



BC Centre for Disease Control
Provincial Health Services Authority

Using advanced surveillance tools to understand norovirus evolution, public health impacts, and to enhance outbreak response

Dr. Natalie Prystajecky
Dr. Mayank Singal
April 3, 2025

Objectives

- To understand the epidemiology of norovirus epidemics & the special role of wastewater surveillance
- To understand the association between genetic evolution and impact on epidemic severity
- To demonstrate response to a foodborne illness outbreak
- To understand newer tools used in norovirus outbreaks and norovirus surveillance

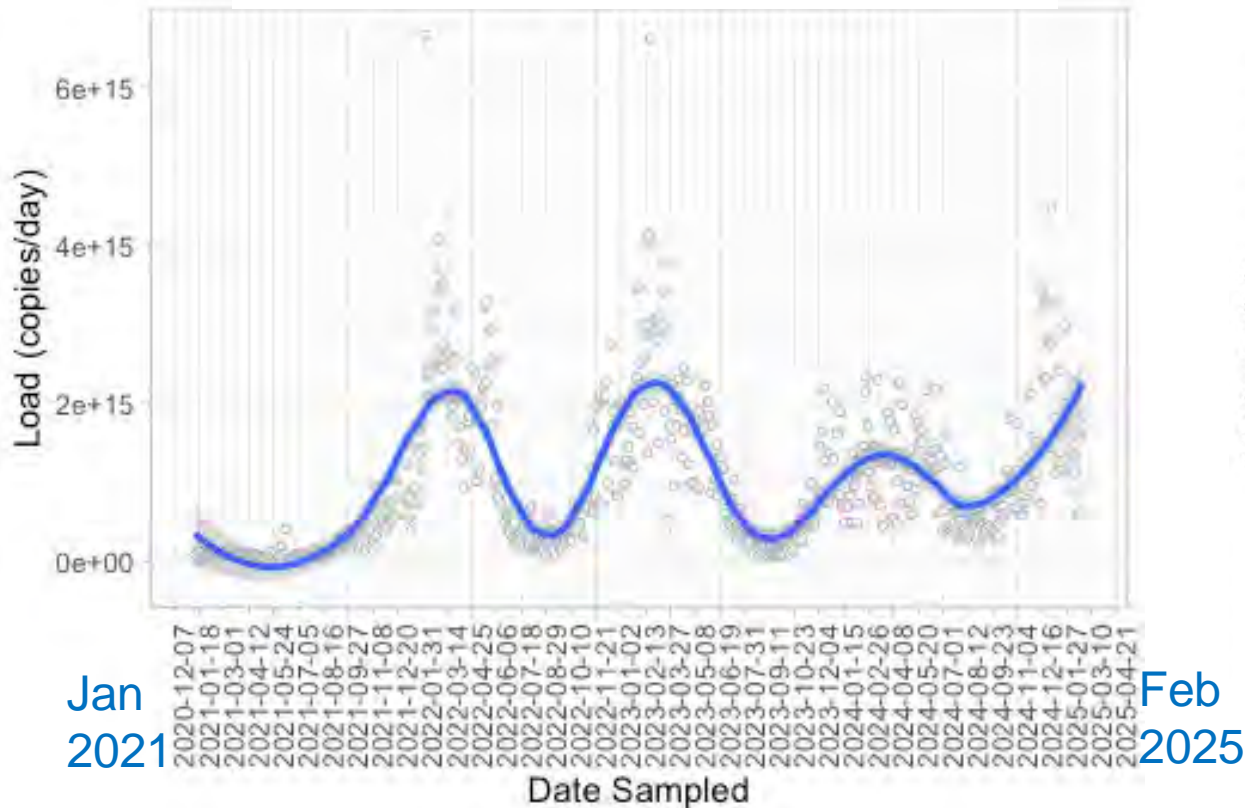
Norovirus illness



