash hands before and after handling raw foods of animal origin
- Avoid cross-contamination from raw meat or poultry to ready-to-eat foods by hands, equipment, or utensils
- Cook thoroughly all food derived from animal sources, particularly poultry
- Avoid consuming unpasteurized milk and untreated surface water
- Provide clean, chlorinated water sources for chickens which might prevent infections in poultry flocks
- Provide fact sheet available at <http://www.health.gov.nl.ca/health/publications/ehp/pdf/Campylobacter.pdf>

## **Reporting Requirements and Procedure**

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## Cholera

## List A

### Case Definition

#### **Confirmed case**

Clinical evidence of illness with laboratory confirmation of infection through isolation of cholera toxin producing *Vibrio cholerae* serotype O1 or O139 from vomitus or stool.

#### **Probable case**

Clinical evidence<sup>1</sup> of illness in a person who is epidemiologically linked to a confirmed case

<sup>1</sup>Cholera is characterized by acute watery diarrhea and/or vomiting. The severity of illness may vary.

### Clinical Presentation

The toxin produced by the bacterium causes an infected person to have vomiting and profuse, watery diarrhea. The spectrum of disease is wide, with mild and asymptomatic illness occurring more frequently than severe disease with rapid dehydration and occasionally hypovolemic shock. Case fatality ranges from 50% or more without treatment to less than 1% among adequately treated patients.

### Epidemiology

**Occurrence:** Cholera infections are associated with poor sanitation and continue to be a major health problem in developing countries. Epidemics are strongly linked to the consumption of unsafe water, poor hygiene, and crowded living conditions. The incidence of cholera is low in Canada where good sanitation, clean water and good hygiene exist.

**Transmission:** The usual mode of infection is the ingestion of large numbers of organisms from contaminated water or food (particularly raw or undercooked shellfish, raw or partially dried fish, or moist grains or vegetables held at ambient temperature). Cholera outbreaks are usually caused by contaminated water, where sewage and drinking water supplies have not been adequately treated. Direct person to person spread has not been documented.

**Incubation Period:** The incubation period is usually from a few hours to 5 days, usually 2-3 days.

**Period of Communicability:** An infected individual remains infectious from the onset of illnesses until recovery.

**Diagnosis:** Diagnosis is based on findings consistent with the case definition listed above.

### Control Measures

**Management of Cases:** Information should be provided about the disease transmission and appropriate hygiene measures. Replacement of fluids remains the cornerstone treatment for all diarrheal diseases including cholera. Antimicrobial therapy should be considered for people who are moderately to severely ill.

**Management of Contacts:** Symptomatic contacts should be tested. Close contacts that are asymptomatic should be interviewed to determine if they have a similar history of travel to an endemic area or contact with a known source.

**Management of Outbreaks:** An outbreak management team should be established to address infection prevention and control measures.

### **Preventive Measures**

Because cholera is spread through contaminated food and water, Public Health Agency of Canada strongly recommends that travellers exercise general food and water precautions to minimize their risk of exposure. The key principles to remember are: *boil it, cook it, peel it or leave it!*

- Eat only food that has been well-cooked and is still hot when served
- Drink only purified water that has been boiled or disinfected with chlorine or iodine, or commercially bottled water in sealed containers
- Avoid ice, unless it has been made with purified water
- Boil unpasteurized milk
- Avoid unpasteurized dairy products and ice cream
- Avoid uncooked foods - especially shellfish - and salads. Fruit and vegetables that can be peeled are usually safe
- Avoid food from street vendors
- Wash hands before eating or drinking
- Provide fact sheet available at:  
<http://www.phac-aspc.gc.ca/tmp-pmv/info/cholera-eng.php#know>

Vaccination with the Chol-Ecol-O vaccine as a prevention strategy against travellers' diarrhea is of limited value and is not routinely recommended for the majority of travellers. Travellers who may be at significantly increased risk (e.g., high-risk expatriates such as relief and aid workers or health professionals working in endemic countries) may benefit from immunization.

### **Reporting Requirements and Procedure**

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## **Cryptosporidiosis**

**List B**

### **Case Definition**

#### **Confirmed case**

Laboratory confirmation of infection with or without symptoms from an appropriate clinical specimen (e.g. stool, intestinal fluid or small bowel biopsy):

- demonstration of *Cryptosporidium* oocysts

OR

- detection of *Cryptosporidium* DNA

OR

- demonstration of *Cryptosporidium* antigen by an approved method (e.g. EIA, immunochromatographic – ICT)

#### **Probable case**

Clinical illness<sup>1</sup> in a person who is epidemiologically linked to a confirmed case

<sup>1</sup>Clinical illness is characterized by diarrhea (often profuse and watery), abdominal cramps, anorexia, fever, nausea, general malaise and vomiting.

### **Clinical Presentation**

The most common manifestation of cryptosporidiosis is frequent, non-bloody, watery diarrhea. Other symptoms may include abdominal cramps, fatigue, vomiting anorexia and weight loss. The disease course can be quite variable, ranging from a self-limiting diarrhea to more severe and protracted syndrome more commonly seen in immunocompromised patient populations.

### **Epidemiology**

**Occurrence:** The disease occurs worldwide and has become recognized as one of the most common causes of waterborne disease in humans in North America. Newfoundland Labrador has had an average of one case per year for the last 8 years. Extensive waterborne outbreaks have been associated with contamination of drinking water; exposure to contaminated recreational water including swimming pools, water slides, hot tubs, and lakes; and consumption of contaminated beverages.

**Reservoir:** The primary reservoir is cattle but other hosts include mammals, birds and reptiles. *Cryptosporidium* species are oocyst-forming protozoa. The most common species causing disease in humans are *Cryptosporidium hominis* and *Cryptosporidium parvum*.

**Transmission:** The mechanism of transmission is felt to be contamination of the water supply by fecal material from cattle or other animals. Routes of transmission include animal to person, waterborne, foodborne and person-to-person.

**Incubation Period:** The incubation period is not known precisely; 1 – 12 days, with a mean of 7 days.

**Diagnosis:** Clinical signs and symptoms must be confirmed by laboratory findings.

### **Control Measures**

**Management of Case:** General supportive therapy should always be considered, particularly in immunocompromised patients; this includes fluid and electrolyte replacement and nutritional support. Drug therapy may be considered in some cases. Contact precautions are recommended when caring for the symptomatic patient.

**Management of Contacts:** Symptomatic contacts should be treated as cases. Specimens must be submitted to establish the diagnosis. Education must be provided to all contacts on the preventative measures.

**Management of Outbreaks:** An outbreak management team should be established to address infection prevention and control measures.

### **Preventive Measures**

- Prompt involvement of community health is essential
- Education of case/s and contacts on the importance of hygienic measures including:
  - Hand hygiene – Wash hands thoroughly with soap and water (Note: *Cryptosporidium* are not killed by alcohol gels and hand sanitizers) before and after eating and after using the toilet
  - Safe disposal of feces – feces is highly infectious
- Cases must avoid swimming in recreational water for at least two weeks after the diarrhea stops.
- Avoid fecal exposure during sex
- Exclude infected children from day care facilities until diarrhea stops
- Exclude infected persons from jobs that require handling of food
- Avoid water that might be contaminated
  - Do not drink untreated water from shallow wells, lakes, rivers, and streams
  - Boil water for one minute to make it safe
- Avoid food that might be contaminated
- Use safe, uncontaminated water to wash all food that is to be eaten raw
- Strict attention to the cleaning and disinfection of swimming pools
- Travelers need to be advised about the risks involved in traveling to areas where sanitation may be questionable
- Adventure travelers or campers should avoid drinking water from lakes and rivers
- Avoid eating uncooked foods when traveling in countries with minimal water treatment systems
- Provide fact sheet available at:  
[http://www.hc-sc.gc.ca/ewh-semt/pubs/water-eau/giardia\\_cryptosporidium-eng.php](http://www.hc-sc.gc.ca/ewh-semt/pubs/water-eau/giardia_cryptosporidium-eng.php)

### **Reporting Requirements and Procedure**

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## Cyclosporiasis

## List B

### Case Definition

#### **Confirmed case**

Laboratory confirmation of infection in a person with or without clinical illness:

- demonstration of *Cyclospora cayetanensis* oocysts in stool, duodenal/jejunal aspirate or small bowel biopsy

#### **Probable case**

Clinical illness<sup>1</sup> in a person with evidence of:

- an epidemiologic link to a confirmed case either by consumption of the same food or exposure to food known to be handled by a confirmed case

OR

- a history of travel to a cyclospora-endemic area

<sup>1</sup>Clinical illness is characterized by watery diarrhea, loss of appetite, weight loss, abdominal bloating and cramping, increased flatus, nausea, fatigue and low-grade fever. Vomiting may also be noted. Relapses and asymptomatic infections can occur. Some evidence suggests that symptoms may be more severe and long-lasting in immunocompromised individuals.

### Clinical Presentation

Symptoms may include watery and sometimes explosive diarrhea, loss of appetite, weight loss, nausea, gas, stomach cramps, muscle ache, vomiting, low grade fever, bloating and fatigue.

### Epidemiology

**Occurrence:** *Cyclospora* is endemic in many developing countries and has been reported as a cause of traveler's diarrhea. Outbreaks in the United States and Canada during 1996-1998 were associated with ingestion of fresh raspberries imported from Central America.

