

Norovirus: a modern day scourge

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Outline

- Objectives
- Background
- Montreal outbreak
- Communication issues
- Emergence of a new strain?
- Challenges for the Public Health Department
- Quebec's Norovirus intervention protocol: challenges and impacts for the healthcare setting
- Prolonged or recurrent outbreaks
- Future challenges
- Conclusions

Special thanks



- GLBHI conference organizers and Michigan Public Health Institute;
- Ms Marie-Line Gilbert, field epidemiologist, PHAC;
- Mr Hughes Charest, microbiologist, Laboratoire de Santé Publique du Québec;
- Montreal Public Health Department:
 - Mrs Josiane Létourneau, nosocomial team coordinator, Public Health Department;
 - Drs Renée Paré et Pierre Pilon, co-authors of the provincial guidelines on epidemic gastroenteritis management in health care settings;
 - Surveillance unit staff;
- CSSS Infection prevention nurses

Objectives



- Review the microbiological and epidemiological characteristics of Norovirus that affect public health practice in the health care setting;
- Qualitative assessment of the impacts of a Norovirus epidemic in health care settings;
- Share and discuss local public health strategies for surveillance and intervention of epidemic gastro-enteritis.

Norovirus

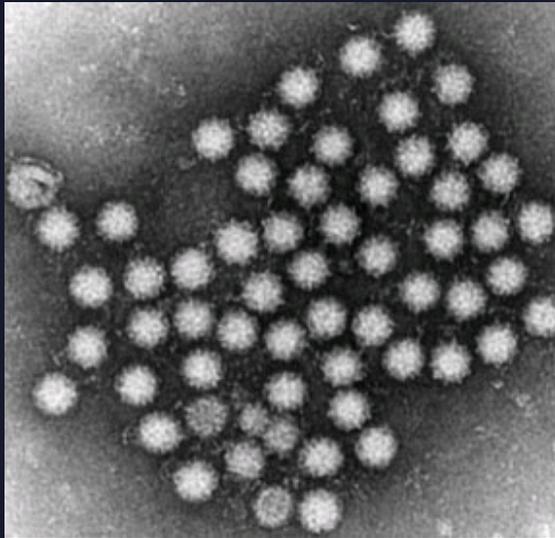


- Also known as *Norwalk* virus disease or *Winter vomiting disease*;
- Very small (27-32 nm), ssRNA, calicivirus family;
- Most common cause of nonbacterial gastroenteritis outbreaks;
- Occurs most often in outbreaks, some sporadic cases;
- Human reservoir;
- Transmission: fecal-oral, contact. Droplet suggested;
- Infecting dose small, large quantity in stool and vomitus;
- Outbreak settings: shellfish consumption, cruise ships, child care, hospitals, military, restaurants.
- Water or food borne with secondary transmission is common presentation.

Norovirus



- Incubation 12-72 hours (mean 24 h);
- Predominant symptoms: nausea, vomiting, diarrhea, cramps, fever and headaches.
- Usually self limited but can be severe in vulnerable populations;
- Communicability: few hours before onset of symptoms to 48h after symptoms have subsided;
- General susceptibility compounded by short-term immunity (14 weeks); levels of antibody do not correlate with susceptibility to the disease;
- Unenveloped, therefore particularly stable in the environment and more resistant to disinfectants;



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Epidemiology of the 2006-2007 Norovirus Outbreak in Montreal



- Definition of viral gastroenteritis:
 - Two sudden vomiting episodes within 24 hours
Or
 - Sudden diarrhea over 24 hours
 - And
 - 2 stools above normal frequency over 24 hours;
 - Absence of other possible causes for the vomiting and diarrhea (ex: laxatives, underlying disease);
 - Fever or nausea or abdominal cramps or HA.

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Definition of an Outbreak



- Suspected when there are two or more cases of gastro-enteritis with a possible epidemiological link (time, person and/or place).