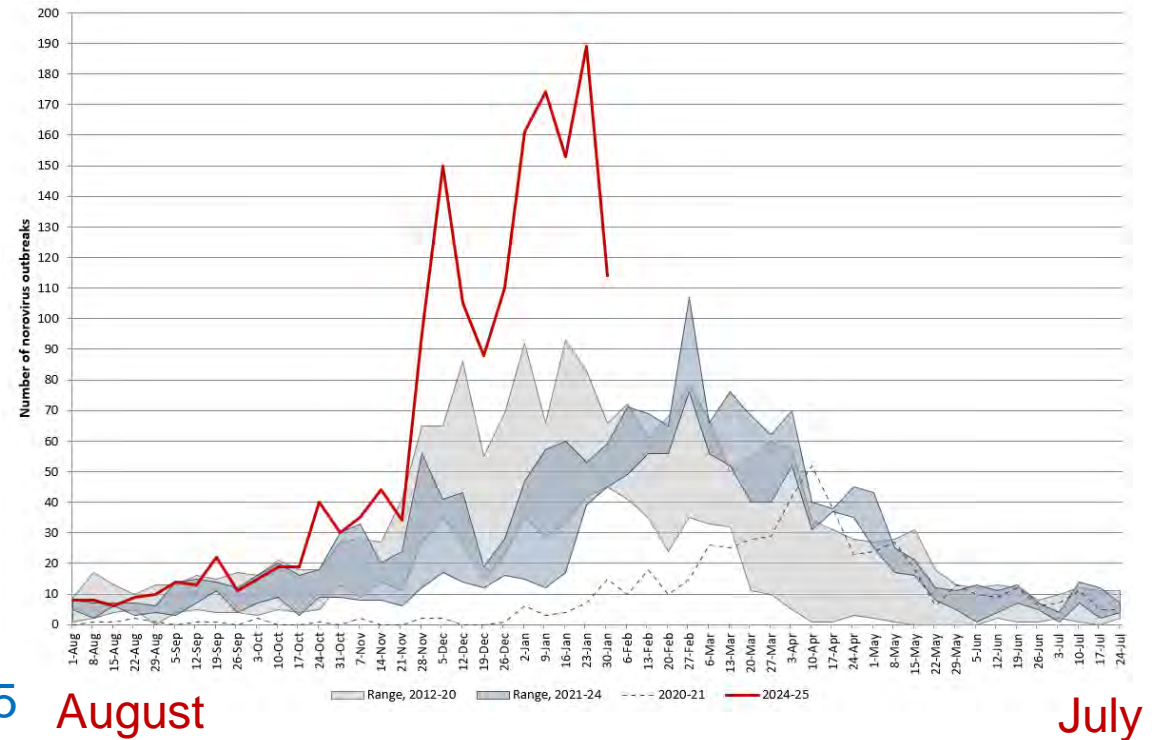
- Most common cause of GI illness
- Abrupt onset
- Nausea + vomiting (intense)
- Diarrhea
- Fever, abdominal pain
- Dehydration
- Self-resolving after 2-3 days
- Transmission: person to person & foodborne

Recent Norovirus Activity

Vancouver Wastewater activity



United States outbreaks (CDC, 2025)



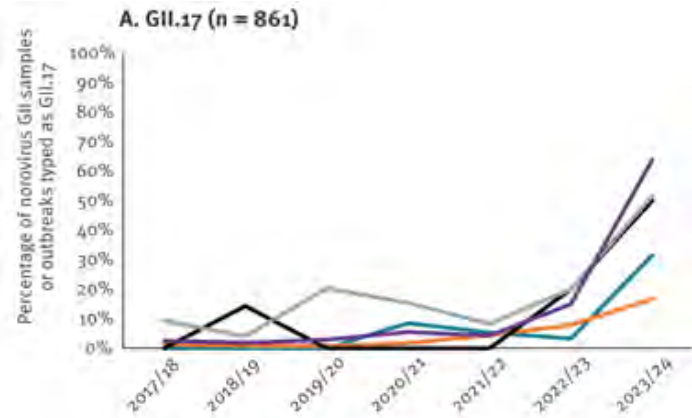
Mansour, McVea, EM lab

What may be behind this unusual increase?

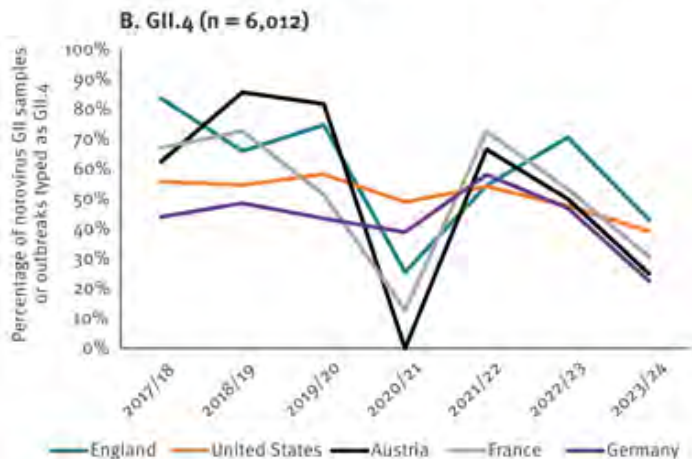
- Virus: new strain, immune escape
- Population: waning immunity, post-pandemic state
- Environment: travel, climate change
- Artefactual causes: more testing, more reporting, more awareness, better lab test