**Reservoir:** *Cyclospora* organisms are intestinal pathogens of humans that are increasingly recognized in many parts of the world; yet, the reservoirs and host range remain poorly defined.

**Transmission:** Indirect transmission can occur if an infected person contaminates the environment and oocysts have sufficient time, under appropriate conditions, to become infectious. For example, *Cyclospora* may be transmitted by ingestion of water or food contaminated with oocysts. Transmission of *Cyclospora* directly from an infected person to someone else is unlikely.

**Incubation Period:** The incubation period is approximately 7 days (range, 1-14 days).

**Period of Communicability:** The period of communicability may be from days to weeks after excretion.

**Diagnosis:** Diagnosis is based on findings consistent with the above listed case definition.

### Control Measures

**Management of a Case:** Trimethoprim/sulfamethoxazole (TMP/SMX), or Bactrim, Septra, or Cotrim, have been shown in a placebo-controlled trial to be effective treatment

for *Cyclospora* infection. This parasite is not endemic in Canada at this time. Even one case warrants a thorough investigation.

**Managements of Contacts:** Contacts should be given information about the disease and advised to use good personal hygiene.

**Management of Outbreaks:** An outbreak management team should be established to address infection prevention and control measures associated with cases.

### **Preventive Measures**

- On the basis of currently available information, avoiding food or water that might be contaminated with stool is the best way to prevent infection
- Produce should be washed thoroughly before it is eaten, although this practice does not eliminate the risk of cyclosporiasis
- Cooking and baking fruits and vegetables will eliminate the risk of infection
- Risk can be reduced through rigorously enforced controls on production, harvesting and packaging of foods
- Provide fact sheet available at <http://www.inspection.gc.ca/english/fssa/concen/cause/cyclosporaie.shtml>

### **Reporting Requirements and Procedure**

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## Giardiasis

## List B

### Case Definition

#### **Confirmed case**

Laboratory confirmation of infection with or without symptoms from stool, duodenal fluid, or small bowel biopsy specimen:

- demonstration of *Giardia lamblia*
- OR
- demonstration of *Giardia lamblia* antigen

#### **Probable case**

Clinical illness<sup>1</sup> in a person who is epidemiologically linked to a confirmed case

<sup>1</sup>Clinical illness is characterized by diarrhea, abdominal cramps, bloating, weight loss, fatigue or malabsorption.

### Clinical Presentation

Infections range from being asymptomatic to chronic diarrheal syndromes. Asymptomatic carriage is the most common manifestation. Symptomatic manifestations include prolonged duration of profuse watery diarrhea, foul smelling flatulence, abdominal cramps, distention and less commonly fever.

### Epidemiology

**Occurrence:** Giardiasis, sometimes called 'beaver fever', is the most common cause of endemic and epidemic diarrhea throughout the world. The causative organism is *Giardia intestinalis* (also known as *Giardia lamblia*). It is a flagellate protozoan that infects the biliary tract and upper small intestine. People who spend time in institutional or day-care environments are more susceptible, as are travelers and those who consume improperly treated water. The mean annual incidence reported in Canada from 2000 to 2004 was 14.6 per 100,000 population and for the same period the mean incidence rate in Newfoundland Labrador was 7.8 per 100,000.

**Reservoir:** Humans are the principal reservoir but *Giardia* organisms can infect beavers, dogs, cats, and other animals. These animals can contaminate water with feces containing cysts that are infectious for humans.

**Transmission:** Giardiasis is passed via the fecal-oral route. People become infected directly by ingestion of cysts from the feces of an infected person or indirectly by ingestion of fecally contaminated water or food. Person-to-person transmission is common where personal hygiene may be poor. Children who are not toilet trained are often linked to day care and family outbreaks.

**Incubation Period:** The incubation period is usually three to twenty five days; median 7-10 days.

**Period of Communicability:** The period of communicability extends through the course of the infection (as long as the person excretes the cysts).

**Diagnosis:** Diagnosis is based on findings consistent with the above listed case definition.

### **Control Measures**

**Management of Case:** Instruction should be given on disease transmission, appropriate personal hygiene, routine practices and contact precautions. The drugs of choice for treatment include metronidazole, tinidazole, or nitazoxanide. Routine practices are recommended when providing care for the majority of patients and contact precautions are recommended for diapered and incontinent children and adults. Exclude symptomatic individuals from work or child care environments until asymptomatic for 48 hours.

**Management of Contacts:** Close contacts should be investigated to determine if there are others infected who may need treatment.

**Management of Outbreaks:** An outbreak management team should be established to address infection prevention and control measures.

### **Preventive Measures**

- Educate families, staff and the public on personal hygiene measures especially the importance of washing hands before handling food, before eating and after toilet use
- Advise persons with diarrhea caused by this organism to avoid using recreational water venues (e.g., swimming pools, lakes, rivers, the ocean) for two weeks after symptoms resolve
- Prevent water outbreaks by the combination of adequate filtration of water from surface water sources (e.g., lakes, rivers, streams), chlorination, and maintenance of water distribution systems
- Advise travelers, campers, and hikers of methods to make water safe
  - Boiling is the most reliable method to make water safe for drinking
  - The time of boiling (1 minute at sea level) will depend on the altitude
  - Toileting must be downstream and away from possible drinking sources
- Provide a fact sheet available at:  
[http://www.hc-sc.gc.ca/ewh-semt/pubs/water-eau/giardia\\_cryptosporidium-eng.php](http://www.hc-sc.gc.ca/ewh-semt/pubs/water-eau/giardia_cryptosporidium-eng.php)

### **Reporting Requirements and Procedure**

- Physicians and laboratories report notifiable diseases immediately for list A and within 4 days for list B, aggregate weekly for list C to the Regional Medical Officer of Health (RMOH)
- The RMOH office initiates coordinated response including contact tracing as indicated for a specific disease
- The RMOH office reports to the Provincial Public Health through electronic reporting system
- If an outbreak has been identified an outbreak report is completed and sent to Provincial Public Health
- The RMOH office will notify local health professionals and others within the community who require disease information
- Provincial Public Health
  - Reports cases to Public Health Agency of Canada
  - Provides analysis and reports to RHAs in the Communicable Disease Report

## **Hepatitis A**

### **List A**

#### **Case Definition**

##### **Confirmed case**

Laboratory confirmation of infection in the absence of recent vaccination:

- detection of immunoglobulin M (IgM) antibody to hepatitis A virus (anti-HAV)
- AND
- Acute clinical illness (see section 5.0)
- OR
- An epidemiological link to a person with laboratory-confirmed hepatitis A infection.

##### **Probable case**

Acute clinical illness<sup>1</sup> in a person without laboratory confirmation of infection who is epidemiologically linked to a confirmed case

<sup>1</sup>Acute clinical illness is characterized by discrete onset of symptoms including fever, malaise, anorexia, nausea and abdominal pain followed by jaundice or elevated aminotransferase levels within a few days.

#### **Clinical Presentation**

Hepatitis A characteristically is an acute, self-limited illness associated with fever, malaise, jaundice, anorexia, and nausea. Among older children and adults, infection usually is symptomatic and typically lasts several weeks, with jaundice occurring in 70% or more. Symptomatic infection occurs in approximately 30% of infected children younger than 6 years of age; few of these children will have jaundice. Fulminate hepatitis is rare but is more common in people with underlying liver disease. Chronic infection does not occur.

#### **Epidemiology**

**Occurrence:** Hepatitis A occurs sporadically worldwide and is endemic throughout the developing world. People born and raised in developing countries, and people born in developed countries before 1945 have usually been infected in childhood with an asymptomatic or mild case of hepatitis A and are likely to be immune to the disease. Individuals from developed countries born after 1945 are at risk for acquiring hepatitis A, especially when traveling to endemic areas. In Canada there were less than 400 cases per year between 2000 and 2004. Newfoundland Labrador reported one to four cases per year during this period.

**Reservoir:** The reservoir is typically humans.

**Transmission:** The most common mode of transmission is person-to-person, resulting from fecal contamination and oral ingestion (i.e., the fecal-oral route). Infection may occur by consumption of contaminated ice/water or by ingestion of uncooked or undercooked foods that have been washed in contaminated water. Raw shellfish are a particular common source of infection.

**Incubation Period:** The incubation period is from 15 to 50 days (average 28-30 days).

**Period of Communicability:** The period of communicability is between one to two weeks before and for at least one week after the onset of illness. Most cases are probably noninfectious after the first week of jaundice. HAV can be detected in stool for longer periods, especially in neonates and younger children.

**Diagnosis:** Diagnosis is based on findings consistent with the case definition as listed above.

### **Control Measures**

**Management of Cases:** Support care (e.g., fluids and nutrition) is the only known management. Routine precautions are appropriate to prevent transmission in most instances. With diapered or incontinent patients, the addition of contact precautions is recommended. Avoidance of exposure is recommended. Information should be given to the patient and family on disease transmission and appropriate personal hygiene. Exclusion from work or school is dependent on the symptoms of the patient but the period is usually two weeks from the onset of illness or until at least one week after the onset of jaundice.

**Management of Contacts:** The contacts of a case must be identified as soon as possible. Symptomatic contacts must be referred for investigation. Information should be given on disease transmission and appropriate personal hygiene. Post-exposure immunoprophylaxis should be undertaken for household and other intimate contacts of proven or suspected cases of HAV. The vaccine should also be given when hepatitis A occurs in day care centers and kindergartens. Post-exposure prophylaxis is not necessary for other contacts, such as school, workplace or health care workers caring for HAV cases unless an outbreak is suspected or likely. Immune globulin (Ig) is the recommended prophylactic agent for i) infants < 1 years of age ii) immunocompromised people, who may not respond fully to the vaccine, and iii) those for whom vaccine is contraindicated.

