PICNet
PROVINCIAL INFECTION CONTROL
NETWORK OF BRITISH COLUMBIA
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Gastrointestinal Infection Outbreak Guidelines for Healthcare Facilities

Reference Document for use by Health Care Organizations for Internal Policy/Protocol Development

Prepared by:

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Summary of Recommendations

1. A written process for Gastrointestinal Illness (GI) Outbreak Management which includes current membership of the Outbreak Prevention and Management Team (OPMT) with contact information should be available to all health care providers (HCP). This should be reviewed and updated annually. (page 7) *Category C11*

2. During an outbreak of GI infection care givers should wear the following personal protective equipment (PPE) when giving direct care to symptomatic patients/residents/clients:
   a. Gloves – for providing any direct care
   b. Gowns – when contamination of HCPs clothing is possible
   c. Surgical/procedure mask with eye protection/face shield to protect mucus membranes from exposure to viral particles when assisting someone who is actively vomiting, has explosive uncontained diarrhea or when cleaning an area grossly contaminated with vomit or feces. (page 15) *Category B11*

3. Whenever possible, equipment should be dedicated for use only on that patient/resident/client. In the event that equipment must be shared, thorough cleaning and disinfection is required in between patients/residents/clients. (page 16) *Category C1*

4. When isolation cannot be avoided, strategies designed to diminish the negative impact and protect the patient/residents/clients should be implemented. (page 16) *Category B11*

5. Symptomatic patients should be confined to their room and only taken elsewhere for medically necessary procedures until they have been asymptomatic for 48 hours. (page 16) *Category B1*

6. Since confinement of residents/clients, even for a few days, could have adverse effects on their well-being the period of confinement should be kept to a minimum, so as not to socially isolate them. (page 16) *Category A11*

7. Consideration should also be given to decreasing or discontinuing group activities, shared food and outings until the outbreak is resolved. It should be noted that limitation of such activities could be very disruptive to the residents/clients. Limiting activities to restrict movement of residents only between units or floors may be an option. (page 16) *Category C1*

8. Hand hygiene should be encouraged for all patients/residents/clients prior to meals. (page 16) *Category A11*

9. All common touch items should be removed from the shared areas (e.g. salt and pepper shakers, sugar bowls, table cloths). Remove and discard food in refrigerators found in common areas or nourishment areas and clean these appliances. (page 16) *Category C11*

10. HCPs should also avoid sharing meals or leaving food items open in their HCPs room. No food items (e.g. bowl of candy, tray of cookies) should be left open in or near patient/resident/client areas (e.g. nursing station). (page 17) *Category C11*

11. Any HCP who develops symptoms consistent with a GI infection (e.g. vomiting, diarrhea) while at work should be required to leave work immediately. (page 17) *Category B11*

12. Employees should remain off work for at least 48 hours following resolution of symptoms. This may decrease the risk of the individual relapsing while at work. (page 17) *Category B11*

13. Meticulous and consistent hand hygiene, which includes all surfaces of hands, wrists, finger tips and under fingernails, and use of protective barriers, should be re-emphasized for all HCPs upon return to work. (page 17) *Category A11*

14. When possible, it is advisable to have the same HCP caring for those who are ill to limit HCP exposure. Since some individuals acquire short term immunity following illness, HCPs who return to work after becoming ill with GI symptoms should also be assigned to ill patients whenever possible. (page 18) *Category B11*

15. All HCPs should have easy access to the PPE required and be knowledgeable about how to use it. Managers should monitor PPE usage and reinforce the need to apply and remove PPE properly. (page 18) *Category C11*

16. As much as possible, within the limitations of personal privacy issues, HCP illness should be tracked and recorded by Occupational Health or the person responsible for Occupational Health. (page 18) *Category C1*

17. Some HCPs move continually between units/sites as an integral element of their work (e.g. physiotherapists, laboratory technologists, patient porters). It is very important that these individuals are adept and vigilant with the use of PPE and hand hygiene. (page 18) *Category B11*

18. Some HCPs work in more than one unit or site. In these cases it is recommended, that where this is unavoidable, HCPs be vigilant in self-assessment for symptoms and be excused from work immediately should they begin to have symptoms. (page 18) *Category B11*

19. An updated report with new cases of both patient/resident/clients and HCPs should be created by the facility/unit manager or Infection Control Practitioner (ICP) and regularly sent to the Environmental Health Officer (EHO) (or other Public Health representative) if assigned to that site. (page 18) *Category C11*

20. Equipment that is shared between patients/residents/clients should be thoroughly cleaned and disinfected in between each use. (page 19) *Category B11*

21. During an outbreak, visitors and volunteers should be warned that they may be at risk of acquiring infection within the facility, instructed how to wear appropriate PPE and required to perform hand hygiene before and after their visit. Visitors should visit only their own friend/relative in their own room, unless otherwise approved by the HCP. (page 20) *Category C11*

22. Animals or pets should not be in an area where food or drink is prepared or served. Diligent hand hygiene practices are recommended before and after handling any animal, pet or providing any form of food (e.g. treats) to them. It is recommended that reptiles and/or amphibians are not housed or allowed to visit any type of health care facility. (page 21) *Category B1*

23. During an outbreak neither health care providers nor patients/residents/clients should be in contact with pets/animals that are unwell. It may be reasonable to restrict visiting pets or temporarily remove resident pets during a GI Outbreak on consultation with the EHO/Medical Health Officer (MHO) and Facility Administrator. (page 21) *Category B11*

24. It is recommended that the OPMT delegate one person to speak with the media to ensure that messages use consistent wording in the event that media statements are needed. (page 21) *Category C11*

25. Daily updates regarding the extent of the outbreak should be composed by a designated member of the outbreak team and circulated to all departments/services who may be involved (e.g. physiotherapy, other unit managers, physicians). (page 21) *Category C11*

26. External ancillary services such as BC Ambulance, Medigas etc. should be notified as soon as the outbreak is confirmed. Should they be required to attend the facility/unit they would be expected to use the same precautionary levels as the HCPs. (page 21) *Category C11*

27. Information for visitors should begin as soon as an outbreak has been confirmed and include the type of outbreak, restrictions for visiting (e.g. relatives only) and emphasis on hand hygiene before and after visit. (page 21) *Category C11*

28. It is strongly recommended that the OPMT* schedule a debriefing session as soon as feasible following the conclusion of an outbreak. (page 22) *Category C11*

***OPMT**=Outbreak Prevention and Management Team

1.0 Gastrointestinal Infection Outbreak Management

1.1 Introduction

Infections that cause gastrointestinal illness (GI) may be caused by a variety of agents including bacteria, viruses and protozoa. Healthcare associated transmission of GI usually results from contact with infected individuals, from consumption of food, water, or other beverages, or from exposure to contaminated objects or environmental surfaces.[1]

Outbreaks of infectious GI can be devastating and lead to significant increased costs, increased patient morbidity, and in some instances patient mortality. Henson et al.[2] gave the mean estimate of the overall economic burden of infectious GI to be 514 million dollars per year in British Columbia.

The most important characteristic of pathogens responsible for infectious GI is their ability to be rapidly transmitted in healthcare settings among individuals who often are highly susceptible. Episodes of infectious GI account for a significant proportion of all patients/residents/clients in healthcare settings who develop diarrhea with or without nausea and/or vomiting.

1.2 Purpose

This reference document is intended to provide information and guidance for all healthcare facilities when developing or updating their policies and processes that pertain to prevention, surveillance for, identification and control of infectious GI outbreaks. This document was not developed to address an outbreak cause by *Clostridium difficile*, although many of the same principles still apply. Please consult the Toolkit for the Management of *Clostridium difficile* Infection in Acute and Residential Care Settings.[3]

This document will enable policy or protocol development to be more straightforward, timely and require less resources. Effective outbreak management requires a collaborative effort between Public Health, Infection Prevention and Control, Laboratory Services, Workplace Health and Safety, facility Managers and facility health care providers. See **Appendix 1** for a Quick Reference Checklist

1.3 Literature Search Strategy

Electronic searches of Medline, Science Direct, PubMed, Google Scholar and Cinahl (January 2009 -November 2015) were carried out to identify relevant papers. Search terms used were: rotavirus, calicivirus, norovirus, *Salmonella*, *Escherichia coli*, adenovirus, or infections caused by these agents, gastrointestinal diseases, communicable diseases, disease outbreaks, virus shedding, infection control, alcohol, anti-infective agents, immunity after infection, hospital food service, kitchen, cooking utensils, eating utensils, animals and pets. References cited in eligible papers that were considered to be relevant were also obtained.

