

Norovirus Outbreaks: Epidemiology Outbreak Management Workshop September 15, 2010

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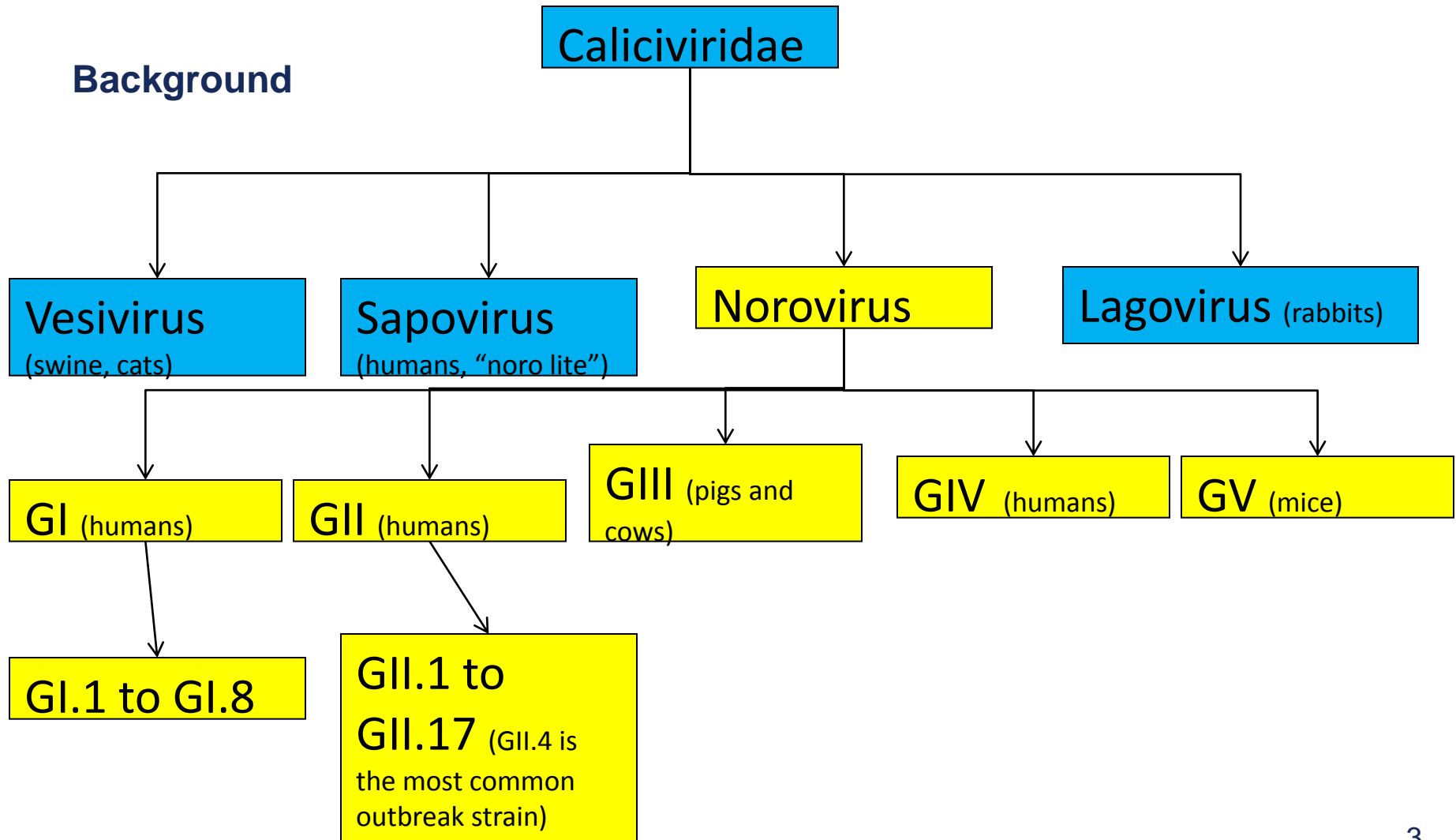
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Objectives

- Background
- Norovirus epidemiology
- Diagnosis
- Disease burden
- Norovirus outbreaks
- Challenges in outbreak control

Background



Epidemiology

- Incubation period: 12-48 hours
- Symptoms: Acute nausea, vomiting, abdominal cramps, diarrhea, headache, low grade fever, chills
- Period of communicability: 24- 60 hours
- Transmission: Fecal-oral spread; droplet
- Genetic component to susceptibility?