**Management of Outbreaks:** An outbreak management team should be established to address infection prevention and control measures.

### **Preventive Measures**

Strategies to prevent transmission of hepatitis A include:

- Pre-exposure prophylaxis – Provincially funded hepatitis A vaccine is available for specific persons at increased risk of infection or increased risk of severe hepatitis A including:
  - People who have chronic liver disease or who are receiving hepatotoxic medication, including persons infected with hepatitis B & C
  - People with hemophilia A or B receiving plasma-derived replacement clotting factor
  - Residents of communities that have high endemic rates of HAV or are at risk of HAV outbreaks
- Advise to travelers
  - Hepatitis A vaccine is recommended and may be purchased by travelers to countries where hepatitis A is endemic
  - Visit a travel clinic prior to travel
- Education of the public about good sanitation and personal hygiene, with special emphasis on careful handwashing
  - Child care centers should be vigilant with hand hygiene procedures and diapering practices

- Food establishments should ensure compliance with the Food Premises Regulations available at <http://assembly.nl.ca/Legislation/sr/regulations/rc961022.htm#1>
- Ensure provision of proper water treatment, water distribution systems and sewage disposal
- Provide fact sheet available at [http://www.phac-aspc.gc.ca/hcai-iamss/bbp-pts/hepatitis/hep\\_a-eng.php](http://www.phac-aspc.gc.ca/hcai-iamss/bbp-pts/hepatitis/hep_a-eng.php)

#### **Reporting Requirements and Procedure**

- Physicians and laboratories report notifiable diseases immediately for list A and within 4 days for list B, aggregate weekly for list C to the Regional Medical Officer of Health (RMOH)
- The RMOH office initiates coordinated response including contact tracing as indicated for a specific disease
- The RMOH office reports to the Provincial Public Health through electronic reporting system
- If an outbreak has been identified an outbreak report is completed and sent to Provincial Public Health
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- Provincial Public Health
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## Listeriosis

## List A

### Case Definition

#### Confirmed case

Laboratory confirmation of infection with symptoms:

- isolation of *Listeria monocytogenes* from a normally sterile site (e.g. blood, cerebral spinal fluid (CSF), or joint, pleural or pericardial fluid)  
OR
- in the setting of miscarriage or stillbirth, isolation of *L. monocytogenes* from placental or fetal tissue (including amniotic fluid and meconium)

#### Probable case

Clinical illness<sup>1</sup> in a person who is epidemiologically linked to a laboratory-confirmed case or to a confirmed source.

<sup>1</sup>Invasive clinical illness is characterized by meningitis or bacteremia. Infection during pregnancy may result in fetal loss through miscarriage, stillbirth, neonatal meningitis or bacteremia.

### Clinical Presentation

Listeriosis can present with flu like symptoms characterized by fever, muscle aches and sometimes gastrointestinal symptoms such as nausea or diarrhea. If infection spreads to the nervous system, symptoms such as headache, stiff neck, confusion, loss of balance or convulsions can occur. The more severe cases of listeriosis usually presents as meningoencephalitis and/or septicemia in newborns and adults and abortion in pregnant women.

### Epidemiology

**Occurrence:** Listeriosis occurs worldwide. Illness is rare and most infections are asymptomatic. Typically infection occurs sporadically; however, outbreaks can occur in all season's. In Canada, listeriosis has been reportable since 1990. On average, in Newfoundland and Labrador there are 1-2 cases of listeriosis per year and generally it occur in those over the age of 65. Although healthy people can be infected, the disease generally affects:

- Pregnant women – they are about 20 times more likely than other health adults to get listeriosis. About one-third of cases happen during pregnancy
- Newborns – Newborns rather than the pregnant women themselves suffer the serious effects of infection in pregnancy
- Immunocompromised persons, for example those with HIV/AIDS, cancer, chronic renal disease or chronic liver disease, diabetes, and those on immunosuppressive medication
- The elderly – the risk increases with age

**Reservoir:** *Listeria monocytogenes* is very common in the environment. The primary reservoirs of *Listeria monocytogenes* are soil and decomposing organic matter and may also be found in dust, water and foods. Animal reservoirs include infected domestic and wild mammals, birds, and man. Asymptomatic fecal carriage is common in humans (up to 10%) and animals.

Seasonal use of silage as feed is frequently followed by increased incidence of listeriosis in animals.

**Transmission:** Cases of listeriosis have been reported in association with ingestion of raw or contaminated milk, soft cheeses, vegetables, and ready-to-eat meats, such as cold cuts and pate. Person to person transmission is rare other than in neonates when transmission may occur from mother to fetus in utero or during the passage through the infected birth canal. A substantial proportion of sporadic cases result from foodborne transmission. Vegetables and fruit may become contaminated from the soil or from manure used as fertilizer.

**Incubation period:** The incubation period is not known with certainty but probably ranges from 3–70 days with an estimated median incubation period of 3 weeks.

**Period of communicability:** Mothers of infected newborns can shed the agent in vaginal discharges and urine during and up to 7–10 days after delivery. Infected individuals can shed the organism in their stool for several months.

**Diagnosis:** Clinical signs and symptoms must be confirmed by laboratory findings.

### **Control Measures**

**Management of cases:** Supportive treatment and antibiotics are required as directed by the attending physician. Routine practices are adequate for the hospitalized individuals. Asymptomatic pregnant women and newborns should be given prophylactic antibiotics if infected with *Listeria*. When infection occurs during pregnancy, antibiotics given promptly to the pregnant women can often prevent infection of the newborn.

Babies with listeriosis receive the same antibiotics as adults, although a combination of antibiotics is often used until the diagnosis is confirmed. Even with prompt treatment, some infections may result in death particularly to those at higher risk of contracting listeriosis.

**Management of Contacts:** The infection is very rarely spread from person to person. Contact should be provided with information about the disease and mode of transmission.

**Management of Outbreaks:** An outbreak management team should be established to address infection prevention and control measures.

### **Preventive Measures**

General recommendations:

- Thoroughly cook raw food from animal sources (e.g., beef, pork, and poultry)
- Wash raw vegetables and fruit before eating
- Keep uncooked meats separate from vegetables, cooked foods, and ready-to-eat foods.
- Avoid consumption of unpasteurized milk or foods made from raw milk
- Wash hands, knives, and cutting boards after handling uncooked foods
- Additional recommendations for persons at high risk (previously defined) include:
  - avoid unpasteurized cheeses (this does not apply to pasteurized cheeses, cream cheese, cottage cheese or yogurt)
  - do not eat refrigerated pates or meat spreads

- do not eat refrigerated smoked seafood, unless it is contained in a cooked dish such as a casserole
- reheat leftovers of ready-to-eat foods should be steaming hot before eating
- do not eat luncheon meats or deli meats unless they are reheated until steaming hot
- Educate veterinarians and farmers to take proper precautions in handling aborted fetuses, and sick or dead animals
- Avoid the use of untreated manure on vegetable crops
- Investigate clusters for a possible common source
- Provide a fact sheet available at <http://www.health.gov.nl.ca/health/publications/ehp/pdf/Listeriosis%20Aug%202008.pdf>

### **Reporting Requirements and Procedure**

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- The RMOH office initiates coordinated response including contact tracing as indicated for a specific disease
- The RMOH office reports to the Provincial Public Health through electronic reporting system
- If an outbreak has been identified an outbreak report is completed and sent to Provincial Public Health
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## Norovirus Infection

## List B

### Case Definition

#### **Confirmed Outbreak**

Two or more cases of clinical illness<sup>1</sup> compatible with norovirus that can be epidemiologically linked to one another (i.e. associated by exposure with onsets within a 1-3 day period), at least one of which is laboratory-confirmed:

- Community outbreak:  
Two or more unrelated\* cases of illness compatible with norovirus that can be epidemiologically linked to one another  
\* Do not live in a common household, excluding institutions
- Institutional outbreak:  
Two or more cases of clinical illness compatible with norovirus that are epidemiologically linked in an institutional setting

<sup>1</sup>Clinical illness is characterized by acute onset of nausea, vomiting, diarrhea, abdominal pain, myalgia, headache, malaise, low grade fever or a combination of these symptoms, lasting 24 to 48 hours.

### Clinical Presentation

Noro viruses also known as Norwalk-like viruses (NLV) are a common cause of outbreaks of viral gastroenteritis. Norovirus gastroenteritis has several distinguishing characteristics which include a rapid onset of the following symptoms; diarrhea, vomiting which is often projectile, a short duration of illness (1--3 days) and a short incubation period. The illness is generally mild, but it can cause severe disease with associated dehydration and electrolyte imbalance that might require hospitalization and aggressive treatment with intravenous fluids. Relapse is uncommon, but recognized, and mortality rates are low, even in hospital outbreaks.

### Epidemiology

**Occurrence:** Noroviruses have a worldwide distribution with multiple antigenic types circulating simultaneously in the same region. Outbreaks have been detected in all age groups and tend to occur in closed populations, such as hospital units, child care centers and on cruise ships. The attack rate is around 50% and the infective dose is as small as 1–10 virus particles.