1.4 Methods

The recommendations made within this guideline are graded based on the level of supporting evidence available, using the Public Health Agency of Canada rating scale for strength and quality of evidence (**Appendix 2**). The grading level assigned does not relate to the importance of the recommendation, but to the strength of the supporting evidence. Spreadsheets were created by the writer organizing new literature into themes and were reviewed by the Guideline Working Group (GWG). Strength of evidence and how it supported recommendations was discussed. For recommendations based on the expert opinion of the GWG members, any differences in opinion were resolved through discussion and consensus. This process was reviewed and approved by the Guidelines Steering Committee.

1.5 Background

Often pathogenic organisms do not cause GI infections because of the protective mechanisms of the GI tract. Under normal circumstances organisms are unable to establish themselves in quantities sufficient enough to cause illness because they are carried straight down the GI tract and excreted with the rest of the intestinal contents. Also, the presence of mucus protects the epithelial cells that line the GI tract, perhaps acting as a mechanical barrier by blocking attachment to the epithelial cells. The mucus also contains IgA antibodies which help protect an individual when their immune system is healthy.[4]

Specific attributes have been developed by some organisms that enable them to overcome the body's natural defenses. These include: [5]

- Specific attachment to intestinal epithelium which enables them to avoid expulsion and establish themselves.
- Motility, which enables them to travel through mucus allowing the pathogen to reach susceptible cells.
- Production of mucinase, an enzyme that assists the transit through any mucus that is present.
- Resistance to stomach acids which allows them to reproduce in large numbers in the stomach and produce infection and shedding from the GI tract.
- Resistance to bile and proteolytic enzymes which allows them to reproduce in large numbers in the GI tract.

When the infecting microorganism penetrates the intestinal epithelium the severity of the illness that it is able to produce depends upon:[4]

- Its ability to multiply in large numbers and spread throughout the GI tract,
- The production of toxins,
- The degree of cell damage it is able to cause and

- The individuals inflammatory and immune responses.

For a table containing the most common agents that cause GI infection outbreaks and their individual characteristics (i.e. incubation period, duration of symptoms) please see **Appendix 3**.

2.0 The Outbreak Prevention and Management Team (OPMT)

Organizational leadership is critical in all health care settings to ensure effective outbreak prevention and control. Ideally, all facilities should have a designated OPMT. This group is responsible for ensuring that measures for preventing outbreaks are in place and for directing and overseeing the management of all aspects of any outbreak. OPMT members should have decision making authority for their discipline within the facility or unit. A lead person from this group should be appointed to coordinate the meeting(s) during an outbreak. The membership of an OPMT will depend upon the facilities location, size and contractual status.

Membership may include:

- A medical advisor (if available)
- Infection control physician (if available)
- Medical Health Officer or delegate
- An administrator
- A Director of Care
- An ICP or person responsible for infection control of that site
- A person responsible for Worksafe Health and Safety/Occupational Health
- An Environmental Health Officer or alternate (e.g. Community Care Facility Licensing Officer)
- A laboratory manager or representative
- A person responsible for support services such as housekeeping and laundry
- A foods services supervisor
- Communications coordinator
- Front line HCP representative (e.g. charge nurse)

A written process for GI Outbreak Management which includes current membership of the OPMT with contact information should be available to all HCPs. This should be reviewed and updated annually. *Category C11*

2.1 Roles and Responsibilities During a Gastrointestinal Infection Outbreak

The BC Public Health Act and Community Care and Assisted Living Act defines the roles and responsibilities of the MHO and EHO in outbreak control. The remaining roles and responsibilities have been recommended by consensus of the GI Outbreak Guidelines Working Group with the understanding that in some Health Authorities or facilities responsibilities may be delegated or shared differently depending upon the type of care provided, resources or physical setting. There is therefore some overlap in the description of roles.

British Columbia Centre for Disease Control (BCCDC) Public Health Laboratory

- Provides advice on sample collection, testing, and timely processing of samples and reporting back to a designated contact person.

Environmental Health Officer (EHO)

- Enforces BC Public Health legislation in regard to disease control and protection of the public. Works with the MHO in conjunction with the facility ICP management and HCPs to ensure that appropriate outbreak control measures will be put into place in preparation for an outbreak. Acts as a consultant and provides support/resources prior to and during an outbreak; communicates/liaises promptly with the MHO and Infection Control when outbreaks are suspected and/or have been declared. Provides expertise in determining the source and means of spread of the agent, especially where food or waterborne spread may be involved.

Facility Administrator/Manager or Director of Care

- Ensures that patients/residents/clients receive care in a safe environment by working collaboratively with ICP/EHO/MHO to ensure that HCPs are familiar with outbreak prevention and control processes and ensures timely implementation of control strategies which may include providing additional resources. Works collaboratively with WH&S to monitor and report HCPs illness.

Infection Control Officer (ICO)

- Usually a physician but may be a senior ICP that is responsible for leading the infection control program in a facility. Provides primary, on site, direction in outbreak pre-planning and control.

Infection Control Professional (ICP)

- Works with the MHO and/or EHO and in conjunction with the facility manager and HCPs to ensure that appropriate outbreak mitigation measures are in place in preparation for an outbreak occurrence. Acts as a consultant and provides support/resources prior to and during an outbreak to ensure control strategies are initiated promptly;

communicates/liaises promptly with Environmental Health and/or the MHO when outbreaks are suspected and/or have been declared.

Local Laboratory/ Medical Microbiologist

- Provides advice on appropriate lab specimens to facilitate diagnostics (in conjunction with BCCDC) and assists in timely transportation of specimens to BCCDC where appropriate. In some cases may perform initial specimen testing.

Media/Public Relations

- With guidance from the MHO and Outbreak Prevention and Management Team develops appropriate public announcements.

Medical Director or Facility Individual Physicians

- Works collaboratively with the Facility Manager and EHO/ICP/MHO to ensure that patients/residents/clients receive care in a safe environment.

Medical Health Officer (MHO)

- Consults with Infection Control, EHO, Occupational Health, Medical Director, Administrators and Nursing HCPs, concerning outbreak declaration, control measures and declares the end of an outbreak. The MHO has legislative authority and responsibility, according to the Public Health Act, to control the outbreak. The MHO may delegate this responsibility. In many situations, jointly developed protocols are in place to guide outbreak detection and management and the Medical Health Officer may not be directly involved with each outbreak. Even if such protocols are in place, the authority of the Medical Health Officer to direct the local response remains in place.

Health Care Provider (HCP: includes all disciplines who provide direct care)

- Work collaboratively with MHO/EHO/ICP and the Facility Managers to ensure best practices are used for the prevention and control of GI Outbreaks. This includes early recognition of clusters of GI infections, diligent use and promotion of hand hygiene, early recognition of possible outbreaks and timely implementation of control strategies.

Support Services

- Assists in outbreak management by ensuring additional resources such as personnel, supplies, enhanced cleaning etc. are available.

Workplace Health and Safety (WH&S)/Occupational Health

- In collaboration with Infection Control or the Facility Manager, monitors and tracks HCPs illness; provides support and education related to sick time and compensation of health care workers.

Note: *A Quick Reference Guide for GI Outbreak Management* is found in **Appendix 2**.

2.2 Action Table

Action	Positions Suggested*
Ensures that GI Outbreak prevention measures are in place such as Routine Practices, identifies suspected outbreaks and communicates promptly with appropriate resources when an outbreak is suspected	Unit Manager, Facility Administrator, HCP
Confirms that cases meet case definition for GI Outbreak. Declares the outbreak and verify nature and extent. Forms an hypothesis as to the source and mode of transmission	EHO, ICP, MHO, Medical Microbiologist, ICO, Facility Administrator, Unit Manager
Reports Outbreak to MHO and other appropriate external agencies. Notifies any facility that admitted a patient/resident/client from the outbreak area within the past 72 hours	EHO, ICO, BCCDC, ICP, CD unit of Public Health
Implements control strategies	ICP, EHO, Unit Manager, Charge Nurse, HCP, OPMT
Provides media with information which can be used for public announcements	MHO, Medical Microbiologist, Facility Administrator, Infection Control Officer, Media spokesperson from OPMT, Communications Coordinator
Provides advice on activity restrictions, admission, and transfer limitations	MHO, EHO, ICP, Facility Care Manager, Charge Nurse
Coordinates on-going surveillance during outbreak	EHO, ICP, Unit Manager, Charge Nurse
Maintains a registry of patients/residents/clients who meet the case definition	ICP, Site Manager, HCP, Charge Nurse
Ensures enough supplies (e.g. gloves, gowns) for HCP to give safe care	Unit Manager, Support Services Managers
Mobilizes Outbreak Prevention and Management Team	ICP, EHO, Facility Administrator, Unit Manager
Coordinates, collects and sends appropriate specimens	Unit Manager, HCP, Laboratory, ICP, WH&S (for staff), EHO, Medical Microbiologist, Dietary Manager (if food borne suspected)
Ensures communication with allied health care providers (e.g. physiotherapy, respiratory therapy)	ICP, EHO, Unit/Site Manager, Charge Nurse
Maintains list of HCPs who have been ill	WH&S, Unit/Site Manager, ICP, EHO