Treatment:

- Hydration and, if needed, electrolytes

Diagnosis

- Stool collected for viral detection
- Specimens should be collected early in illness when viral shedding is greatest, however viral detection using RT-PCR is very sensitive
- Norovirus difficult to identify from food and water samples

Disease burden

- Most dominant genotype is the GII.4, causing 60%-90% of cases in the US and globally (no Canadian data)
- Studies have estimated that for every lab confirmed case, there are 1562 other undiagnosed norovirus infections
- 23 million cases in the US each year, second only to rotavirus as a cause of paediatric diarrhea
- Of the 23 million cases, 50,000 are hospitalized, 310 fatalities, mostly among the very young and old and immunocompromised
- 91,000 ER visits and 23,000 hospitalizations for children <5

Disease burden con't

- 300–400 outbreaks of norovirus are reported to the National Enteric Surveillance Program at PHAC each year
- Historically, norovirus outbreaks are poorly reported in Ontario

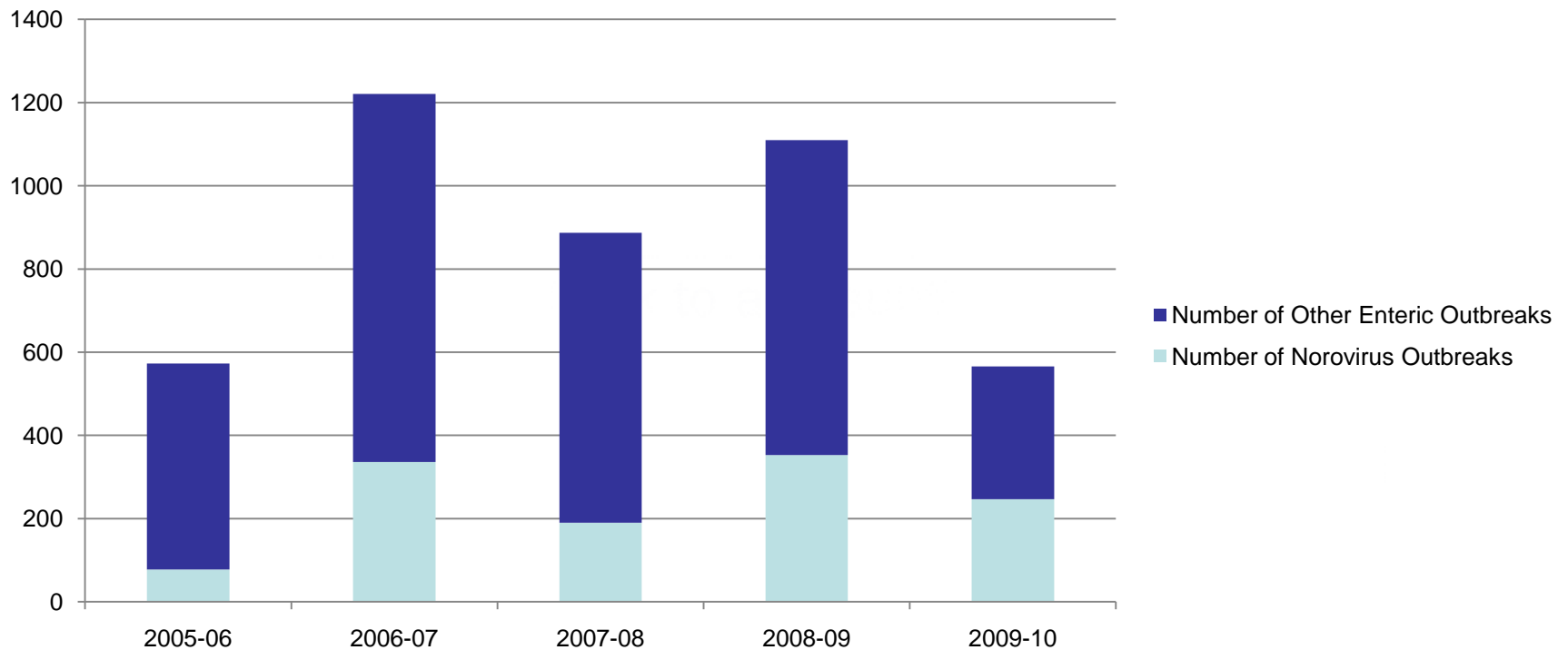
Institutional gastroenteritis outbreak: Case definition, Ontario