**Reservoir:** Humans are the natural reservoir for noroviruses and are the source of infection.

**Transmission:** Transmission is by person to person spread by the fecal-oral route but there may be aerosolisation of vomitus, which typically contains abundant infectious virus particles. Common-source outbreaks have been described after ingestion of ice, shellfish, salads, and cookies, usually contaminated by infected food handlers. Exposure to contaminated surfaces has also been implicated in some outbreaks.

**Incubation Period:** The incubation period is usually 24 – 48 hours.

**Period of Communicability:** Excretion lasts 5 – 7 days after the onset of symptoms in 50% of infected people and can be prolonged in immunocompromised hosts.

**Diagnosis:** Collection of stool sample from the first 10 patients for viral studies and the first three patients for bacteriologic analysis is recommended. Once norovirus has been identified in an outbreak, further fecal specimens are not required.

### **Control Measures**

**Management of Case:** Place the case on contact precautions and encourage fluids to maintain hydration. Fluid and electrolyte replacement may be needed in severe cases. Exclusion is recommended for symptomatic individuals who work handling food, or who work with infants, the elderly, the immunocompromised and with institutionalized patients or residents. Advise work restrictions until the case has been symptom free for 48 hours.

**Management of Contacts:** Identify the contacts and provide education regarding the signs and symptoms of infection and preventative measures.

**Management of Outbreaks:** An outbreak management team should be established to address infection prevention and control measures.

### **Preventive Measures**

- Implement measures applicable to diseases transmitted via the fecal-oral route
- Advise strict adherence to hand hygiene measures with an increased educational focus on recommendations as to when and how to wash hands
- Promote enhanced environmental cleaning of frequently touched surfaces
- Review the preparation and cooking of shellfish to prevent infection from that source
- Provide fact sheet available at <http://www.health.gov.nl.ca/health/publications/ehp/pdf/Norovirus.pdf>

### **Reporting Requirements and Procedure**

- Physicians and laboratories report notifiable diseases immediately for list A and within 4 days for list B, aggregate weekly for list C to the Regional Medical Officer of Health (RMOH)
- The RMOH office initiates coordinated response including contact tracing as indicated for a specific disease
- The RMOH office reports to the Provincial Public Health through electronic reporting system
- If an outbreak has been identified an outbreak report is completed and sent to Provincial Public Health
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- Provincial Public Health
  - Reports cases to Public Health Agency of Canada
  - Provides analysis and reports to RHAs in the Communicable Disease Report

## Salmonellosis

## List B

### Case Definition

#### **Confirmed case**

Laboratory confirmation of infection with or without clinical illness:

- isolation of *Salmonella* sp. (excluding *Salmonella typhi*) from an appropriate clinical specimen (e.g. sterile site, deep tissue wounds, stool, vomit or urine)

#### **Probable case**

Clinical illness<sup>1</sup> in a person who is epidemiologically linked to a confirmed case

<sup>1</sup>Clinical illness is characterized by headache, diarrhea, abdominal pain, nausea, fever and sometimes vomiting. Asymptomatic infections may occur, and the organism may cause extra-intestinal infections.

### Clinical Presentation

*Salmonella* organisms can cause asymptomatic carriage, gastroenteritis, bacteremia and focal infections such as meningitis and osteomyelitis. The most common illness associated with a *Salmonella* infection is gastroenteritis, in which diarrhea, abdominal cramps, and fever are common manifestations. The site of infection usually is the small intestine but colitis can occur. The illness usually lasts 4 to 7 days and most people recover without treatment. The very young, the elderly and immunosuppressed persons are more at risk for complications.

### Epidemiology

**Occurrence:** Salmonellosis occurs worldwide and it is generally considered as a foodborne disease. There are over 2000 serotypes which cause human diseases but the two most common serotypes recovered in Canada are *Salmonella enteritidis* and *Salmonella typhimurium*. It is estimated that only 1% of clinical cases are reported. From 2000 to 2004 rates of salmonellosis have ranged from 16.0 – 19.6/100,000 in Canada. In Newfoundland Labrador during the same period the rate ranged from 5.4 -10.5/100,000.

**Reservoir:** *Salmonella* species are widely present in nature and reservoirs include domestic and wild animals including poultry, birds, reptiles, livestock, rodents, pets; such as iguanas, tortoises, turtles, dogs and cats; also humans.

**Transmission:** The major vehicle of transmission is food of animal origin, such as poultry, beef, eggs, and dairy products. Other food vehicles (eg., fruits, vegetables, and bakery products) have been implicated in outbreaks, in which the food was contaminated by contact with an infected animal product or human. Other modes of transmission include ingestion of contaminated water; contact with infected reptiles or amphibians and possibly rodents; and exposure to contaminated medications, dyes, and medical instruments.

**Incubation Period:** The incubation period is from 6 to 72 hours, usually 12-36 hours.

**Period of Communicability:** The risk of transmission exists for the duration of fecal excretion of organisms.

**Diagnosis:** Diagnosis is based on findings consistent with the above listed case definition.

### **Control Measures**

**Management of Case:** Support care (e.g., fluids and nutrition) is the usual management. Antimicrobial therapy usually is not indicated for patients with either asymptomatic infection or uncomplicated gastroenteritis caused by non-typhoidal *Salmonella* species. Routine precautions are appropriate to prevent transmission in most instances. With diapered or incontinent patients, the addition of contact precautions is recommended. Information should be given to the patient and family on disease transmission and appropriate personal hygiene. Exclusion is recommended for symptomatic individuals who work handling food, or who work with infants, the elderly, the immunocompromised and with institutionalized patients or residents. Advise work restrictions until the case has been symptom free for 48 hours.

**Management of Contacts:** Symptomatic contacts must be referred for investigation. Information should be given on disease transmission and appropriate personal hygiene. Investigation of contacts should include stool cultures of any household contacts who are involved in food handling, direct patient care, or care of young children or elderly people in institutional settings.

**Management of Outbreaks:** An outbreak management team should be established to address infection prevention and control measures.

### **Preventive Measures**

- Education of the public about good sanitation and personal hygiene
- Food establishments should ensure compliance with the Food Premises Regulations available at <http://assembly.nl.ca/Legislation/sr/regulations/rc961022.htm#1>
- Follow the clean, separate, cook and chill rules
  - Clean: wash hands and surfaces often
    - Wash hands before and after handling food and after using the bathroom, changing diapers, and handling pets.
    - Wash utensils, cutting boards, dishes, and countertops after preparing each food item and before you go on to the next item
  - Separate: Don't cross-contaminate
    - Separate raw meat, poultry, and seafood from other foods in the grocery shopping cart and in the refrigerator.
    - Always wash cutting boards, dishes, countertops, and utensils after they come in contact with raw meat, poultry, and seafood.
    - Never place cooked food on a plate that previously held raw meat, poultry, or seafood
  - Cook: Cook to safe temperatures
    - Use a clean food thermometer when measuring the internal temperature of meat, poultry, casseroles, and other foods to make sure they have reached a safe minimum internal temperature
    - Do not eat or drink foods containing raw eggs, or unpasteurized milk
  - Chill: Refrigerate promptly

- Keep food safe at home, refrigerate promptly and properly. Refrigerate or freeze perishables, prepared foods, and leftovers within 2 hours (1 hour if temperatures are above 90 °F)
- Freezers should register 0 °F or below and refrigerators 40 °F or below
- Thaw food in the refrigerator, in cold water, or in the microwave. Foods should not be thawed at room temperature
- Foods thawed in the microwave or in cold water must be cooked to a safe minimum internal temperature before refrigerating
- Marinate foods in the refrigerator
- Divide large amounts of leftovers into shallow containers for quick cooling in the refrigerator
- Don't pack the refrigerator. Cool air must circulate to keep food safe
- Provide a fact sheet available at <http://www.health.gov.nl.ca/health/publications/ehp/pdf/Salmonellosis.pdf>

### **Reporting Requirements and Procedure**

- Physicians and laboratories report notifiable diseases immediately for list A and within 4 days for list B, aggregate weekly for list C to the Regional Medical Officer of Health (RMOH)
- The RMOH office initiates coordinated response including contact tracing as indicated for a specific disease
- The RMOH office reports to the Provincial Public Health through electronic reporting system
- If an outbreak has been identified an outbreak report is completed and sent to Provincial Public Health
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- Provincial Public Health
  - Reports cases to Public Health Agency of Canada
  - Provides analysis and reports to RHAs in the Communicable Disease Report

## Shigellosis

## List B

### Case Definition

#### **Confirmed case**

Laboratory confirmation of infection with or without clinical illness:

- isolation of *Shigella* sp. from an appropriate clinical specimen (e.g. sterile site, deep tissue wounds, stool, vomit or urine)

#### **Probable case**

Clinical illness<sup>1</sup> in a person who is epidemiologically linked to a confirmed case

<sup>1</sup>Clinical illness is characterized by diarrhea, fever, nausea, vomiting cramps and tenesmus. Asymptomatic infections may occur.

### Clinical Presentation

*Shigella* species mainly infect the large intestine causing symptoms which range from loose stools to more severe symptoms with fever, abdominal cramps, tenesmus and mucoid stools with or without blood. Clinical presentations vary with *Shigella* (*S*) species; *S sonnei* infection usually exhibit watery diarrhea; people with *S flexneri*, *S boydii*, and *S dysenteriae* infection typically have bloody diarrhea and severe systemic symptoms.