Action	Positions Suggested*
Educates patients/residents/clients, visitors, volunteers on hand hygiene and promotes control strategies	ICP, EHO, Unit Manager, HCP, Charge Nurse
Completes a report of Outbreak for Internal reporting	ICP, EHO, Unit Manager, ICO

* *Often taken on in combination of several positions and may vary depending upon the specific setting.*

3.0 Identifying an Outbreak

3.1 Case Definition

A case of GI infection is defined as any one of the following conditions that **cannot be attributed to another cause** (e.g. laxative use, medication side effect, diet, prior medical condition):

- Two or more episodes of diarrhea in a 24 hour period – above what is considered normal for that individual

  OR
- Two or more episodes of vomiting in a 24 hour period

  OR
- One episode each of vomiting and diarrhea in a 24 hour period

  OR
- Positive culture for a known enteric pathogen with a symptom of GI infection (e.g. vomiting, abdominal pain, diarrhea)

  OR
- One episode of bloody diarrhea

3.2 Potential Outbreak/Alert Stage

When one or two suspect cases of GI infection occur within a 4-day period, it is recommended that the facility:

- Segregate patients/residents/clients with GI illness and continue to use Routine Practices plus Contact Precautions when providing direct care.
- Ensure implementation of thorough hand hygiene and Routine Practices for asymptomatic individuals throughout entire unit/site. While symptomatic cases are much more likely to transmit the illness, it is possible for asymptomatic cases to contribute to an outbreak.
- Increase monitoring and recording of GI symptoms on remainder of patients/residents/clients.
- Record self-reported GI symptoms among HCP.

The purpose of taking action at this time is to prevent an outbreak from occurring.

3.3 Outbreak Definition

Three or more cases of GI infection, potentially related, occurring within a four day period, within a specific geographic area (i.e. unit, ward).

4.0 Reporting and Notification

According to the Public Health Act all GI outbreaks in health care facilities must be reported to the MHO and/or designated Public Health contact (i.e. EHO, CD team). The facility Manager/Director of Care or Infection Control Professional should also notify the Infection Control Officer and mobilize the Outbreak Prevention and Management Team. An example of an initial Outbreak Report Form is in **Appendix 4**.

5.0 Identifying the Source(s)

Although it is often not initially clear what the source of the outbreak may be, it is important to think about this from the beginning. The type of specimens to collect and send may depend upon the suspected source (e.g. food borne versus viral pathogen). To determine the source one must understand the possible common sources, potential modes of transmission, usual reservoirs, incubation periods and the microbiological traits of the pathogen of concern. This information will enable one to formulate a hypothesis on the type of organism, index case or source, initiate the appropriate observation strategy and ensure the correct specimens are collected. [6] The ability to identify the source will also provide information that will be helpful in bringing the outbreak to an end. The Medical Health Officer, Environmental Health Officer or BCCDC Public Health Laboratory will provide consultation for this process.

A common-source GI infection outbreak occurs from exposure to a pathogen in food or water. This can result from a single exposure to the agent or from repeated exposures. Usually, common-vehicle outbreaks are characterized by explosiveness of onset and limitation or localization in time, place and people. A typical example of this is a single source of exposure such as a pathogen from a food item.[7] If a large number of people become ill within a very short time period and within a limited location, one should consider a “common source” such as food or water.

A propagated source occurs when there is successive transfer from person to person.[7] These situations may begin as a few cases and each day bring a few more cases as the first ones recover. This usually occurs when someone introduces the infectious agent into the facility making one or two people ill, who in turn infect others, and so on.

Questions that should be considered are:

- Who were the first individuals to become ill?
- What was the timing between each case? Did they all become ill within a short period of time (minutes to a few hours) or was there a longer period of time between each case?
- Was there an activity or an outing that they have in common?
- Are they or were they located in the same place? (could be unit, site, area)
- Was there any object that they shared? (food, equipment)

Clusters of patients/residents/clients who develop diarrhea, nausea and vomiting lasting only a few days, accompanied by symptomatic healthcare workers should lead to seeking a viral etiology.[8]

5.1 Collection of Specimens

5.1.1 Clinical Specimens

Clinical specimens include feces and vomit. Collect specimens as early in the infection as possible (within 3 days of the onset of symptoms in the individual). Use the outbreak kit provided by the BCCDC Public Health Laboratory for the collection of clinical specimens.
If a bacteria or virus is suspected:

- The sterile dry fecal container with spoon is for bacteriological and viral testing, and has no liquid in it. This should be filled to the line, as a maximum (**10ml of feces is minimum amount required**).
- Larger vials with white lids are for vomit specimens and contain no liquid.

If a protozoan/parasite is suspected:

- The red-capped vial contains SAF preservative and is for testing for the presence of protozoa (e.g. *Giardia*, *Cryptosporidium*). The preservative must be kept in the vial, and the ratio of specimen to liquid is 1:3 (about 2 to 3 spoonfuls of specimen using the built-in spoon). Note the expiry on the container.

Storage and shipping:

- For both feces and vomit, keep specimens refrigerated at 4^{o}C . Transport specimens in a cooler with an ice pack to the laboratory promptly within 3 days of collection. Do not freeze specimens. Deliver to the laboratory by the most expeditious route. Shipping by mail is not recommended.

It is important that the Outbreak Identification number is indicated on all forms. Please follow the instructions provided on the form.

- BCCDC Public Health Laboratory Guide to Program and Services: http://www.bccdc.ca/resource-gallery/Documents/Guidelines%20and%20Forms/Guidelines%20and%20Manuals/Labs/PHAD_060_00PR_Ver_72_GuidetoProgramServicesOctober2015.pdf#page=51
- Gastrointestinal Disease Outbreak Kit Order Form: http://www.bccdc.ca/resource-gallery/Documents/Statistics%20and%20Research/Statistics%20and%20Reports/Labs/BCPHMRLOrderForm.pdf
- Gastrointestinal Disease Outbreak Notification Form: http://www.bccdc.ca/resource-gallery/Documents/Guidelines%20and%20Forms/Forms/Labs/GIOutbreakFAXForm.pdf

5.1.2 Environmental Samples

If food or water is suspected as the source of the outbreak the EHO may collect samples of food served recently (if available) or samples of the water. Food that has been implicated should be submitted in their original containers or placed into sterile plastic containers or whirlpak plastic bags and refrigerated. Requirements for water vary with the suspected microorganism. The EHO, MHO or Medical Microbiologist will provide direction regarding water specimen collection, if required. Swabbing surfaces for environmental sampling would only occur in unusual circumstances and at the specific request of the MHO or EHO.

- Food poisoning Form Part A – Incident summary: http://www.bccdc.ca/resource-gallery/Documents/Guidelines%20and%20Forms/Forms/Labs/FoodPoisoningSummaryForm.pdf
- Food poisoning Form Part B – Requisition: http://www.bccdc.ca/resource-gallery/Documents/Guidelines%20and%20Forms/Forms/Labs/FoodPoisoningRequisition.pdf
- Water Bacteriology Requisition: http://www.bccdc.ca/resource-gallery/Documents/Guidelines%20and%20Forms/Forms/Labs/WaterTestingReq_April2014.pdf

6.0 General Principles of Control

6.1 Mode of Transmission from Person to Person

GI infections are spread from person to person primarily through direct or indirect contact via the fecal/oral route. Direct contact can occur when the transfer of microorganisms results from direct physical contact between an infected or colonized individual and a susceptible host (body surface to body surface without barriers). Transfer of microorganisms to a host may also occur indirectly via an intermediate object, such as contaminated hands that are not cleaned between patients/residents/clients or contaminated patient/resident/client care equipment. Current literature also suggests that in the case of some small round structured viruses (e.g. norovirus) exposure may occur from suspended droplets during some situations (e.g. someone is actively vomiting, gross contamination of environment with vomit or feces).[9-12]

6.2 Routine Practices

Routine practices is the term used by Public Health Agency of Canada[13] to describe the system of infection prevention and control practices used to prevent the transmission of infections in health care settings. Routine practices should be used with all clients at all times. A full description of these may be obtained from:
http://publications.gc.ca/collections/collection_2013/aspc-phac/HP40-83-2013-eng.pdf

Close attention to Routine Practices is fundamental to preventing transmission of microorganisms among patients/residents/clients and HCP in all health care settings.