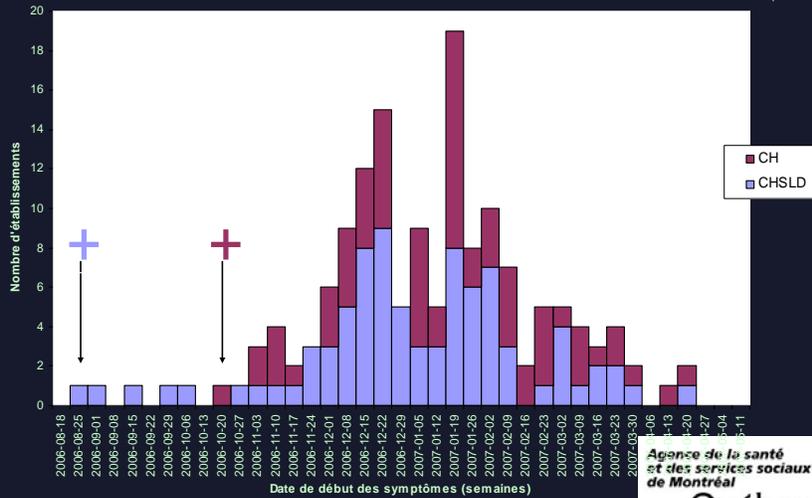
Surveillance in health care facilities



- Outbreak of gastro-enteritis in a health care facility is notifiable in Quebec;
- Surveillance via passive reporting.

Epi curve 2006-2007

Courbe épidémique des éclosions de gastro-entérite en établissements (CHSLD et CH) par semaine de début de symptômes, Montréal, 18 août 2006 au 11 mai 2007



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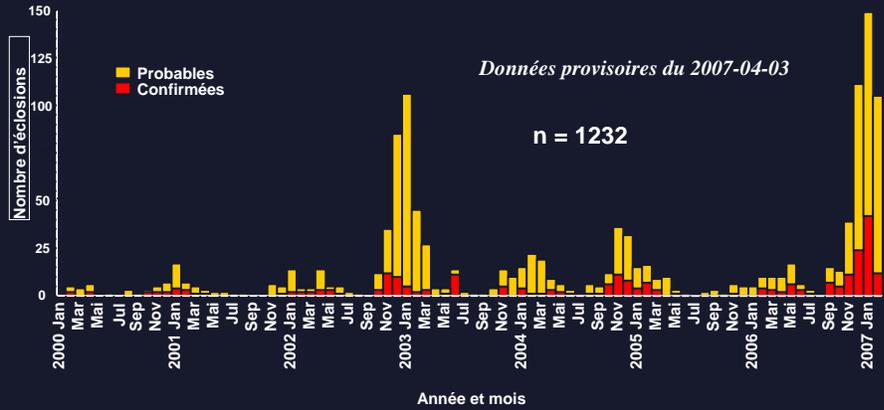
Outbreak data: health facilities

- Long-term care facilities:
 - 55/84 at least 1 outbreak;
 - 25/55 confirmed positive with Noro or calicivirus;
 - Total of 84 outbreaks.

- Acute care facilities and rehabilitation centres:
 - 28/33 at least 1 outbreak;
 - 24/28 confirmed positive with Noro or calicivirus;
 - 7/28 only one episode of outbreak;
 - Includes 3 psychiatric facilities, 3 rehabilitation, 1 paediatric, 1 geriatric institute.

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Outbreak declarations from Public Health Departments



Source: Laboratoire de Santé Publique du Québec



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- Typical seasonal incidence;
- Biannual epidemic curves;
- 2002-2003: US Farmington Hill

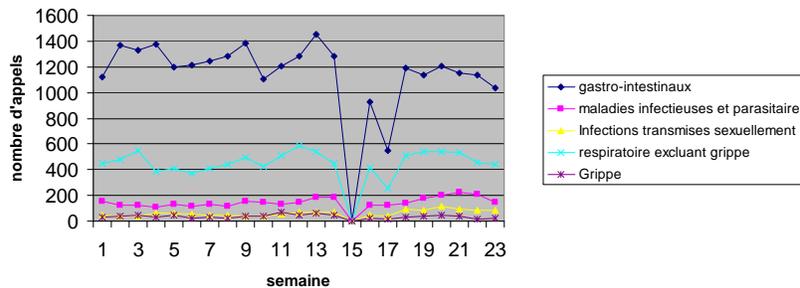


Norovirus in the community

- Health information telephone system;
- Passive reporting of outbreaks in schools, daycare, etc.
- Reporting of possible foodborne events;
- ER consultations and ambulance use (« Multi-risk surveillance »)