### Epidemiology

**Occurrence:** *Shigellosis* occurs worldwide, a rate of 1.93 per 100,000 was reported in Canada in 2007. There were no reported cases in NL for 2007.

**Reservoir:** Humans are a significant reservoir for this disease.

**Transmission:** Transmission occurs through the fecal -oral route. Predominated modes of transmission include person-to-person contact, contact with a contaminated inanimate object, ingestion of contaminated food or water, and sexual-contact. Houseflies also can be vectors through physical transport of infected feces. The infective dose is very low; 10 -200 organisms can cause an infection.

**Incubation Period:** The incubation period is typically 2 to 4 days (range 1-7 days).

**Period of Communicability:** Transmission can occur as long as the organism is present in feces usually about 4 weeks from onset of illness.

**Diagnosis:** Diagnosis is based on findings consistent with the above listed case definition.

### Control Measures

**Management of Case:** Support care (e.g., fluids and nutrition) is the usually management. In certain individuals antimicrobial therapy may be used to shorten the duration of illness. Contact precautions are indicated for the duration of illness. Information should be given to the patient and family on disease transmission and appropriate personal hygiene. Exclusion is recommended for symptomatic individuals who work handling food, or who provide child or

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patient care until 2 successive fecal samples or rectal swabs are found to be negative.

**Management of Contacts:** Symptomatic contacts in child care facilities and in the household of the case should have stool specimens submitted for testing. Information should be given on disease transmission and appropriate personal hygiene.

**Management of Outbreaks:** An outbreak management team should be established to address infection prevention and control measures.

### **Preventive Measures**

General control measures include:

- Strict attention to hand hygiene and personal hygiene
- Proper cooking and storage of food
- People with diarrhea should not use recreational water venues (eg., swimming pools, lakes, rivers, the ocean) for 2 weeks after symptoms resolve
- Breastfeeding provides protection for infants
- Protect, purify and chlorinate public water supplies
- Control flies
- Provide fact sheet available at <http://www.inspection.gc.ca/english/fssa/concen/cause/shige.shtml>

### **Reporting Requirements and Procedure**

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## Typhoid and Paratyphoid Fever

## List A

### Case Definition

#### **Confirmed case**

Clinical illness<sup>1</sup> with laboratory confirmation of infection:

- isolation of *Salmonella typhi* from an appropriate clinical specimen

<sup>1</sup>Typhoid is characterized by insidious onset of sustained fever, headache, malaise, anorexia, splenomegaly, constipation or diarrhea, and nonproductive cough. Relative bradycardia and rose spots (less than 25% of individuals) may be seen. Atypical presentations occur and severity of illness varies.

### Clinical Presentation

Both typhoid and paratyphoid fever are systemic bacterial diseases with symptoms that can vary from mild illness to severe clinical disease. They have an insidious onset of fever, severe headaches, malaise, anorexia, splenomegaly and chills. Diarrhea is uncommon and vomiting is not usually severe. The fatality rate for typhoid can be high without therapy. In paratyphoid the clinical illness is similar but is less severe and the case fatality is lower.

### Epidemiology

**Occurrence:** Both diseases occur worldwide. They are endemic in many developing countries particularly Africa, Central and South America, and India. The incidence is extremely low in developed countries such as Canada. The risk to Canadians is during travel to endemic areas. An average of 139 cases of typhoid and 108 cases paratyphoid were reported in Canada annually between 2004 and 2006. There have been no cases reported in Newfoundland Labrador since 1991.

**Reservoir:** The reservoir for typhoid and paratyphoid fever is man; and rarely, domestic animals for paratyphoid fever.

**Transmission:** Typhoid and paratyphoid transmission occurs when food or water becomes contaminated with the feces and urine of infected individuals and carriers. Transmission can also take place if raw sewage contaminates seafood such as shellfish. The infection is rarely spread by casual contact.

**Incubation Period:** For typhoid, the incubation period is from 3 days to 60 days (usual range is 8-14 days) and depends on the size of the infecting dose and host factors. The incubation for paratyphoid fever period is 1-10 days.

**Period of Communicability:** The contagious period is most commonly from one week until the individual is recovered.

**Diagnosis:** The diagnosis is based on findings consistent with the above listed case definition.

### Control Measures

**Management of Case:** Supportive care and antibiotics are recommended. Information on the disease and infection prevention measures must be given to the patient and family. Contact precautions are required for children with infection. Consider contact precautions for incontinent adults if the stool cannot be contained or for adults with poor hygiene who contaminate their environment. Exclusion from work is recommended for healthcare workers, child care staff, and food handlers until three consecutive stool specimens are reported as negative. The specimens must be taken not earlier than one month after onset of illness, at least 48 hours after

completion of antimicrobial therapy, and not less than 24 hours apart.

**Management of Contacts:** All members of a travel group in which a case has been identified should be followed. Symptomatic contacts must be referred for medical evaluation. Information on the disease and infection prevention measures must be given to contacts.

**Management of Outbreaks:** An outbreak management team should be established to address infection prevention and control measures.

### **Preventive Measures**

Prevention is based on access to safe water and proper sanitation as well as adherence to safe food handling practices.

The greatest risk for Canadians is when they travel to areas where this disease is endemic.

- Advise to travelers
  - Visit a travel clinic 4 – 6 weeks prior to traveling
  - Emphasize the importance of hand hygiene
  - Vaccine information
    - There are two vaccines for typhoid licensed in Canada
    - Vaccinate against typhoid if planning to visit rural areas in countries where typhoid is endemic or if they plan long term visits
    - Vaccines only provide 50 – 60% coverage
  - Provide food and water precautions recommendations
    - Eat food served hot
    - Eat fruits and vegetables that have been cooked or peeled
    - Avoid road side food vendors
    - Drink bottled or boiled water
- Provide fact sheet available at:  
<http://www.phac-aspc.gc.ca/tmp-pmv/travel/typhoi-eng.php> and  
<http://www.phac-aspc.gc.ca/msds-ftss/msds133e-eng.php>

### **Reporting Requirements and Procedure**

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- Provincial Public Health
  - Reports cases to Public Health Agency of Canada
  - Provides analysis and reports to RHAs in the Communicable Disease Report

## Verotoxigenic *Escherichia coli*

## List A

### Case Definition

#### **Confirmed case**

Laboratory confirmation of infection with or without clinical illness :

- isolation of verotoxin producing *E. coli* from an appropriate clinical specimen (e.g. feces, urine, blood)

OR

- detection of verotoxin antigen or nucleic acid

#### **Probable case**

Clinical illness<sup>1</sup> in a person who is epidemiologically linked to a confirmed case, which would include persons with hemolytic uremic syndrome (HUS)

<sup>1</sup>Clinical illness is characterized by diarrhea (often bloody) and abdominal cramps; fever is often absent. Illness may be complicated by hemolytic uremic syndrome (HUS), thrombocytopenic purpura (TTP) or pulmonary edema. Asymptomatic infections may also occur and the microorganism may cause extra-intestinal infections.

### Clinical Presentation

*Escherichia coli* have more than 30 serotypes which produce verotoxin causing food-borne illness. The best known of these is *E coli* O157:H7, a gram-negative bacterium. The illness is characterized by severe abdominal pain and diarrhea (usually bloody). There is little or no fever. Severe symptoms occur in 8% of patients and can result in hemolytic uremic syndrome (HUS), a simultaneous triad of hemolytic anemia, thrombocytopenia and acute renal failure requiring dialysis in 50% of cases.

### Epidemiology

**Occurrence:** First identified in Canada in 1982, the organism has been associated with outbreaks in North America and Europe. The incidence rate for Canada has been relatively consistent for 2001-2004 at 3-4/100,000 population. In Newfoundland Labrador the rate has ranged from 0.18 to 1.75/100,000 during the period 1997– 2004.

**Reservoir:** Cattle are the most important reservoir; humans may also serve as a reservoir for person-to-person transmission.

**Transmission:** Transmission is primarily through the ingestion of contaminated food or water. Outbreaks have been associated with various food sources: beef (inadequately cooked ground beef), produce (including melons, lettuce, coleslaw, apple cider, alfalfa sprouts), and unpasteurized dairy milk. Human-to-human transmission can occur in families, child care centers and custodial institutions. Waterborne transmission occurs both from contaminated drinking water and contaminated recreational waters.

**Incubation Period:** The incubation period is from 2 – 10 days, with a mean of 3-4 days.

**Period of Communicability:** Usually one week, but may be up to 3 weeks in one third of children.

**Diagnosis:** Clinical signs and symptoms must be confirmed by laboratory findings.

### Control Measures

**Management of Case:** Dehydration and electrolyte abnormalities should be prevented

if possible or corrected quickly. Illness is usually self-limiting, lasting one to five days. Antibiotic therapy has not been shown to decrease morbidity or reduce complications. During acute illness contact precautions are recommended. For patients with HUS, contact precautions should continue until diarrhea resolves and results of two consecutive stool cultures are negative for *E coli* O157. Exclusion is recommended for symptomatic individuals who work: handling food, with infants, the elderly, and the immuno-compromised and with patients or residents. Children should not return to day care or school until symptoms resolve and two successive negative stools have been reported.

**Management of Contacts:** Symptomatic contacts should be treated as cases. Cultures must be submitted to establish the diagnosis. Education must be provided to all contacts on the preventative measures.