6.3 Additional Precautions

Additional Precautions are used in addition to Routine Practices when an infection with a specific mode of transmission is suspected or confirmed and Routine Practices may not be sufficient to prevent transmission. Based upon a point of care risk assessment, additional precautions, such as Contact Precautions, will be required during a GI outbreak to control the spread of infection.[13] Patients/residents/clients and their visitors should be assisted to understand the requirements for the additional precautions being used. Health care settings are required to ensure that HCPs have quick and easy access to the personal protective equipment (PPE) and cleaning products required when providing care and are educated in risk assessment. *Regulation*

6.4 Risk Assessment

A risk assessment is the evaluation of the interaction between the Health Care Provider (HCP), the patient/resident/client and the environment to determine the potential for exposure to pathogens.[13] Prior to any patient/resident/client interaction all HCPs have a responsibility to always assess the infectious risk posed to themselves and to others (e.g. other patients/residents/clients, visitors, other HCP). A risk assessment in a GI outbreak setting would include considering:

- Potential exposure to body fluids (i.e. active vomiting, explosive diarrhea)
- Exposure to large deposits of body fluids (vomit, feces) on environmental surfaces
- Patient/resident/client's continence level and ability to comply with instructions

6.5 Personal Protective Equipment

During an outbreak of GI infection care givers should wear the following PPE when giving direct care to symptomatic patients/residents/clients: [9-13]

- Gloves – for providing any direct care
- Gowns – when contamination of HCPs clothing is possible
- Surgical/procedure mask with eye protection/face shield to protect mucus membranes from exposure to viral particles when assisting someone who is actively vomiting, has explosive uncontained diarrhea or when cleaning an area grossly contaminated with vomit or feces. *Category B11*

6.6 Placement of Patient/Resident/Client

In acute care facilities, a single room with a toilet and hand hygiene facilities is preferable. If large numbers of patients/residents/clients require Additional Precautions simultaneously,

single room accommodation may not be possible. In this case, it is advisable to cohort patients/residents/clients with similar symptoms. When single rooms are scarce and/or cohorting is not feasible:

- Avoid placing a patient/resident/client with GI symptoms in the same room as a patient who is at high risk for complications (e.g. immunocompromised, recent surgery etc.).
- In shared rooms, a patient/resident/client with symptoms should not share a toilet with a well patient/resident/client. Assign a dedicated toilet or commode.
- In shared rooms, roommates and all visitors must be aware of the precautions to follow. Select roommates for their ability to comply with precautions.

Whenever possible, equipment should be dedicated for use only on that patient/resident/client. In the event that equipment must be shared, thorough cleaning and disinfection is required in between patients/residents/clients.[14-17] *Category C1*

6.7 Limiting Movements of Patients/Residents/Clients

6.7.1 Patient/Resident/Client Safety

Research has shown an increase in feelings of depression and anxiety and adverse events in patients/residents/clients that are isolated.[18-21] Time spent segregated or isolated should be kept as short as possible. When isolation cannot be avoided, strategies designed to diminish the negative impact and protect the patients/residents/clients should be implemented. *Category B11*

Examples of these are:

- one to one supervision of meals for those who have difficulty swallowing
- monitoring of patients/residents/clients to ensure adequate nutritional and fluid intake
- increasing frequency of rounds to provide oral fluids for patients/residents/clients
- planned one to one (or room to room) interactions with priority given to those who have cognitive issues
- physiotherapy or other rehabilitative therapy should continue if individual is well enough

6.7.2 Acute Care

Symptomatic patients should be confined to their room and only taken elsewhere for medically necessary procedures until they have been asymptomatic for 48 hours.[10, 22, 23] *Category B11*

6.7.3 Residential Care

Any resident/client with symptoms that are consistent with GI infection should be confined to their room as much as possible until asymptomatic for 48 hours[10]. Since confinement of

residents/clients, even for a few days, could have adverse effects on their well-being the period of confinement should be kept to a minimum, so as not to socially isolate them.[18-21, 24, 25]

Category A11

6.7.4 Common Areas

Consideration should be given to decreasing or discontinuing group activities, shared food and outings until the outbreak is resolved. It should be noted that limitation of such activities could be very disruptive to the residents/clients. If, upon consultation with the MHO or delegate, it is decided that some activities may continue these should be restricted to individuals who are symptom free. Limiting activities to restrict movement of residents only between units or floors may be an option. *Category C1*

Encourage hand hygiene for all patients/residents/clients prior to meals. *Category A11*

All common touch items should be removed from the shared areas (e.g. salt and pepper shakers, sugar bowls, table cloths).[10] Remove and discard food in refrigerators found in common areas or nourishment areas and clean these appliances. *Category C11*

HCPs should also avoid sharing meals or leaving food items open in their staff room. No food items (e.g. bowl of candy, tray of cookies) should be left open in or near patient/resident/client areas (e.g. nursing station). *Category C11*

7.0 Restrictions of Units

Restricting new admissions and/or transfers to units or facilities is a commonly used control strategy during GI outbreaks. Restricting admissions helps to control outbreaks by reducing the pool of susceptible people and thus the potential for ongoing spread of infection. The direct contribution of this action is difficult to estimate because usually several control mechanisms are deployed simultaneously. One identified benefit is that as beds become vacant from discharges and remain unfilled the need for nursing hours decreases. This is helpful at a time when many HCPs are also ill and excluded from work. On the other hand, there is a loss of revenue for facilities and a delay in treatment for other individuals if surgeries, diagnostic tests or other treatments are cancelled and other departments (i.e. emergency) will experience an increase in demand.[10, 26-29]

Repatriation or transfers of patients/residents/clients between acute and residential care sites should be evaluated on an individual basis. Repatriation of residents who had been admitted to acute care as a result of illness caused by the outbreak should not be delayed once they are well enough. It is recommended that protocols are developed locally to address situations where patients/residents/clients are moved between acute care and residential care.

The local Medical Health Officer should be consulted when considering restrictions or closures of units or facilities.

8.0 Health Care Provider Exposure and Illness

Any HCP who develops symptoms consistent with a GI infection (e.g. vomiting, diarrhea) while at work should be required to leave work immediately.[30-32] *Category B11*

There is evidence that suggests that exclusion of employees from work for 48 -72 hours after symptoms resolve may decrease attack rates.[10, 33-37] It is difficult to know the exact contribution of any one action since outbreak control measures are usually implemented and are most effective when implemented in combination. Infected individuals will continue to shed the pathogen for longer than 48 - 72 hours following resolution of symptoms and it is unclear when they no longer are infectious to others.[35, 37-41] It is recommended that employees remain off work for at least 48 hours following resolution of symptoms. This may decrease the risk of the individual relapsing while at work. In specific circumstances an EHO (or other public health representative) may instruct an individual who handles food to remain away longer.

Category B11

Meticulous and consistent hand hygiene, which includes all surfaces of hands, wrists, finger tips and under fingernails, and use of PPE, should be re-emphasized for all HCPs upon return to work. *Category A11*

Infections caused by microorganisms such as Verotoxigenic *E.coli*, *Salmonella* typhi and paratyphi, and some *Shigella* and *V. cholerae* species have specific requirements before an

individual may return to work. Consult with the MHO or EHO and refer to the "Exclusion of Enteric Cases and Their Contacts in High Risk Settings" Policy in the BC Communicable Disease Control Manual.

When possible it is advisable to have the same HCP caring for those who are ill to limit HCP exposure. Since some individuals acquire short term immunity following illness, HCPs who return to work after becoming ill with GI symptoms should also be assigned to ill patients whenever possible.[42-45] *Category B11*

All health care providers should have easy access to the PPE required and be knowledgeable about how to use it. Managers should monitor PPE usage and reinforce the need to apply and remove PPE properly. *Category C11*

As much as possible, within the limitations of personal privacy issues, HCP illness should be tracked and recorded by Occupational Health or the person responsible for Occupational Health.[32, 46] This allows for better surveillance of the extent of the outbreak, provides information regarding HCP resources available and may contribute important information towards determining the etiology of the outbreak. *Category C1*

Some health care providers move continually between units/sites as an integral element of their work (e.g. physiotherapists, laboratory technologists, patient porters). It is very important that these individuals are adept and vigilant with the use of PPE and hand hygiene.

Category B11

Some health care providers work in more than one unit or site. In these cases it is recommended, that where this is unavoidable, HCPs be vigilant in self-assessment for symptoms and be excused from work immediately should they begin to have symptoms.[10, 31, 32, 44, 45]

Category B11

9.0 Ongoing Surveillance and Reporting

An updated report with new cases of both patient/resident/clients and HCPs should be created by the facility/unit manager or ICP and sent to the EHO (or other Public Health representative) if assigned to that site on a regular basis. *Category C11*

Appendix 5 provides an example form for patient/resident/client surveillance.

Appendix 6 provides an example form for HCP surveillance.