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

OR

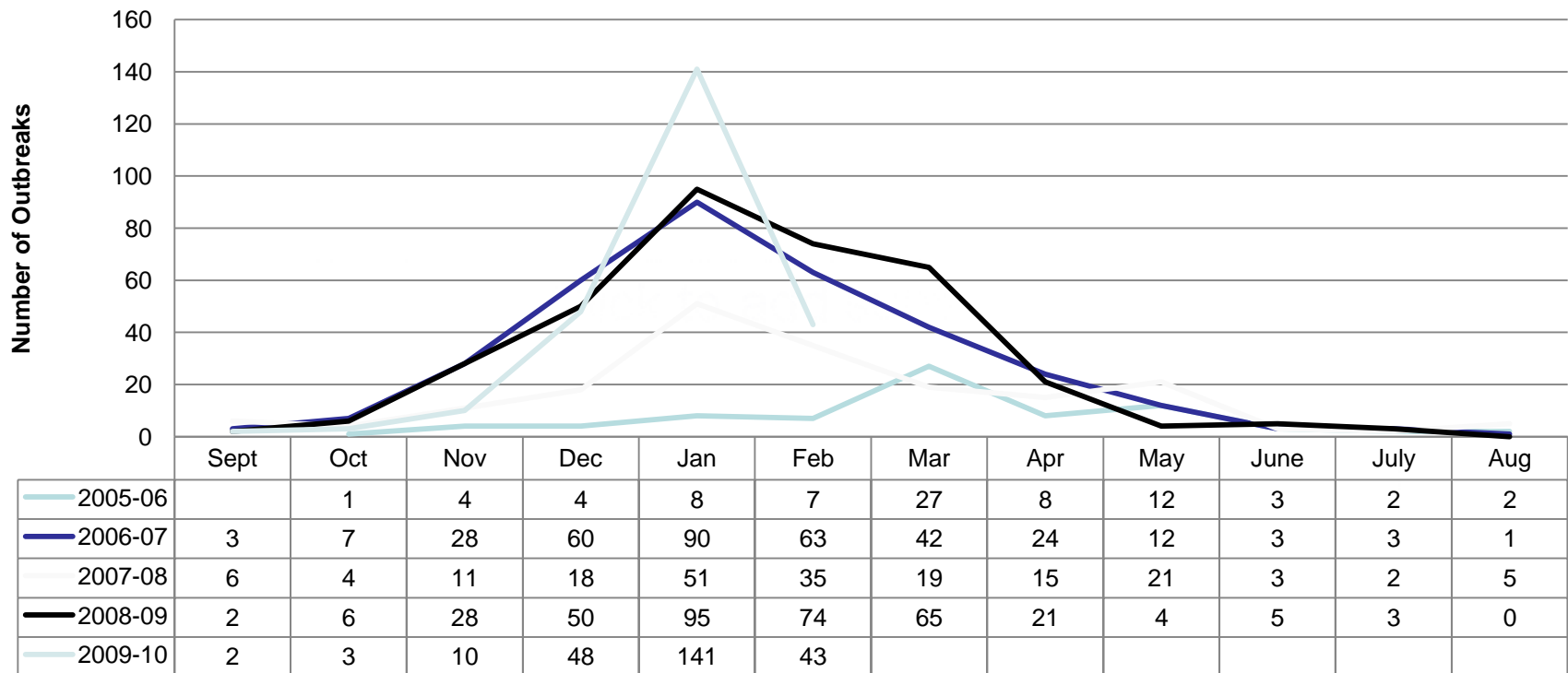
- Three or more units/floors having a case of infectious gastroenteritis within 48 hours

Number of confirmed enteric outbreaks by year, Ontario, September 1, 2005 to February 19, 2010



Source: MOHLTC, iPHIS database

Number of laboratory confirmed norovirus outbreaks by month, Ontario, Sept. 1, 2005 to Feb. 19, 2010