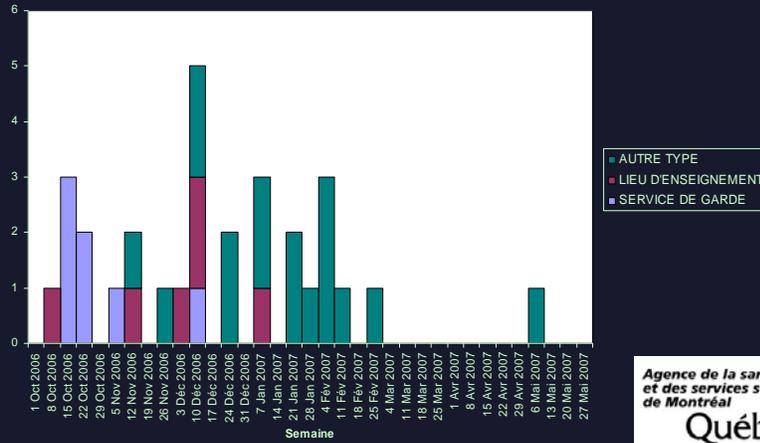
Health information telephone system

Raisons d'appels sélectionnés à Infosanté par semaine
Région de Montréal
du 18 décembre 2006 au 26 mai 2007



Other Outbreaks

Éclosions gastro-entérite région Montréal, période octobre 2006 à mai 2007



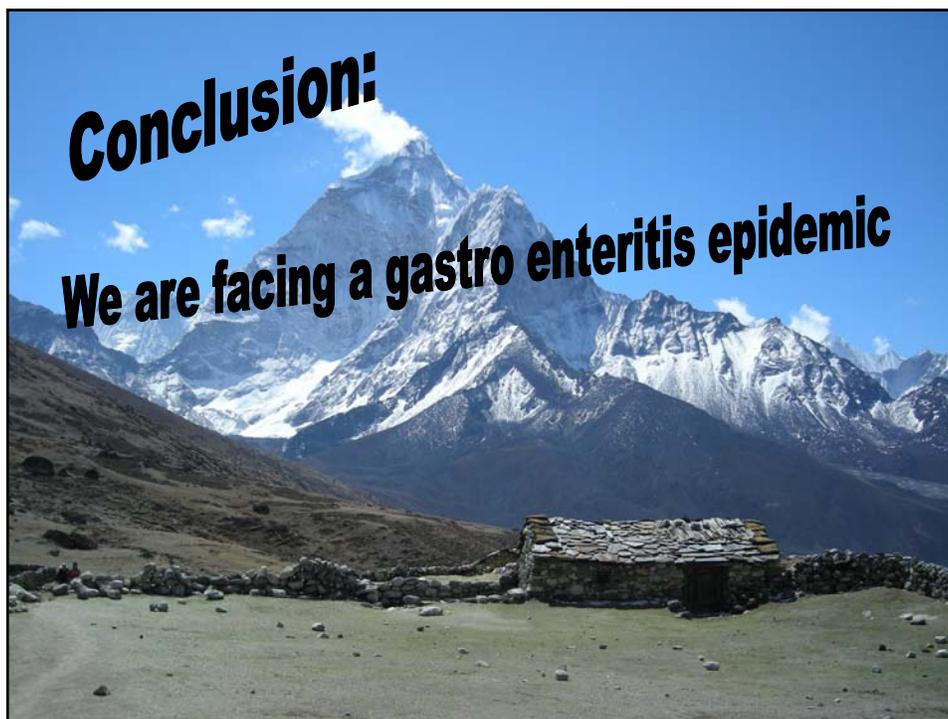
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Multi risk surveillance

Nombre d'inscriptions à l'urgence région Montréal, octobre 2006 à mai 2007
 Source de données : Siturg+



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New strain?