10.0 Housekeeping

Dirt, organic material and debris act to protect microbes from contact with disinfectants. Thorough cleaning removes this protection and facilitates effective disinfection. Consistent, regular cleaning assists in reducing the potential for environmental transmission of microorganisms and processes should already be in place to ensure effective cleaning.[10, 14, 47] Cleaning methods which use firm contact and friction reduces the number of organisms. Use a separate cloth for cleaning and another for disinfection. Cleaning cloths should be changed frequently to prevent spreading microorganisms from surface to surface. **Do not "double dip" a cloth into disinfectant solution**.

Increased frequency of cleaning high touch surfaces is an important contribution to the control of spread. Surfaces that are considered to be "high touch" include:

- Bed rails
- Call bell cords
- Bathroom surfaces (taps, toilet handle)
- Door knobs, light switches
- Hand rails in rooms and hallways
- Elevator buttons
- Tables, counter tops
- Nourishment areas (fridges, ice machines, cupboard handles)
- Nurses' station

Equipment that is shared between patients/residents/clients should be thoroughly cleaned and disinfected in between each use. *Category B11*

10.1 Disinfectants

Currently, available solutions that are effective for common microbes responsible for GI outbreaks are accelerated hydrogen peroxide 0.5% and sodium hypochlorite 1000ppm.[48-51] A limited number of quaternary ammonium products have demonstrated effectiveness in recent studies.[52, 53] New products are in development and may be appropriate in the future. Any disinfectant used in a health care setting is required to have a Drug Identification Number (DIN) assigned by Health Canada. The manufacturer should be able to provide evaluations that demonstrate the product's effectiveness against common enteric agents including at least one non-enveloped virus (preferably from a third party). Follow the manufacturer's instructions regarding dilution and contact time required to be effective. When organic matter is present (e.g. vomit, feces) many disinfectants require the surfaces be cleaned with a detergent prior to disinfection. If in doubt about a cleaning product please contact the EHO/Public Health/ICP in your area. For a table of commonly used products, see **Appendix 7**.

10.2 Cleaning Up Vomit and Feces

During an outbreak of GI infection, special consideration must be given to the cleaning of areas contaminated with either vomit or fecal matter. The area should be cordoned off, to prevent other patients/residents/clients from unintentional exposure, and cleaned immediately.[10, 14, 47] Failing to immediately clean contaminated areas may contribute to rapid spread and continuation of the outbreak. For a detailed procedure for cleaning up excrement, see **Appendix 8**.

10.3 Evolving Technology to Enhance Housekeeping Efforts

10.3.1 Ultraviolet (UV) Light for Disinfection

There has been some research evaluating the effectiveness of various forms of UV light for disinfection of surfaces in health care settings. While the results suggest there may be potential for use in health care settings, the organisms used in these studies have not been ones that cause GI Outbreaks. The effectiveness of this technology in reducing the attack rate or the duration of a GI outbreak has also not been studied.[54-61]

10.3.2 Vaporized Hydrogen Peroxide

A growing body of evidence is supportive of the use of vaporized hydrogen peroxide for terminal disinfection of patient rooms. Hydrogen peroxide is a broad-spectrum disinfectant, considered active against a wide range of nosocomial pathogens.[62-68] Goyal et al (2014)[62] demonstrated that their hydrogen peroxide vapour-phase disinfection method, was virucidal on structurally distinct viruses dried on surfaces, including feline calicivirus. The effectiveness in reducing the attack rate or the duration of a GI outbreak has not been studied to date.

10.3.3 Ozone-based Systems

Research evaluating the effectiveness of Ozone-based disinfections systems also suggests potential for use in health care settings.[69, 70] Hudson et al (2007)[69] demonstrated effectiveness against feline calicivirus on various hard and soft surfaces. The effectiveness in reducing the attack rate or the duration of a GI outbreak has not been studied to date.

NOTE: All of these evolving technologies rely on diligent cleaning of surfaces first and are *not* meant to replace thorough cleaning of surfaces in patient care settings.

11.0 Visitors and Volunteers

Visitors and volunteers play an important role in supporting the provision of health care and the quality of experience of the patient/resident/client in all settings. Visitors and volunteers should be advised not to visit the facility if they have GI symptoms such as nausea, diarrhea etc. During an outbreak, visitors and volunteers should be warned that they may be at risk of acquiring infection within the facility. Instructions on how to wear appropriate PPE and how to perform hand hygiene before and after their visit should be provided. Visitors should visit only their own friend/relative in their own room, unless otherwise approved by the HCP. *Category C11*

12.0 Animals and Pets

Animals or pets should not be in an area where food or drink is prepared or served. Diligent hand hygiene practices are recommended before and after handling any animal or providing any form of food (e.g. treats) for animals.[71] It is recommended that farm animals (e.g. chicks, livestock), zoo animals, reptiles and/or amphibians are not housed in or allowed to visit any type of health care facility.[72-77] *Category B1*

Animals or pets may be a source of a GI outbreak or may amplify transmission via direct or indirect contact. During an outbreak neither health care providers nor patients/residents/clients should be in contact with pets/animals that are unwell. It may be reasonable to restrict visiting pets or temporarily remove resident pets during a GI outbreak on consultation with the EHO/MHO and Facility Administrator. *Category B11*

Recommendations for restricting or excluding pets do **not** apply to certified guide or service dogs. The *Guide Dog and Service Dog Act* (the Act) was passed in April 2015 and has been brought into force by regulation. The Act ensures public access rights for guide dogs and service dogs, complementing the rights provided to individuals under the *Human Rights Cod*e.

Regulation

13.0 Notification/Education Strategies

Timely, accurate communication is a critical contribution to limiting the spread of a GI outbreak, both within and beyond a facility/unit. It is recommended that the OPMT delegate one person to speak with the media to ensure that messages use consistent wording in the event that media statements are needed. *Category C11*

Daily updates regarding the extent of the outbreak should be composed by a designated member of the outbreak team and circulated to all departments/services that may be involved (e.g. physiotherapy, other unit managers, physicians). *Category C11*

An example of a Daily Update Report for the OPMT is provided in **Appendix 9.**

An example of an Outbreak Communication Memo is provided in **Appendix 10.**

External ancillary services such as BC Ambulance, Medigas etc. should be notified as soon as the outbreak is confirmed. Should they be required to attend the facility/unit they would be expected to use the same precautionary levels as the health care providers.[30, 46, 78] *Category C1*

Information for visitors should begin as soon as an outbreak has been confirmed and include the type of outbreak suspected, restrictions for visiting (e.g. relatives only) and emphasis on hand hygiene before and after visit. *Category C11*

GI outbreak signs should be posted at all entrances to the facility indicating that there is an outbreak. For an example of a sign see **Appendix 11**.

14.0 Declaring the Outbreak Over

The MHO has the legal authority and discretion to declare the outbreak over. Often protocols and guidelines are in place that enable an Infection Control Officer, ICP or Facility Manager to lift the outbreak control measures. It is the responsibility of the facility operator to inform the outbreak consultant (EHO, ICP, MHO etc.) when nearing or meeting the criteria for declaring the outbreak over. The MHO's office is to be notified at the time of restrictions being lifted. Even under these circumstances the authority of the Medical Health Officer remains in effect.

If the causative agent is known, usually an outbreak is considered to have ended when there are no new cases after 2 incubation periods following the onset of symptoms in the last case. If the causative agent is unknown usually the outbreak is considered to have ended when there have been no new cases 72 hours after the resolution of acute symptoms of the last identified case. It is important that vigilant observation for new cases continues even after the outbreak is declared over, especially when the causative agent has not yet been identified. A summary of the outbreak should be compiled and sent to the OPMT. An example of an Outbreak Summary form is provided in **Appendix 12**.

15.0 Debriefing the Outbreak Prevention and Management Team

It is strongly recommended that the OPMT schedule a debriefing session as soon as feasible following the conclusion of an outbreak. The purpose of the debriefing session is to evaluate how the outbreak management process unfolded and identify interventions that worked well and opportunities for improvement. Examples of opportunities for improvement are:

- Communication within OPMT and to media
- Timeliness in recognizing and reporting outbreak
- Timeliness in implementing control measures
- Effectiveness of control measures in limiting the outbreak *Category C11*

Glossary

Acute Care Facility: A hospital where lengths of stay average < 30 days, and where a variety of services are provided, including surgery and intensive care.

Additional Precautions: Interventions implemented for certain pathogens or clinical presentations in addition to routine infection control practices, to reduce the risk of transmission of microorganisms from patient to patient, patient to HCP, and HCP to patient

Case: In epidemiology, a person in the population or study group identified as having the particular disease, health disorder or condition under investigation. A variety of criteria may be used to identify cases: e.g. diagnosis, registries and notifications, abstracts of clinical records, reporting of defects such as a dental record. The epidemiologic definition of a case is not necessarily the same as the ordinary clinical definition.