**Management of Outbreaks:** An outbreak management team (OMT) should be established to address infection prevention and control measures

### **Preventive Measures**

- Prompt involvement of community health is essential
- Search intensively for the specific vehicle (food or water) of disease transmission if:
  - foodborne outbreaks, a food recall may be necessary
  - waterborne outbreak is suspected, an order to boil water is indicated
  - swimming-associated outbreak is suspected, the pool or beaches affected must be closed
  - drinking unpasteurized milk, pasteurization or boiling of the milk is recommended
- Education of case/s and contacts on the importance of hygienic measures
  - Handwashing is the single most important way to prevent infection
- Follow the Canadian Food Inspection Agency's 4 point plan for food safety
  - Clean start – Clean your hands before and after handling food, clean your countertop and utensils before and after preparing foods, wash fruits and vegetables with water before you prepare and eat them
  - Chill your food – keep cold food at or below 4 °C
  - Cross-contamination is to be avoided – Separate raw meats from cooked meats; platters, utensils and cutting boards for raw meats must not be used for cooked meats; and separate raw foods from ready-to-eat foods while shopping, storing or preparing foods
  - Cook safely – Cook meat to a safe internal temperature; use a food thermometer – hamburgers can turn brown inside before they have been cooked safely; consult a safe cooking temperature chart for meats
- Ensure that slaughterhouse operations meet recommended standards
- Wash hands after contact with farm animals or the farm environment
- Pasteurize milk and dairy products
- Protect, purify and chlorinate public water supplies including swimming pools
- Fact sheet available at <http://www.health.gov.nl.ca/health/publications/ehp/pdf/Hamburger%20Disease.pdf>

### **Reporting Requirements and Procedure**

- Physicians and laboratories report notifiable diseases immediately for list A and within 4 days for list B, aggregate weekly for list C to the Regional Medical Officer of Health (RMOH)
- The RMOH office initiates coordinated response including contact tracing as indicated for a specific disease

- The RMOH office reports to the Provincial Public Health through electronic reporting system
- If an outbreak has been identified an outbreak report is completed and sent to Provincial Public Health
- The RMOH office will notify local health professionals and others within the community who require disease information
- Provincial Public Health
  - Reports cases to Public Health Agency of Canada
  - Provides analysis and reports to RHAs in the Communicable Disease Report

**APPENDIX A: Foodborne/Waterborne Illness Investigation  
Form C-Clinical Data, Food History & Common Sources Report Form**

**SECTION 1: CLINICAL DATA (Complete for all cases)**

<b>Reported By:</b>	<b>Date Reported:</b>	<b>Client's Phone Number: Work:</b>	<b>Home:</b>
<b>Client Name:</b>	<b>Age</b>	<b>MCP #</b>	
<b>Home Address:</b>	<b>Female</b> <input type="checkbox"/> <b>Male</b> <input type="checkbox"/>	<b>Next of Kin:</b>	

<b>Disease Name, if Known:</b> _____	<b>Date specimen collected:</b> <i>(month/day/year)</i> <b>Type of specimen obtained:</b>
<b>Laboratory Confirmed:</b> <input type="checkbox"/> Yes <input type="checkbox"/> No <b>If yes, Date lab confirmed:</b> _____	
<b>Hospital Lab</b> <input type="checkbox"/> <b>Public Health Lab</b> <input type="checkbox"/> <b>Other</b> <input type="checkbox"/> <b>(Please identify)</b> _____	

<b>Attending Physician Consulted:</b>	<b>Address:</b>	<b>Tel:</b>
<b>Family Physician :</b>	<b>Address:</b>	<b>Tel:</b>

<b>Case Ill:</b> <input type="checkbox"/> Yes <input type="checkbox"/> No	<b>Hospitalized:</b> <input type="checkbox"/> Yes <input type="checkbox"/> No <b>If yes, Dates:</b>
<b>Case Notified of Illness:</b> <input type="checkbox"/> Yes <input type="checkbox"/> No	<b>Hospital:</b>

<b>Occupation:</b> (Identify if case is a food handler, child care, adult care or health care worker)	<b>Place of Work:</b>
<b>Date of Onset of Symptoms:</b> <i>(month/day/year)</i>	<b>Duration of Illness:</b> <input type="checkbox"/> Ongoing <i>(days)</i>
<b>Time of Onset of Symptoms:</b> <i>(include A.M. or P.M.)</i>	<b>Incubation Period:</b> <input type="checkbox"/> Unknown <i>(hours)</i>

<b>Medications Prescribed for Illness:</b> <input type="checkbox"/> Yes <input type="checkbox"/> No	<b>Type:</b>	<b>Amount</b>	<b>Date Started:</b> <i>(mm/dd/yy)</i>	<b>Duration:</b> <i>(Days)</i>
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<b>Known Allergies:</b>	<b>Special Dietary Habits, etc.:</b>	<b>Medication/Vaccine Prior to Illness:</b>
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**Signs and Symptoms:** *(check appropriate signs and symptoms and circle those that occur first)*

<b>Intoxication</b>	<b>Enteric Infections</b>	<b>Generalized Infections</b>	<b>Localized Infections</b>	<b>Neurological Illnesses</b>
nausea	abdominal cramps	lack of appetite	ear	blurred vision
vomiting	diarrhea	headache	eye	dizziness
bloating	bloody <input type="checkbox"/> mucoid <input type="checkbox"/> greasy <input type="checkbox"/>	muscular aching	itching	numbness

	dehydration				perspiration		mouth		tingling
	weight loss		chills		malaise		rash		difficulty swallowing
	fever		weakness		skin lesion				difficulty breathing
			constipation		other:		describe		other:

**EHO Comment:** Any Attempted call(s) or visit(s)?  yes  no If yes, please list date(s) & time(s)

**SECTION 2: OPEN-ENDED FOOD HISTORY**

**Instructions:** Please note that the detailed length of the food history will depend upon the maximum incubation period of the infectious agent. If infectious agent is unknown, please complete a 3 day food history. If you are unable to obtain at least 50 % or more of the meals for the required length of the food history then Section 3 must be completed

**Please try to remember what you may have eaten in the days before you started feeling sick. We'll start with the day you got sick and work backwards.** (If a meal was eaten out, specify where.)

**DAY OF ILLNESS- Date:** \_\_\_\_\_

<p><b>Breakfast</b> Place _____ Hour: _____ Items Consumed:  <input type="checkbox"/> Unable to Recall</p>	<p><b>Lunch</b> Place _____ Hour: _____ Items Consumed:  <input type="checkbox"/> Unable to Recall</p>	<p><b>Dinner</b> Place _____ Hour: _____ Items Consumed:  <input type="checkbox"/> Unable to Recall</p>	<p><b>Snacks/Water Ingested</b> Place _____ Hour: _____ Items Consumed:  <input type="checkbox"/> Unable to Recall</p>
Companions at Meal (Ill & Well)	Companions at Meal (Ill & Well)	Companions at Meal (Ill & Well)	
Comments:			

**DAY BEFORE ILLNESS- Date:** \_\_\_\_\_

<p><b>Breakfast</b> Place _____ Hour: _____ Items Consumed:  <input type="checkbox"/> Unable to Recall</p>	<p><b>Lunch</b> Place _____ Hour: _____ Items Consumed:  <input type="checkbox"/> Unable to Recall</p>	<p><b>Dinner</b> Place _____ Hour: _____ Items Consumed:  <input type="checkbox"/> Unable to Recall</p>	<p><b>Snacks/Water Ingested</b> Place _____ Hour: _____ Items Consumed:  <input type="checkbox"/> Unable to Recall</p>
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Companions at Meal (Ill & Well)	Companions at Meal (Ill & Well)	Companions at Meal (Ill & Well)	
Comments:			

**Instructions:** Please photocopy this page if the detailed length of the required food history is greater than three days before illness

**\_\_\_\_\_ DAYS BEFORE ILLNESS- Date: \_\_\_\_\_**

<b>Breakfast</b> Place _____ Hour: _____ Items Consumed:  <input type="checkbox"/> Unable to Recall	<b>Lunch</b> Place _____ Hour: _____ Items Consumed:  <input type="checkbox"/> Unable to Recall	<b>Dinner</b> Place _____ Hour: _____ Items Consumed:  <input type="checkbox"/> Unable to Recall	<b>Snacks/Water Ingested</b> Place _____ Hour: _____ Items Consumed:  <input type="checkbox"/> Unable to Recall
Companions at Meal (Ill & Well)	Companions at Meal (Ill & Well)	Companions at Meal (Ill & Well)	
Comments:			

**\_\_\_\_\_ DAYS BEFORE ILLNESS- Date: \_\_\_\_\_**

<b>Breakfast</b> Place _____ Hour: _____ Items Consumed:  <input type="checkbox"/> Unable to Recall	<b>Lunch</b> Place _____ Hour: _____ Items Consumed:  <input type="checkbox"/> Unable to Recall	<b>Dinner</b> Place _____ Hour: _____ Items Consumed:  <input type="checkbox"/> Unable to Recall	<b>Snacks/Water Ingested</b> Place _____ Hour: _____ Items Consumed:  <input type="checkbox"/> Unable to Recall
Companions at Meal (Ill & Well)	Companions at Meal (Ill & Well)	Companions at Meal (Ill & Well)	
Comments:			

**SECTION 3: SPECIFIC FOOD ITEMS**

**Instructions:** Please complete this section, if you are unable to obtain a satisfactory detailed food history from Section 2 or directed by the Regional Medical Officer of Health. Please note that a satisfactory detailed food history is defined as obtaining information from at least 50 % or more of the meals for the required length of the food history