- Calicivirus: Norovirus-like and Sapporo;
- GI - GVI
- GI: classical Norwalk virus cluster
- GII: More diverse (Gwynend, Snow Mountain, Hawaii, White River, Toronto, Lordsdale virus clusters)
- In Quebec: GII 4 most common, especially Lordsdale
- Diagnostic testing by LSPQ: EM, PCR, **RT-PCR**

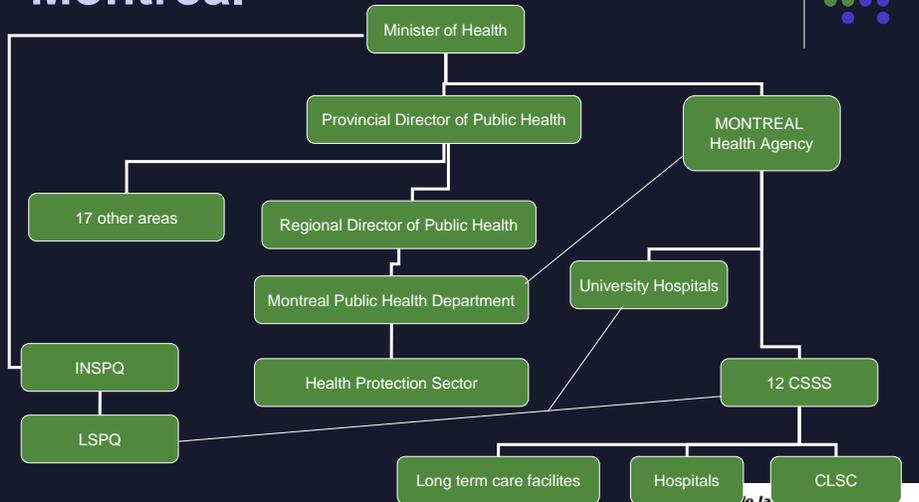
Source: *Laboratoire de Santé Publique du Québec*

- Lonsdale GII – 4 is predominant from 2000 to 2007;
- Other GI and GII have also been detected;
- Different cluster of GII - 4 in 2006-2007;
- Rapid dispersion of new clusters across Quebec;
- Sudden appearance and disappearance of new clusters;
- 2006-2007 clusters similar to international clusters identified (Japan and Holland);

Source: Laboratoire de Santé Publique du Québec



Public health organization in Montreal



Internal functioning



- ID Response team: 1 coordinator, 10 nurses, 1 field epi, 1 medical consultant and 1 physician on call ;
- For outbreaks in a healthcare facility, on call physician is responsible for initial assessment and counseling the facility;
- Info is forwarded to the Surveillance unit that creates a file for the facility;
- Follow-up done by team coordinator;
- Daily Briefings to discuss the cases;
- During the course of the epidemic, added secretarial help to gather the follow-up info.

Available tools



- Provincial intervention guidelines
 - Before outbreak season: dissemination and clarification of guidelines with health care facilities;
 - 5 stool samples (bacterial and viral testing);
 - In Norovirus « season » after 4-5 positive samples only bacterial testing is recommended;

Other tools

- Communication with partners:
 - Appel à la vigilance;
 - Epidemiological bulletin;
 - Fax sheets;
- On call physician:
 - Local questionnaire based on the provincial guidelines;
 - Includes a follow-up section;
 - Special Gastro enteritis folder with to do list;
 - Intervention aid for prolonged outbreaks (more than 7-10 days);
- Epidemiology:
 - Epi curves
 - Line listing

Leaving the evening news?