Case Definition: A set of diagnostic criteria that must be fulfilled in order to identify a person as a case of a particular disease. Case definition can be based on clinical, laboratory or combined clinical and laboratory criteria or a scoring system with points for each criterion that matches the features of the disease. If the diagnosis is based on a scoring system e.g. Multiple Sclerosis, it is important to abide by the system for surveillance purposes and when deciding whether to include or exclude cases in an epidemiologic study.

Cleaning: The physical removal of foreign material e.g. dusts, soil, organic material such as blood, secretions, excretions and microorganisms using mechanical and/or chemical means. Cleaning physically removes rather than kills microorganisms.

Cohort: Two or more patients/residents/clients colonized or infected with the same organism that are separated physically, in a separate room or ward, from other patients who are not colonized or infected with that organism

Cohorting HCPs: The practice of assigning specified personnel to care only for patients/residents known to be colonized or infected with the same organism. Such personnel would not participate in the care of patients/residents/clients that are not colonized or infected with that organism

Contact Precautions: Interventions to reduce the risk of transmission of microorganisms through direct or indirect contact. Contact Precautions include the use of gloves and gowns when giving direct care to patients/residents/clients or when in contact with their environment.

Diarrhea: Stool that is of the consistency that it takes the shape of the container it is placed into (Bristol stool chart 6 or 7).

Drug Identification Number (DIN): In Canada, disinfectants are regulated under the Food and Drugs Act and Regulations. Disinfectants must have a drug identification number (DIN) from Health Canada prior to marketing. This ensures that labeling and supportive data have been

provided and that it has been established by the Therapeutic Products Directorate (TPD) that the product is effective and safe for its intended use.

Disinfection: The inactivation of disease-producing microorganisms. Disinfection does not destroy bacterial spores. Disinfection usually involves chemicals, heat or ultraviolet light.

Droplet precautions: Interventions to reduce the risk of transmission of microorganisms via respiratory droplets. Droplet precautions include the use of a surgical mask and eye/face protection whenever one is within 2 meters of the patient/resident.

Environmental Health Officer (EHO) (Public Health Inspectors): Enforces the BC Public Health legislation in regard to disease control and protection of the public. Works with the MHO in conjunction with the facility ICP management and HCP to ensure that appropriate outbreak mitigation measures will be put into place in the event of an outbreak. Acts as a consultant and provides support/resources prior to and during an outbreak; communicates/liaises promptly with Infection Control and/or the MHO when outbreaks are suspected and/or have been declared. Provides expertise in determining the source and means of spread of the agent, especially where food or waterborne spread may be involved.

Hand Hygiene: A process for the removal of soil and transient microorganisms from the hands. Hand hygiene may be accomplished using soap and running water or by the use of alcohol-based hand rubs. Optimal strength of alcohol-based hand rubs should be 60% to 90% alcohol. Hand washing is required whenever hands are visibly soiled. Alcohol based hand rubs have limited effect on non-enveloped viruses (depending upon concentration) and spore forming bacteria (e.g. *C. difficile).*

Health Care Provider: Individual providing or supporting health care services that will bring them into contact with patients/clients/ residents. This includes, but is not limited to: emergency service providers, physicians, dentists, chiropractors, nurses, podiatrists, respiratory therapists and other allied health professionals, students, support services (e.g. housekeeping, dietary, maintenance, hairdressers), and volunteers.

Hospital-grade Disinfectant: A disinfectant that has a drug identification number (DIN) from Health Canada indicating its approval for use in Canadian hospitals

Infection Prevention and Control Professional (ICP): Trained individual responsible for a health care setting's infection prevention and control activities.

Isolation: The physical separation of infected individuals from those uninfected for the period of communicability of a particular disease

Medical Health Officer (MHO): a medical practitioner with training, knowledge, skills and experience in community medicine who is designated to this position, for a geographical area, by the Lieutenant Governor of BC under the Public Health Act. The MHO provides advice and direction on public health issues including health promotion and health protection and their

related practices, bylaws and policies. The MHO reports to the public those matters which are deemed to be in the public interest.

Occupational Health: the specialized practice of medicine, public health and ancillary health professions in an occupational setting. Its aims are to promote health as well as to prevent occupationally related diseases and injuries and the impairments arising there from, and when work related illness or injury occurs to treat these conditions.

Personal Protective Equipment (PPE): Clothing or equipment worn by individuals for protection against hazards such as blood, body fluids, and infectious secretions.

Public Health Nurse: Public Health nurses care for the physical and mental health needs of the community as a whole. They may work with families in the home, with community groups, in schools, in government agencies and at workplaces.

Residential Care Facility: Residential care facilities provide 24-hour professional nursing care and supervision in a protective, supportive environment for people who have complex care needs and can no longer be cared for in their own homes

Routine Practices: Routine practices is the term used by Health Canada/Public Health Agency of Canada to describe the system of infection prevention and control practices recommended in Canada to be used with all clients/patients/residents during all care to prevent and control transmission of microorganisms in health care settings.

Surveillance: Systematic, ongoing collection, collation, and analysis of health-related information that is communicated in a timely manner to all who need to know which health problems require action. Surveillance is a central feature of epidemiological practice, where it is used to control disease. Information that is used for surveillance comes from many sources, including reported cases of communicable diseases, hospital admissions, laboratory reports, cancer registries, population surveys, reports of absence from school or work, and reported causes of death.

Appendix 1 Quick Reference Checklist

This list is an example and meant to be modified and/or re-organized to meet individual facility needs.

Case Definition

A case of GI infection is defined as any one of the flowing conditions that **cannot be attributed to another cause** (e.g.: laxative use, medication side effect, diet, prior medical condition):

- Two or more episodes of diarrhea in a 24 hour period – above what is considered normal for that individual

  OR
- Two or more episodes of vomiting in a 24 hours period

  OR
- One episode each of vomiting and diarrhea in a 24 hours period

  OR
- Positive culture for a known enteric pathogen with a symptom of GI infection (e.g. vomiting, abdominal pain, diarrhea)

  OR
- One episode of bloody diarrhea

Outbreak Definition

Three or more cases of GI infection that are potentially related occur within a four day period, in a specific geographic area (i.e. unit, ward).

Report

- Report outbreak to the MHO or delegate
- Complete Gastrointestinal Disease Outbreak Form and send to BCCDC
- Notify appropriate Managers and Patient Care Leaders
- Outbreak Prevention and Management Team should meet as soon as possible.
- Notify service providers such as HandyDART, oxygen services, laboratory services, BC Ambulance, etc. of outbreak and control measures required
- Notify any facility that admitted a patient/resident/client from the outbreak area within the past 72 hours
- Complete line listing of ill patients/residents/clients (see page 32)
- Complete line listing of ill HCPs (discuss with person responsible for occupational health) , where this information is available (see page 31)

Discuss with MHO or delegate the need to:

- Postpone transfers to other units or facilities, admissions or re-admissions unless medically warranted. Depending upon the physical layout of the building and the extent of the outbreak, restrictions may apply to one wing or one unit, one floor or the entire facility.
- Decrease or discontinue group activities and outings until the outbreak is resolved
- Restrictions on visitors

Collect

- Collect and send specimens as outlined on page 9

Establish Outbreak Control Measures

- Wherever possible, confine ill patients/residents to rooms until 48 hours post symptoms
- As much as possible, assign the same HCPs to take care of ill clients over the duration of the outbreak.
- Post outbreak signage and Alcohol Based Hand Rub (ABHR) at each entrance to unit/facility
- Reinforce hand hygiene practices with all HCPs
- Ensure everyone has easy access to hand hygiene stations (e.g. soap and water, ABHR)
- HCPs to use Contact Precautions when caring for ill individuals.
- When caring for individuals who are actively vomiting or when cleaning up areas grossly contaminated by vomit or feces use droplet precautions in addition to Contact Precautions.
- Advise all visitors of outbreak, emphasize hand hygiene upon entering and exiting site
- Remind visitors not to enter the facility if they have vomiting and/or diarrhea
- Ensure all visitors wear personal protective equipment as recommended by the HCPs
- Visitors should only visit one patient/resident/client and not travel from room to room during visit
- Increase cleaning and disinfection procedures for washrooms, common areas and all frequently touched surfaces.
- Ensure soiled laundry is handled as little as possible, with minimum agitation and transported in closed bags
- Whenever possible dedicate equipment to be used only on that patient/resident/client. In the event that equipment must be shared it requires thorough cleaning and disinfection in between patients/residents/clients.