***Now, I'd like to ask about specific food items. Did you eat any of the following during the week before your illness?***

**Comments (variety/brand, how prepared, where bought/eaten, etc.)  
dk/ns (don't know/not specified)**

**Dairy Products**

- Milk, unpast  yes  no  dk/ns \_\_\_\_\_
- Icecream, unpast  yes  no  dk/ns \_\_\_\_\_
- Yogurt, unpast  yes  no  dk/ns \_\_\_\_\_
- Cheese, unpast  yes  no  dk/ns \_\_\_\_\_
- Soft cheeses  yes  no  dk/ns \_\_\_\_\_
- brie  yes  no  dk/ns \_\_\_\_\_
- queso fresco  yes  no  dk/ns \_\_\_\_\_
- cream  yes  no  dk/ns \_\_\_\_\_
- feta  yes  no  dk/ns \_\_\_\_\_
- mozzarella  yes  no  dk/ns \_\_\_\_\_
- ricotta  yes  no  dk/ns \_\_\_\_\_
- other (soft)  yes  no  dk/ns specify \_\_\_\_\_
- Other cheeses  yes  no  dk/ns specify \_\_\_\_\_

**Fish, Poultry, and Meats Comments (variety/brand, how prepared, where bought/eaten, etc.)**

- Fish  yes  no  dk/ns \_\_\_\_\_  
(shrimp, lobster, clams, etc., specify) \_\_\_\_\_
- Chicken  yes  no  dk/ns \_\_\_\_\_
- Turkey  yes  no  dk/ns \_\_\_\_\_
- Pork  yes  no  dk/ns \_\_\_\_\_
- Veal  yes  no  dk/ns \_\_\_\_\_
- Lamb  yes  no  dk/ns \_\_\_\_\_
- Moose  yes  no  dk/ns \_\_\_\_\_
- Caribou  yes  no  dk/ns \_\_\_\_\_
- Rabbit  yes  no  dk/ns \_\_\_\_\_
- Other Venison  yes  no  dk/ns specify \_\_\_\_\_
- Sausage  yes  no  dk/ns \_\_\_\_\_
- Hot dog  yes  no  dk/ns \_\_\_\_\_
- Beef jerky  yes  no  dk/ns \_\_\_\_\_
- Dried salami  yes  no  dk/ns \_\_\_\_\_
- Steak  yes  no  dk/ns \_\_\_\_\_
- Roast beef  yes  no  dk/ns \_\_\_\_\_
- Other beef  yes  no  dk/ns specify \_\_\_\_\_

**Ground Meats**

- Ground Beef**  yes  no  dk/ns
- If yes, was item eaten at home or out?  at home  out, where \_\_\_\_\_  
 both
- How was the item cooked?  rare (red in middle)  medium (pink in middle)  
 well done (no pink)
- For item eaten in the home, was it made from (*also ask where item was purchased from,, % fat, etc*):
- Fresh (never frozen) raw food item  yes  no  dk/ns \_\_\_\_\_
- Previously frozen raw food item  yes  no  dk/ns \_\_\_\_\_
- Pre-made uncooked patties  yes  no  dk/ns \_\_\_\_\_
- Pre-made, pre-cooked patties  yes  no  dk/ns \_\_\_\_\_
- Other ground item such as in a taco, meatloaf, etc.  yes  no  dk/ns \_\_\_\_\_
- If yes, specify dish \_\_\_\_\_, eaten at home or out, where \_\_\_\_\_

- Ground Chicken/Turkey**  yes  no  dk/ns If yes, was item eaten at home or out?  at home  out, where \_\_\_\_\_  both

How was the item cooked?  rare (red in middle)  medium (pink in middle)  
 well done (no pink)

For item eaten in the home, was it made from (*also ask where item was purchased from, % fat, etc*):

- Fresh (never frozen) raw food item  yes  no  dk/ns \_\_\_\_\_
- Previously frozen raw food item  yes  no  dk/ns \_\_\_\_\_
- Pre-made uncooked patties  yes  no  dk/ns \_\_\_\_\_
- Pre-made, pre-cooked patties  yes  no  dk/ns \_\_\_\_\_

Other ground items such as in a taco, meatloaf, etc.  yes  no  dk/ns \_\_\_\_\_  
 If yes, specify dish \_\_\_\_\_, eaten at home or out, where \_\_\_\_\_

**Ground Pork**  yes  no  dk/ns

If yes, was item eaten at home or out?  at home  out, where \_\_\_\_\_  
 both

How was the item cooked?  rare (red in middle)  medium (pink in middle)  well done (no pink)

For item eaten in the home, was it made from (*also ask where item was purchased from,, % fat, etc*):

- Fresh (never frozen) raw food item  yes  no  dk/ns \_\_\_\_\_
- Previously frozen raw food item  yes  no  dk/ns \_\_\_\_\_
- Pre-made uncooked patties  yes  no  dk/ns \_\_\_\_\_
- Pre-made, pre-cooked patties  yes  no  dk/ns \_\_\_\_\_

Other ground items such as in a taco, meatloaf, etc.  yes  no  dk/ns \_\_\_\_\_  
 If yes, specify dish \_\_\_\_\_, eaten at home or out, where \_\_\_\_\_

**Other Ground Meats**  yes  no  dk/ns *If yes, please specify type* If yes, was

item eaten at home or out?  at home  out, where \_\_\_\_\_  both

How was the item cooked?  rare (red in middle)  medium (pink in middle)  
 well done (no pink)

For item eaten in the home, was it made from (*also ask where item was purchased from,, % fat, etc*):

- Fresh (never frozen) raw food item  yes  no  dk/ns \_\_\_\_\_
- Previously frozen raw food item  yes  no  dk/ns \_\_\_\_\_
- Pre-made uncooked patties  yes  no  dk/ns \_\_\_\_\_
- Pre-made, pre-cooked patties  yes  no  dk/ns \_\_\_\_\_

Other ground item such as in a taco, meatloaf, etc.  yes  no  dk/ns \_\_\_\_\_  
 If yes, specify dish \_\_\_\_\_, eaten at home or out, where \_\_\_\_\_

**Salads and Vegetables** *Comments (variety/brand, how prepared where bought/eaten, etc.)*

Cole slaw  yes  no  dk/ns \_\_\_\_\_

Pasta salad  yes  no  dk/ns \_\_\_\_\_

Potato salad  yes  no  dk/ns \_\_\_\_\_

Pre-packaged/Pre-bagged salad or lettuce  
*specify type/brand*  yes  no  dk/ns \_\_\_\_\_

Lettuce  yes  no  dk/ns \_\_\_\_\_  
*(loose leaf, whole heads, not bagged)*

- Iceberg  yes  no  dk/ns \_\_\_\_\_
- Green leaf  yes  no  dk/ns \_\_\_\_\_
- Red leaf  yes  no  dk/ns \_\_\_\_\_
- Romaine  yes  no  dk/ns \_\_\_\_\_
- Mesclun  yes  no  dk/ns \_\_\_\_\_
- Other  yes  no  dk/ns *specify type* \_\_\_\_\_

Alfalfa sprouts  yes  no  dk/ns \_\_\_\_\_

Bean sprouts  yes  no  dk/ns \_\_\_\_\_

- Other sprouts       yes    no    dk/ns *specify type* \_\_\_\_\_
- Carrots             yes    no    dk/ns *specify type (large, baby)* \_\_\_\_\_
- Cabbage            yes    no    dk/ns \_\_\_\_\_
- Celery              yes    no    dk/ns \_\_\_\_\_
- Spinach             yes    no    dk/ns \_\_\_\_\_
- Tomatoes          yes    no    dk/ns *specify type (large, plum, cherry)* \_\_\_\_\_
- Onions              yes    no    dk/ns \_\_\_\_\_
- Radishes           yes    no    dk/ns \_\_\_\_\_
- Green onions      yes    no    dk/ns \_\_\_\_\_
- Parsley             yes    no    dk/ns \_\_\_\_\_
- Cilantro            yes    no    dk/ns \_\_\_\_\_
- Basil                yes    no    dk/ns \_\_\_\_\_

**Fresh Fruits      Comments (variety/brand, how prepared where bought/eaten, etc.)**

- Watermelon        yes    no    dk/ns whole or precut? \_\_\_\_\_
- Cantaloupe        yes    no    dk/ns whole or precut? \_\_\_\_\_
- Honeydew melon  yes    no    dk/ns whole or precut? \_\_\_\_\_
- Apples             yes    no    dk/ns \_\_\_\_\_
- Grapes             yes    no    dk/ns red or green? \_\_\_\_\_
- Strawberries      yes    no    dk/ns \_\_\_\_\_
- Kiwi                yes    no    dk/ns \_\_\_\_\_
- Mango             yes    no    dk/ns \_\_\_\_\_
- Pineapple          yes    no    dk/ns \_\_\_\_\_
- Avocado           yes    no    dk/ns \_\_\_\_\_

**Unpasteurized Juices      Comments (variety/brand, where bought/eaten, etc.)**

- Apple juice/cider    yes    no    dk/ns \_\_\_\_\_
- Orange juice         yes    no    dk/ns \_\_\_\_\_
- Smoothie             yes    no    dk/ns *specify type/ingredients* \_\_\_\_\_
- Other juices          yes    no    dk/ns *specify type/ingredients* \_\_\_\_\_

**Cross Contamination/Handling Potential**

*INDIRECT EXPOSURE TO GROUND MEAT IN THE HOME SETTING*

*If client answered no to eating some type of ground meat, ask the following.*

**Was there any ground meat in your refrigerator (not freezer) in the 7 days before your illness?**

yes       no       dk/ns If yes, where was meat stored in the refrigerator?