- Or did we?
- Number of interviews:
- Links with the *C. difficile* outbreak of 2004;
- Expectations of the media:
 - Daily report of number of cases and outbreaks;
 - Names of facilities involved;
 - Reporting of closing of facilities or units;
- Expectations of the Provincial Minister of Health

PHD Challenges and opportunities



- Media:
 - Did our communication strategy contribute to the fire?
 - Public information;
- Strategic perspective
 - How far should we go given dealing with a generally self limited disease (cost benefit) ?
 - Cost efficacy of interventions when the disease is widely spreading in the community?
 - Regional consequences of closing a unit or a facility of acute care? (Risk vs Benefit)
- Internal management
 - How to ensure a coordinated response when the physician on call changes every week / varying different levels of expertise?
 - Procedure with on call physician is time consuming and inefficient when 20+ outbreaks are reported in a single week

PHD Challenges and opportunities



- Relationship with CSSS and partners:
 - Being aware and informed of the situation;
 - Excellent results with diagnostic testing;
 - Should the PHD or the facility decide to temporarily stop admissions to a facility because of a Norovirus outbreak?
 - Facilities closed to visitors against PH recommendations?
 - Questions that are not in the guidelines? Christmas parties, religious ceremonies...
 - How to support infectious disease prevention nurses in being creative and autonomous about implementing the recommended guidelines?
 - Acting as “negotiator” between short-term and long-term care facilities

Health care and infection control historical context



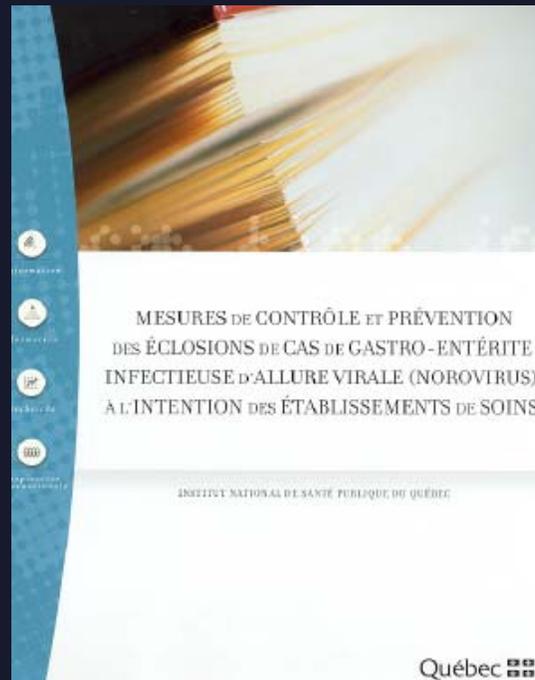
- Health care facilities:
 - Built >20 years ago. Some are >80 years old
- Infection control nurses
 - Recent implementation in long-term care facilities
 - Most of the infection control nurses have less than a year of experience.
 - Quebec's Norovirus intervention protocol was published in 2005

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Quebec's Norovirus intervention protocol



Definitions

- Outbreak and end of an outbreak

Guidelines

- Hand washing
- Cleaning and disinfection
- Workers
- Patients / residents
- Visitors

Quebec's Norovirus intervention protocol



Hand washing

- October - November 2006
 - Posters and flyers explaining what a good hand wash means;
 - Alternatives to plain soap and water hand wash; alcohol based soap

Quebec's Norovirus intervention protocol



Hand washing cont'd

- December 2006
 - Some outbreaks exceeds the expected 7-10 days;
 - PHD is concerned and realize that the alcohol-based soap used in most of the facilities is a 60% alcohol-based, when a 70% should be used.
- January 2007
 - Outbreaks are more frequent and last longer >2weeks up to 4-5 weeks.
 - Security agents are posted near the entrance of the facilities or even the wards to control hand washing.

Quebec's Norovirus intervention protocol



Hand washing vs disposable gloves

- November 2006
 - Outbreaks occurs due to the misuse of disposable gloves.
 - Gloves weren't always disposed between patients.

Quebec's Norovirus intervention protocol



Cleaning and disinfection of the environment

- Old facilities
- Particularities of the cleaning / disinfection agents
- Involves a better understanding and collaboration by the:
 - Health care workers
 - House cleaning team
 - Administration
- November-December 2006
 - Poor to fair understanding and collaboration
- January-end of outbreak season
 - Big improvements
 - Regular meetings were held between managers, infection control providers, head nurse's, house cleaning, human resources.