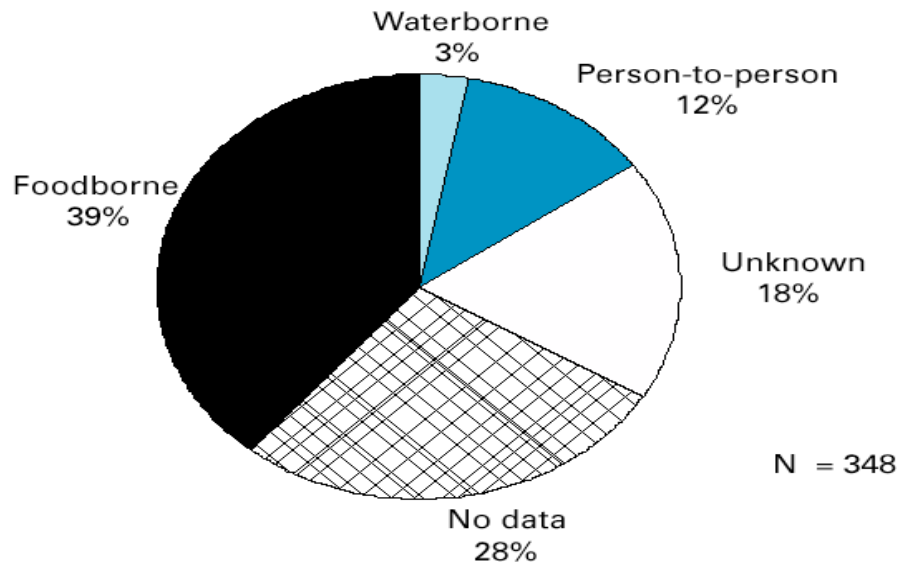
Source: MOHLTC, iPHIS database

Outbreak locations

- Often occur in semi-closed environments such as:
 - Long-term care homes, hospitals, cruise ships, military quarters, aircraft
- Community settings such as
 - Sports events, camping trips, travel that favors person-to-person spread

Transmission Mode and Settings of 348 Norovirus Outbreaks: USA, 1996-2000 MMWR

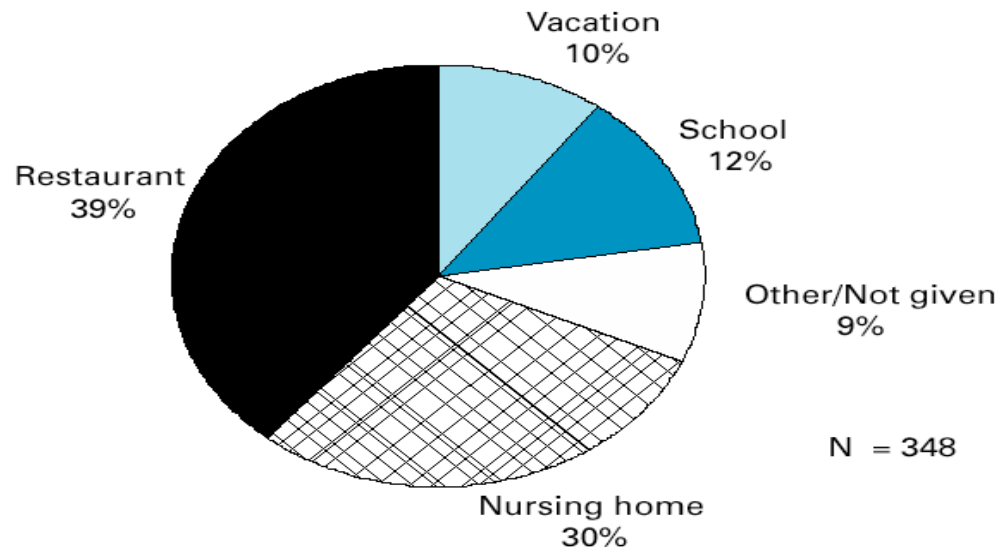
FIGURE 1. Settings of 348 outbreaks of gastroenteritis reported to CDC during January 1996–November 2000*



* Source: Fankhauser RL, Noel JS, Monroe SS, Ando T, Glass RI. Molecular epidemiology of "Norwalk-like viruses" in outbreaks of gastroenteritis in the United States. J Infect Dis 1998;178:1571–8; and CDC, unpublished data, 1997–2000.


Transmission Mode and Settings of 348 Norovirus Outbreaks: USA, 1996-2000 MMWR

FIGURE 2. Mode of transmission of 348 outbreaks of gastroenteritis reported to CDC during January 1996–November 2000*



*Source: Fankhauser RL, Noel JS, Monroe SS, Ando T, Glass RI. Molecular epidemiology of "Norwalk-like viruses" in outbreaks of gastroenteritis in the United States. J Infect Dis 1998;178:1571–8; and CDC, unpublished data, 1997–2000.

Challenges in outbreak control

- Low infectious dose (10-100 viral particles)
- Prolonged shedding 2- 8 wks (significance?)
- Strain drifts and diversity
- Non enveloped virus
- Short-term immunity
- 
- High attack rates

Control measures for institutional outbreaks

- Key is to prevent person to person transmission
- Rapid isolation of cases based on symptoms, not lab confirmation
- Contact precautions, masks/eye protection may be needed if risk of splashing
- Education of staff

Control measures con't

- Appropriate IPAC practices including hand hygiene
- Appropriate and frequent cleaning
- Staff exclusion for facility outbreaks
- “Often when VRE, norovirus, or MRSA has been isolated from a surface, often unrelated to a failure of the disinfectant but a failure to clean and disinfect all surfaces leading to continued contamination”
- Some outbreaks have only ended when there are no more susceptible individuals

Conclusions

- Control of norovirus outbreaks remains a challenge due to unique virus characteristics
- Emphasis on prevention of transmission through:
 - early recognition of symptoms
 - effective staff, visitor and patient education
 - Rapid implementation of IPAC practices and environmental cleaning

Questions, comments?

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