

Presentation to the OAHHP Outbreak Management Workshop

**Irene Armstrong MD MSc CCFP
FRCP(C)**

**Associate Medical Officer of Health
Toronto Public Health**

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- Describe norovirus epidemiology
- Review norovirus burden of illness
- Become familiar with clinical symptoms
- Discuss challenges particular to the management of norovirus outbreaks

- First identified in 1972 in diarrheal stools obtained from cases and family contacts of an elementary school outbreak of gastroenteritis (GE) in Norwalk, Ohio in 1968.

- Caliciviridae Family
- Small, round single-stranded RNA virus
- Five genogroups: GI, GII, GIV infect humans
- GII.4 is responsible for majority (>80%) of norovirus cases/outbreaks

- European & U.S. GE outbreaks: 50%
- U.S. – estimate 23 million cases per year
- Ontario (09/10):
 - 13% community GE outbreaks
 - 51% institutional GE outbreaks
- Toronto (2010):
 - 48% of all GE outbreaks
 - 86% of GE outbreaks with an identified organism

- Transmission:
 - Person-to-person
 - Waterborne
 - Foodborne
- Infectious Dose: 10-100 particles
- Incubation period: 24-48 hours
- Period of Communicability: unknown, peak shedding first 24-48 hours after illness onset, prolonged shedding
- Seasonality: winter

- Complex and poorly understood
- Strain specific
- Short duration: 4 -36 weeks
- Great diversity of strains due to point mutations and recombination

- Up to 30% of infections are asymptomatic
- Illness usually self-limited
- More severe disease in debilitated, elderly, immunosuppressed
- Deaths rarely reported
- Illness duration: 48-72 hours

- Nausea (79%)
- Vomiting (69%)
- Non-bloody diarrhea (66%)
- Fever (37%)
- Chills (32%)
- Abdominal cramps (30%)
- Myalgias (26%)
- Headache (22%)

In Mandell D et al. Principles and Practice of Infectious Disease (7th Ed.) 2010.

- Self limited illness in most
- Supportive therapy may be required: hydration and electrolyte replacement

- Faecal samples in a sterile container for virus detection (maximum 5 per outbreak)
- Vomitus is not accepted
- Collect specimens as soon as possible after symptom onset
- Difficult to determine clinical relevance of norovirus in water and food samples.

The Role of Public Health

- Provide expertise and assistance in the prevention, detection, management, and control of gastroenteritis outbreaks.

- **Institutional:**

- Hospitals
- Long-term care homes

- **Community:**

- Cruise ships
- Schools
- Day cares
- Food services (e.g., restaurants, hotels)
- Military

Ontario Case Definition for Institutional GE Outbreaks

- Three or more cases* with signs and symptoms compatible with infectious gastroenteritis in a specific unit or floor within a four-day period

OR

- Three or more units/floors having a case of infectious gastroenteritis within 48 hours

Challenges in Norovirus Outbreak Management

- Strain specific and short lasting immunity
- Strain diversity (“drift”)
- Low infectious dose (10-100 viral particles)
- Prolonged/asymptomatic shedding
- Resistant to inactivation leading to environmental persistence
- Hand hygiene and cleaning products tested with norovirus surrogates

General Control Measures

- Meticulous hand hygiene
- Environmental decontamination
- Prevention of food and water contamination, including restriction of ill food handlers
- Exclusion of ill persons
 - Isolation of infected persons in closed settings (e.g. institutions, cruise ships)
 - Community - stay home if ill

Infection Prevention and Control in Health Care Settings

PIDAC Recommendations

- Contact precautions (in addition to routine practices)
- Single room
- Continue precautions until 48 hours after resolution of symptoms
- Report to local public health and notify Infection Control

Infection Prevention and Control Alcohol-based Hand Rub (ABHR)

ABHR recommended by PIDAC

- Evidence that 70% ABHR works for norovirus
- ABHR is available at point of care
- Isolated patient in contact precautions, gloves have proven efficacy in preventing transmission

- Highly resistant to inactivation by freezing, heating to 60°C, exposure to chlorine in concentrations of 0.5 to 1.0 mg per litre, pH level of 2.7, and treatment with ether, ethanol, or detergent-based cleaners
- Norovirus has been shown to survive in the environment for at least 12 days.

- Products used for disinfection of norovirus must have an appropriate virucidal claim
- Hypochlorite at 1,000 ppm is recommended by some jurisdictions
- Avoid cleaning carpets and buffing floors during an outbreak as norovirus may be re-circulated

- Prompt cleaning of emesis and faeces followed by disinfection with appropriate virucidal agent
- Increased frequency of bathroom and toilet cleaning, and disinfection on affected units
- Replacement of privacy curtains on terminal cleaning
- Steam cleaning carpet and soft furnishings following regular cleaning ($>60^{\circ}\text{C}$)
- Strict adherence to hand hygiene
- Enhanced cleaning of ER bathrooms

Declaring Institutional Outbreaks Over

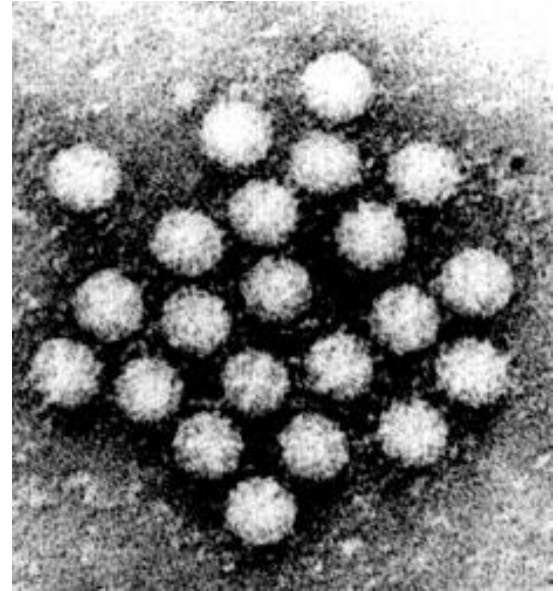
- Symptomatic staff associated with a norovirus outbreak should be excluded for a **minimum of 48 hours after symptom resolution**
- Norovirus outbreaks can be declared over when there are no new cases after five days

Issues in Managing Community Outbreaks

- Source identification in community norovirus point source outbreaks
 - Often undertake case control studies
 - Seldom successfully identify food item
 - Huge resource implications in context of limited resources.

- Responsible for a large burden of illness
- Many challenges in preventing and controlling outbreaks
- Refer to PIDAC documents for advice on routine practices and additional precautions and environmental cleaning.

Questions?



- Submitted faecal specimens negative for bacterial, and if tested, parasitic pathogens
- Greater than 50% of cases reporting vomiting as a symptoms of illness
- Mean or median duration of illness ranging between 12 and 60 hours, and
- Mean or median incubation period ranging between 24 and 48 hours.