Quebec's Norovirus intervention protocol



Workers

- Isolation gowns:
 - Not done systematically by all type of health care workers.
 - Information session, surveillance / control and peer pressure contributed to improve the use of isolation gowns.
- Exclusion of symptomatic worker until 48h after last symptoms
 - Enhance staff shortage;
 - Need to pay while on sick leave to make sure they stay home the whole length of period;
 - Recurrent episodes of gastro-enteritis.

Quebec's Norovirus intervention protocol



Workers

- Cohort of the personnel
 - Very difficult to implement in some facilities due to;
 - staff shortage
 - facility organization.
- Context of the private nursing agencies;
 - Don't always pay sick days.
 - Same nurse can work in more than one facility.
 - Private agencies have a role to play in the prevention of nosocomial infections;
 - Arrangements were established between facilities and agencies.
 - Nurses "dedicated" to one facility.

Quebec's Norovirus intervention protocol



Patients / residents

- Individual isolation until 48 hours after last symptom.
 - I don't understand. What does it mean?
 - How and where will I eat? And what? And will it still be hot?
- Cohort of ill patients
- Patients with cognitive deficiencies.
- Ward closed to visitors
 - Becomes an important irritant after a few days

Quebec's Norovirus intervention protocol



Patients / residents cont'd

- Suspension of social activities
 - Christmas and new year's gathering
 - Sunday's mass
 - Closed restaurant; every one eats in their rooms
 - Pet therapy
 - Hair dresser
- Suspension of transfers / admission;
 - Impact on the bed management.
 - A lot of questions for PHD.

Quebec's Norovirus intervention protocol



Visitors

- Hand wash "police"
- Need to wear an isolation gown
 - How?
 - Do I really need to wear one? I'll only talk, I won't touch him.
 - Why do I need to wear one when the worker isn't wearing one?
- Limiting visitors
 - Have I been sick? Why asking?
- Closed ward
 - When will I be able to see my relative?
 - How / who will feed him? Bathe him?

Impacts from the intervention protocol



- Physical / Psychological
 - Workers
 - Stress
 - Exhaustion
 - Verbal aggression from patients / family members / visitors
 - Patients / residents / family members
 - Incomprehension
 - Depression / despair
 - Multiple complaints
 - Mortality

Impacts from the prevention and control protocol



- Financial burden
 - Limited human resources
 - Mandatory overtime
 - Extra-personnel
 - Security agents
 - Private agencies
 - Paid sick leave
 - Protective material / disinfectant products
 - Unused beds

Prolonged or recurrent outbreaks



- Possible causes
 - Patients
 - Workers
 - Administration
 - Facility
 - Visitors
- Impacts
 - Exhaustion
 - Decreased confidence towards guidelines
- Challenges
 - Applying the guidelines adequately
 - Facilities decreeing a quarantine

Prolonged or recurrent outbreaks



Facilities decreeing a quarantine

- Closed to all new patients and to visitors
- Not recommended in the Quebec's Norovirus intervention protocol
- Impacts:
 - PHD is questioned and blamed
 - Media gets involved
 - Great despair among residents and family members
- But, when well managed at all levels, it can rapidly help gaining control and stop the outbreak.

Conclusions



- Norovirus in Montreal was part of an International epidemic of a new cluster of GII – 4;
- The microbiological characteristics of Norovirus affect infection prevention and control;
 - Appears in outbreaks;
 - Frequent and sudden mutations, small infecting dose, fleeting immunity;
 - Stable in environment and resistant to usual disinfection products;
 - Highly communicable and population widely susceptible.
- There were important impacts of the epidemic at the local level:
 - PHD: Internal functioning and resources;
 - PHD: Relationship with partners at the local and provincial levels;
 - Health care settings: Financial, equipment, functioning, workers, patients, residents, families;
 - Media;
 - Population-based impacts difficult to assess.

Conclusions



- Importance of the longitudinal work with CSSS and long term care facilities:
 - Creation of a nosocomial infection prevention and control regional committee;
 - Enhanced training;
 - Enhanced communication;
 - Support the development of the autonomy for the Infection Control Providers;
 - Ensuring collaboration with managers of the facilities