\_\_\_\_\_

**Did you or someone in your household prepare a meal for others that contained ground meat?**    yes       no       dk/ns \_\_\_\_\_

**Did you handle any raw meat/fish at home or anywhere else in the 7 days before your illness?**    yes    no       dk/ns If yes, what kind of meat(s)/fish was it?

\_\_\_\_\_

**SECTION 4: RESTAURANTS, GROCERY STORES, EVENTS (Complete for all cases)**

*Now, I would like to ask you about events in the week before your illness.*

**Did you eat out at any restaurants (including take-outs, street vendors, home delivery meals) during the week before your illness?**    yes    no    don't know/not specified (dk/ns)

Name \_\_\_\_\_ Date \_\_\_\_\_ Time: \_\_\_\_\_

Location \_\_\_\_\_

Foods eaten: \_\_\_\_\_

Name \_\_\_\_\_ Date \_\_\_\_\_ Time: \_\_\_\_\_

Location \_\_\_\_\_

Foods eaten: \_\_\_\_\_

Name \_\_\_\_\_ Date \_\_\_\_\_ Time: \_\_\_\_\_

Location \_\_\_\_\_

Foods eaten: \_\_\_\_\_

Name \_\_\_\_\_ Date \_\_\_\_\_ Time: \_\_\_\_\_

Location \_\_\_\_\_

Foods eaten: \_\_\_\_\_

Name \_\_\_\_\_ Date \_\_\_\_\_ Time: \_\_\_\_\_

Location \_\_\_\_\_

Foods eaten: \_\_\_\_\_

**Where did you purchase groceries that were eaten during the week before your illness (including specialty stores, produce/fruit stands, dairy marts, butcher shop, etc.)?**

Name \_\_\_\_\_ Location \_\_\_\_\_

Name \_\_\_\_\_ Location \_\_\_\_\_

Name \_\_\_\_\_ Location \_\_\_\_\_

Name \_\_\_\_\_ Location \_\_\_\_\_

**Did you attend any large gatherings (parties, festivals, fairs, etc.)?**

yes    no    dk/ns If yes, when \_\_\_\_/\_\_\_\_/\_\_\_\_

Where/type function \_\_\_\_\_

Foods eaten \_\_\_\_\_

### SECTION 5: DRINKING AND RECREATIONAL WATER EXPOSURES (Complete for all cases)

**Where does your household water supply come from?**

Private well  Municipal/city  Other: (*specify*) \_\_\_\_\_

**Is your drinking water treated in any special way (e.g. softened, boiled, filtered)?**

yes  no  dk/ns If yes, *check all that apply*:  Softened  Boiled  
 Filtered, type of filter \_\_\_\_\_

**Do you have a cottage or recreational vehicle?**

yes  no  dk/ns If yes, specify the source of your recreational drinking water? \_\_\_\_\_

**Did you drink any bottled water in the last two weeks before your illness?**

yes  no  dk/ns If yes, what brand? \_\_\_\_\_

**Did you drink any untreated water in the last two weeks before your illness (e.g. water from pond, lake, river)?**

yes  no  dk/ns If yes, where \_\_\_\_\_

**Did you drink any water from roadside springs in the last two weeks before your illness ?**

yes  no  dk/ns If yes, where \_\_\_\_\_

**Did you do any swimming or wading in the last two weeks before your illness?**

yes  no  dk/ns If yes, what type of swimming area was it? (*check all that apply*)

Wading or kiddie pool, where \_\_\_\_\_

Outdoor swimming pool, where \_\_\_\_\_

Indoor swimming pool, where \_\_\_\_\_

Hot tub, jacuzzi or spa, where \_\_\_\_\_

Pond, lake, river or stream, where \_\_\_\_\_

Other (*specify*) \_\_\_\_\_ where \_\_\_\_\_

Did you submerge your head under water?  yes  no  dk/ns

Did you swallow any water?  yes  no  dk/ns

**SECTION 6: TRAVEL (Complete for all cases)**

**Any routine travel (i.e. staying at a cottage) in the last two weeks before your illness?**  yes  no  dk/ns If yes, where? \_\_\_\_\_

When? from \_\_\_\_\_ to \_\_\_\_\_

**Any non routine travel in the last two weeks before your illness?**  yes  no  dk/ns If yes, where? \_\_\_\_\_

When? from \_\_\_\_\_ to \_\_\_\_\_

**If airline travel, what airline?** \_\_\_\_\_

Outgoing flight no. \_\_\_\_\_ Return flight no. \_\_\_\_\_

Foods eaten on plane going there: \_\_\_\_\_ return: \_\_\_\_\_

**If you stayed at a resort, please provide resort name:** \_\_\_\_\_

**If cruise ship, name of ship** \_\_\_\_\_

**Destinations** \_\_\_\_\_

**SECTION 7: FARM AND ANIMAL EXPOSURES (Complete for all cases)**

**Did you visit a farm or petting zoo at which there were animals?**  yes  no  dk/ns

If yes, where \_\_\_\_\_

What kind of animals were there? \_\_\_\_\_

**Did you have direct contact with any farm animals?**  yes  no  dk/ns

If yes, what kind of animal(s)? \_\_\_\_\_

Where \_\_\_\_\_

**Did you do any gardening?**  yes  no  dk/ns

**Did you have contact with animal manure (as might occur during farming or gardening)?**  yes  no  dk/ns If yes, what kind of activity were you involved in?

\_\_\_\_\_

**Did you have contact with household pets (including reptiles)?**

yes  no  dk/ns If yes, what kind of animal(s)

\_\_\_\_\_

Were the animal(s) sick with diarrhea?  yes  no  dk/ns

**SECTION 8: OCCUPATION/DAYCARE, HOUSEHOLD & OTHER CONTACT INFORMATION**

(Complete for all cases)

**If you have children or if case is a child, do your child/children attend daycare?**

yes  no If yes, name of daycare \_\_\_\_\_ Location \_\_\_\_\_

**Did your child/children attend daycare while sick with diarrhea and/or vomiting, etc?**  yes  no If yes, dates attended \_\_\_\_\_

type(s) of symptoms \_\_\_\_\_

**Do your child/children need assistance with toileting?**  yes  no

**Do you have any member of your household who require home care, elder care, etc?**  yes  no If yes, specify the member of your household?  
\_\_\_\_\_

**Can you tell us about other household members, coworkers or/and others contacts who have been ill with a similar illness:**

Name	Relationship	Age	Occupation	Onset & symptoms

**SECTION: EHO COMMENTS, ACTIONS & SIGNATURE (Complete for all cases)**

**Control Measures Discussed:**

**Besides Control Measures Discussed, List any Recommendation(s) made to the Person Interviewed:**

**Comments:**


**Person Interviewed:**

case  someone else, specify name & relationship to case \_\_\_\_\_

**Probable Source of Infection** \_\_\_\_\_  Unkr

<b>Environmental Health Officer (EHO)Signature:</b>	<b>Agency:</b>	<b>Date Comp</b>
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**GUIDANCE INSTRUCTIONS FOR COMPLETION OF FORM C:**

***In order to determine the cause of the enteric infection, it is paramount that the following be met:***

- ***The form must be completed fully and clearly, and returned as soon as possible to the regional health authority***
- ***All details in each appropriate section of this form must be completed. Please note that the form may be sent back for completion by the regional health authority if it is deemed that the information is incomplete***

**SECTION 1: CLINICAL DATA**

- Complete for all cases
- Any attempted call(s) or visit(s) must be recorded with date(s) & time(s) in the EHO Comment Table located on the bottom of page

**SECTION 2: OPEN-ENDED FOOD HISTORY**

- Detailed length of the food history for this section will depend upon the maximum incubation period of the infectious agent. If infectious agent is unknown, please complete a 3 day food history.
- Please photocopy page # 3 if the detailed length of the required food history is greater than three days before illness

**SECTION 3: SPECIFIC FOOD ITEMS**

- Complete this section, if you are unable to obtain a satisfactory detailed food history from Section 2 or directed by the Regional Medical Officer of Health. Please note that a satisfactory detailed food history is defined as obtaining information from at least 50 % or more of the meals for the required length of the food history

**SECTION 4: RESTAURANTS, GROCERY STORES, EVENTS**

- Complete for all cases

**SECTION 5: DRINKING AND RECREATIONAL WATER EXPOSURES**

- Complete for all cases

**SECTION 6: TRAVEL**

- Complete for all cases

**SECTION 7: FARM AND ANIMAL EXPOSURES**

- Complete for all cases

**SECTION 8: OCCUPATION/DAYCARE, HOUSEHOLD & OTHER CONTACT INFORMATION**

- Complete for all cases

**SECTION: EHO COMMENTS, ACTIONS & SIGNATURE**

- Complete for all cases. If interview was completed by an EHO Trainee, the supervising EHO must review & also sign this document.

**For waterborne disease cases such as giardiasis where a food history may not be necessary, the requirements are reduced to the completion of sections 1, 4, 5, 6, 7, 8 & . However, Sections 2 or 3 may need to be completed if it is determined during the interview there is a disease link with food.**