Ongoing surveillance

- Management and HCPs should maintain a watch for GI symptoms in patients/residents/clients and report any new onset to patient/resident/client care leaders
- HCPs should self-monitor for GI symptoms and report illness to supervisor. HCPs who are ill must remain away from work until symptom free for 48 hours, regardless of whether they feel well enough to work.
- HCPs returning after illness must be meticulous and consistent with hand hygiene
- Communicate status of outbreak daily to Outbreak Prevention and Management Team

Appendix 2 Public Health Agency of Canada, Rating Scale for Strength and Quality of Evidence

Grade of Evidence		
Strength of Evidence	**Grades**	**Criteria**
Strong	**AI**	Direct evidence from meta-analysis or multiple strong design studies of high quality, with consistency of results
	AII	Direct evidence from multiple strong design studies of medium quality with consistency of results OR At least one strong design study with support from multiple moderate design studies of high quality, with consistency of results OR At least one strong design study of medium quality with support from extrapolation from multiple strong-design studies of high quality, with consistency of results
Moderate	**BI**	Direct evidence from multiple moderate design studies of high quality with consistency of results OR Extrapolation from multiple strong design studies of high quality, with consistency of results
	BII	Direct evidence from any combination of strong or moderate design studies of high/medium quality, with a clear trend but some inconsistency of results OR Extrapolation from multiple strong design studies of medium quality or moderate design studies of high/medium quality, with consistency of results OR One strong design study with support from multiple weak design studies of high/medium quality with consistency of results
Weak	**CI**	Direct evidence from multiple weak design studies of high/medium quality, with consistency of results OR Extrapolation from any combination of strong/moderate design studies of high/medium quality, with inconsistency of results
	CII	Studies of low quality regardless of study design OR Contradictory results regardless of study design OR Case series/case reports OR Expert opinion

Appendix 3 Agents that are Common in Gastrointestinal Infection Outbreaks

Agent	Reservoir	Survival on Surfaces	Incubation Period	Symptoms	Duration of Symptoms	Period of Communicability	Person to Person Transmission	Type of Precautions and Duration
Calicivirus (i.e. Norovirus or Sapovirus)	Humans	Feline calicivirus (FCV), a surrogate, can survive on glass surfaces for 21-28 days at room temperature and for longer periods at 4°C. At 37°C, FCV survives over 24 hours	Usually 24-48 hours (range-10-50 hours)	Self-limited mild to moderate vomiting and diarrhea	24-48 hours	During acute symptoms and up to 48 hours after symptoms resolve	Yes	Contact until asymptomatic for 48 hours. Use a surgical mask with eye/facial protection in specific situations(see page 14)
Rotavirus	Probably humans	May survive for a few hours on human hands and for days on hard and dry surfaces.	24-72 hours	Abrupt onset of vomiting and diarrhea and rapid dehydration, fever	4-6 days	Abrupt onset of vomiting and diarrhea and rapid dehydration, low grade fever	Yes	Contact until asymptomatic for 48 hours. Use a surgical mask with eye/facial protection in specific situations (see page 14).
Adenovirus	Humans	Very stable in the environment and persist for 7 days to 3 months on dry inanimate surfaces	3-10 days	Abrupt onset of vomiting and diarrhea and rapid dehydration, low grade fever	4-6 days	During acute symptoms and up to 14 days after onset	Yes	Contact (a surgical mask with eye/facial protection in specific situations) until asymptomatic for 48 hours or longer if poor hygiene or continence issues (consult MHO)
Campylobacter species (bacteria)	Animals, mostly raw poultry; pets	Can survive freezing for several months in frozen poultry, minced meat, and other cold food products. Can survive for many weeks in water at 4°C, but only a few days in water above 15°C	Usually 2-5 days (range 1-10 days)	Diarrhea, abdominal pain, malaise, fever, nausea and vomiting	2-5 days	Throughout infection, from several days to weeks if not treated	May be possible in food handlers or if individual faecally incontinent and has poor hygiene	Routine

Agent	Reservoir	Survival on Surfaces	Incubation Period	Symptoms	Duration of Symptoms	Period of Communicability	Person to Person Transmission	Type of Precautions and Duration
Clostridium difficile	Humans and some animals	Weeks to months	Unknown	Mild to severe diarrhea capable of causing bowel perforation	Several days to months	Duration of symptoms until 48 hours after resolution	Yes	Contact precautions until stools have normalized for 48 hours
Clostridium perfringens	Soil; GI tract of healthy people and animals (cattle, fish, pigs, poultry)	Ever present in soil, decaying vegetation, etc. Common in raw meats, dehydrated soups, sauces, raw vegetables, and spices. Spores can survive cooking, and grow rapidly in foods inadequately hot held or refrigerated after cooking.* Survival times depends on temperature, pH, water activity, salts & oxygen	Usually 10-12 hours (range= 6-24 hours)	Mild disease of short duration; sudden onset abdominal cramping and diarrhea; vomiting and fever usually absent	1 day or less	N/A	No	Routine
E. coli O157:H7	Agricultural animals especially cattle, goats, sheep and humans	Variable: butter - up to 50 min; cream - 10 days; hamburger meat - survives well; does not survive long in slurry systems	2-8 days	Range from mild non-bloody to grossly bloody diarrhea Hemolytic uremic syndrome in 2-7% of cases	Typically less than a week, usually longer in children	1 week in adults; up to 3 weeks in children	Yes	Contact for 1-3 weeks depending upon age, ability to control excretions and hygiene

Agent	Reservoir	Survival on Surfaces	Incubation Period	Symptoms	Duration of Symptoms	Period of Communicability	Person to Person Transmission	Type of Precautions and Duration
Salmonella	Domestic and wild animals and humans	Known to survive on fingertips for up to 80 minutes. Can live up to 63 days on lettuce, 231 days on parsley, 32 weeks in pecans, 10 months on refrigerated cheddar cheese, 9 months in butter, up to 63 days in frozen yogurt, and up to 20 weeks on frozen minced beef and chicken	Usually 6-12 hours (range= 6-72 hours)	Sudden onset headache, abdominal pain, diarrhea, nausea and sometimes vomiting. Usually fever	Several days to several weeks Can become a chronic carrier	While symptomatic, shedding continues after symptoms resolve	Yes	Contact until asymptomatic for 48 hours or longer if poor hygiene, continence issues or if person is employed as a food handler (consult MHO)
Salmonella *typhi* and *paratyphi*	Humans	As above	*S*. Typhi 5-28 days *S*. Paratyphi 1-10 days	Often begins with fever, Abdominal pain, later diarrhea, Multiple side effects	*S. typhi* can become a chronic infection, especially if treated with incorrect antibiotic	Primarily while GI symptoms are occurring	yes Food borne spread is usually via infected food handlers.	Contact while symptomatic
Shigella sp.	Humans	Can survive up to months on dry surfaces, up to 10 days in citric juices and carbonated soft drinks, several days on contaminated vegetables, over 3 hours on fingers, 2 – 28 days on metal utensils at 15°C or 0 – 13 days at 37°C, in feces for 12 days at 25°C and water for under 3 days	1-3 days	Diarrhea accompanied by fever, vomiting and cramps.	4-7 days	During acute symptoms and up to 4 weeks after illness	Yes	Contact until asymptomatic for 48 hours or longer if poor hygiene or continence issues or if person is employed as a food handler (consult MHO)

Agent	Reservoir	Survival on Surfaces	Incubation Period	Symptoms	Duration of Symptoms	Period of Communicability	Person to Person Transmission	Type of Precautions and Duration
S. aureus enterotoxigenic	Humans sometimes cows, dogs, and fowl	Survives on floors (less than 7 days), glass (46 hours), sunlight (17 hours), UV (7 hours), meat products (60 days), coins (up to 7 days), skin (30 minutes to 38 days). Depending on colony size, *S. aureus* can survive on fabrics from days to months	Usually 2-4 hours (range= 30 min.-8 hours)	Abrupt onset nausea, cramps, vomiting and sometimes diarrhea	1-2 days	N/A	No	Routine

*For more information on food safety, go to: http://www.bccdc.ca/foodhealth/default.htm

Appendix 4 Sample Initial Outbreak Report Form

Brief Description of Outbreak **Date:** _____

Location: _____ Date of index case: _____

Predominant symptoms:

Progression to others:

Actions Taken

Date and time reported to MHO: _____

Activation of Outbreak Management Team: _____

Notification of external service providers (e.g. BC Ambulance, Medigas):

"Just in time" in-services to HCPs:

Cohorting of patients/residents and/or HCPs:

Enhanced cleaning:

Restriction (visitors, HCP, unit closure):

Extra hand hygiene stations/signage:

Specimens sent:

Current Status:

Number of symptomatic patients/residents: _____ Number of symptomatic HCP: _____

Name and title of reporting person: _____

Appendix 5 GI Outbreak Surveillance Form - Patients/Residents/Clients

Patient/Resident/Client Information					Clinical Presentation			Specimen(s) sent	
Name	**Date of birth y/m/d**	**Unit**	**Room #**	**Room type**	**Date of onset of symptoms**	**Symptoms**	**Duration of symptoms**	**Collection Date/ Date Submitted**	**Result**

SYMPTOMS: **V**=Vomiting **D**=Diarrhea **C**=Cramps **N**=Nausea **F**=Fever **H**=Headache **A**=Abdominal Pain **M**=Myalgia
ROOM TYPE: **P**=Private **S**=Semi-private **M**=Multi-bed

Appendix 6 GI Outbreak Surveillance Form – HCPs

HCPs Information				Clinical Presentation				Specimen	
Name	**DOB y/m/d**	**Occupation**	**Unit(s) worked**	**Date of symptom onset**	**Onset at work?**	**Symptoms (see below)**	**Date of symptom resolution**	**Collection Date/ date submitted**	**Result**

SYMPTOMS: **V**=Vomiting **D**=Diarrhea **C**=Cramps **N**=Nausea **F**=Fever **H**=Headache **A**=Abdominal Pain **M**=Myalgia

Appendix 7 Disinfectants Commonly Used in GI Outbreaks

[14, 49, 51, 53, 79, 80]

Agent and Concentration	Uses	Active Against	Properties/Cautions
Chlorine: **Household bleach (5.25%)** 1:100 (500 ppm solution) 10 ml bleach to 990 ml water	Used for disinfecting general household surfaces. (make fresh daily) Allow surface to air dry naturally	Vegetative bacteria (*Salmonella, E. coli*), Enveloped viruses (Hepatitis B and C)	All organic matter must be cleaned from surface first Make fresh daily as shelf life shortens when diluted Store in closed containers which do not allow light to pass through away from light and heat Irritant to skin and mucous membranes Area should be well ventilated to prevent respiratory tract irritation Corrosive to metals Discolors carpets and clothing **NEVER** mix with any other cleaning solution
1:50 (1000 ppm solution) 20 ml bleach to 980 ml water	Used for disinfecting surfaces contaminated with bodily fluids and waste like vomit, diarrhea, mucus, or feces. Allow surface to air dry naturally	Vegetative bacteria Enveloped viruses Non-enveloped viruses (Norovirus, Hepatitis A)	
1:10 (5000 ppm solution) 100 ml bleach to 900 ml water	Used for disinfecting surfaces contaminated by blood Allow surface to air dry naturally	Bacterial spores (e.g. *C difficile*)	
Accelerated hydrogen Peroxide 0.5%	Used for disinfecting general surfaces and surfaces contaminated with body fluids and waste Follow manufacturer's instructions for contact time (1-5 min.)	Bacteria Enveloped viruses Non-enveloped virus (norovirus)	Active in the presence of organic matter Good cleaning ability due to detergent properties Non-toxic

Agent and Concentration	Uses	Active Against	Properties/Cautions
Accelerated hydrogen Peroxide 4.5%	Use for cleaning and disinfecting toilet bowls, sinks, basins, commodes Follow manufacturer's instructions for contact time	Sporicidal, use when *C. difficile* is suspected	
Quaternary Ammonium Compounds (QUAT)	Use for general cleaning of floors, walls, furnishings Saturate thoroughly and allow surfaces to air dry naturally	Vegetative bacteria Enveloped viruses Some fungi	Detergent properties Non-corrosive Do **Not** use to disinfect instruments Many preparations have limited effectiveness against common organisms that cause GI infections (e.g. norovirus). Use in well-ventilated areas Always check for DIN and manufactures list of indications

VERY IMPORTANT:

- Ensure product has a DIN.
- Check manufacturers information to ensure that product is effective against organisms in question.
- Follow product instructions for dilution and contact time
- Unless otherwise stated on the product, use a detergent to clean surface of all visible debris prior to application of disinfectant.
- Alcohol (70%) may be used on some small equipment such as stethoscopes but not as a general surface disinfectant

Appendix 8 Cleaning Up Vomit and Feces

[14, 48, 51, 81-83]

- Attend to the patient/resident/client first, if necessary.
- Isolate the area, if possible, and place a wet floor sign/flag to prevent slipping.
- Wear disposable gloves or household rubber gloves (these will need to be disposed after) as well as other personal protective equipment (surgical mask, eye protection, gloves, gown or apron).
- All solid pieces of vomit and/or feces must be removed prior to cleaning and disinfecting. Wipe up excrement using absorbent disposable material (e.g. paper towels). Use a wipe up technique that does not agitate excrement and place directly into a regular garbage bag.
- Clean the surface with neutral detergent to remove any trace residual dirt or body fluids.
- Disinfect the area to a radius of 2 meters with an accelerated hydrogen peroxide 0.5% ensuring a 5 minute contact time or a fresh 1/50 dilution of household bleach 5.25% (e.g. 20 ml bleach to 980 ml water) and allow to air dry naturally. **NB. ensure that area is very well ventilated.**
- Discard waste including gloves into regular garbage immediately.
- If the area involved was so large that a mop had to be used to apply disinfectant, wash the mop head, soak in disinfectant and place into a leak proof laundry bag when finished. The bucket contents should be carefully poured into the available sewage outlet (i.e. hopper, utility sink), and the bucket rinsed and wiped with the disinfectant.
- Remove personal protective equipment and discard in regular garbage.
- Perform hand hygiene at the end of the procedure.
- If a vomiting or fecal incident occurred in an area where food is prepared, served, displayed or stored, dispose of any food that had been handled by the ill person, or had been present within 2 meters during the incident.
- Wash all dishes, utensils and trays in hot water and detergent (minimum of 74^{o} for 10 seconds). Be careful not to cross-contaminate dirty and clean dishes.

Appendix 9 Sample Daily Update Outbreak Report for OPMT

Location: _____

Date: _____ Day _____ of Outbreak

Number of new cases today - Patients/Residents/Clients: _____

Number of new cases today – HCPs: _____

Date of symptom onset of last case: _____

Number of patients/residents currently symptomatic: _____ (include new cases)

Number of patients/residents recovered: _____

New developments/concerns:

Further actions required

Appendix 10 Sample Outbreak Communication Memo

From: _____ Date: _____

To: All units/ departments/ancillary services

An outbreak of gastroenteritis has been declared today *(date),* _____on unit ____

The unit is reporting _____ *(specify number of ill patients/number of total unit patients)* patients ill with new symptoms of vomiting and/ or diarrhea since _____ *(specify date)*

Actions taken

- Additional Precautions have been implemented on all symptomatic patients
- Additional hand hygiene stations have been set up at the point of entry to the unit
- Fact sheet on Viral Gastroenteritis is available at the hand hygiene station and nursing station
- Signage is posted at the point of entry to _____ *(unit)*
- Specimens are being collected/ sent to BCCDC to identify the organism
- Symptomatic patients will remain in their rooms unless medically warranted
- _____ *(unit)* will notify Infection Control of all new cases
- Visitor restrictions are in place on the affected unit
- Restriction on transfers/admissions of patients to _____ *(unit)* until further notice
- Patients will be cohorted where ever possible
- Cohorting of HCPs is in place; if possible.
- **All** HCPs and visitors are reminded to practice meticulous hand hygiene before and after contact with each patient and to use masks, protective eyewear, gloves and gowns appropriately
- Housekeeping have been notified to implement “Enhanced Cleaning”
- **Healthcare provider exclusion**: During an outbreak, Occupational Health will provide direction to HCPs presenting with signs & symptoms of gastroenteritis.
- **Treatment**: no specific therapy exists for viral gastroenteritis. Symptomatic therapy consists of replacing fluid losses and correcting electrolyte disturbances through oral and intravenous fluid administration

Appendix 11 Sample Sign for Entrance

ATTENTION VISITORS!

We presently have a number of ill residents/patients. You may wish to reconsider visiting at this time.

Please let the staff know who you will be visiting and they will give you any other necessary instructions.

Please wash your hands or apply alcohol hand rub to your hands before visiting and before leaving.

Thank you.

Appendix 12 Sample Outbreak Summary Report

Date of onset of outbreak: _____ Date outbreak declared over:_____

Microorganism identified: _____Laboratory Confirmed? Yes___ No___

Number of specimens identified in: _____ Suspected source: _____

Number of patients/residents exposed: _____ Total number of cases: _____

Attack rate for patients/residents (# of exposed divided by # of cases, multiply by 100):_____

Number of HCPs exposed: _____ Total number of cases (HCPs): _____

Attack rate for HCPs (# of exposed divided by # of cases, multiply by 100): _____

Number of cases requiring higher level of care: _____

(e.g. transfer to hospital, transfer to ICU)

Number of deaths: _____

Unusual situations:

Name and signature of person reporting: _____

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