Change in circulating genotype

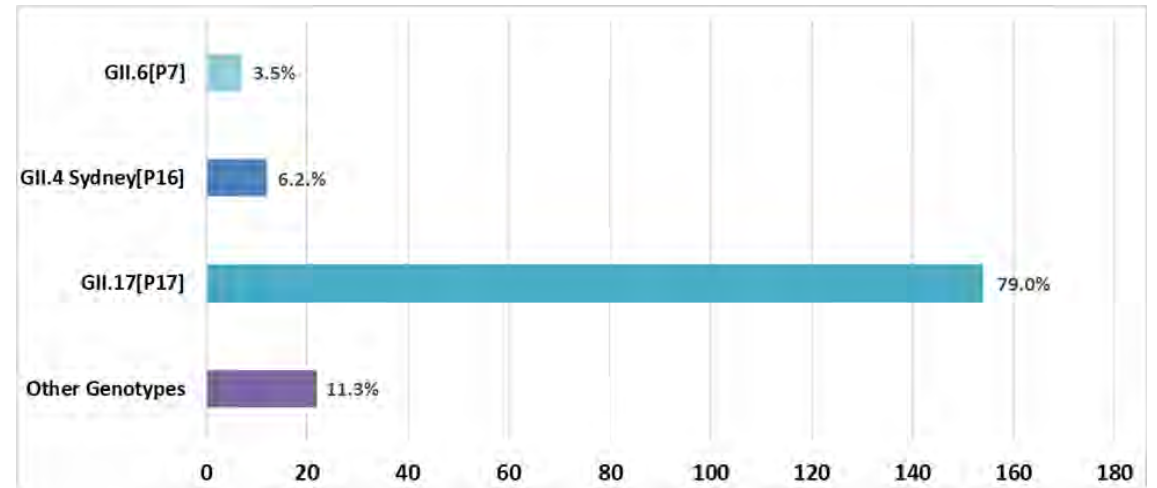
GII.17



GII.4

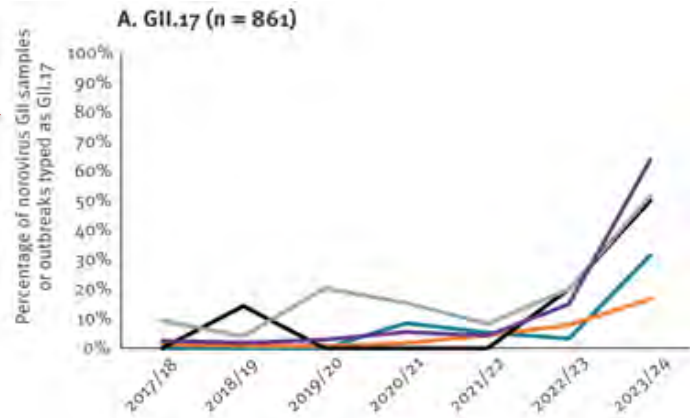


United States outbreaks: Sep 2024 – Jan 2025

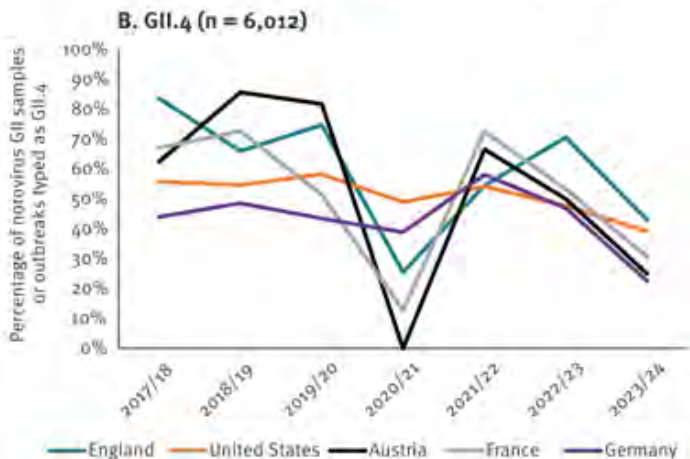


Shifting genotype associated with greater illness

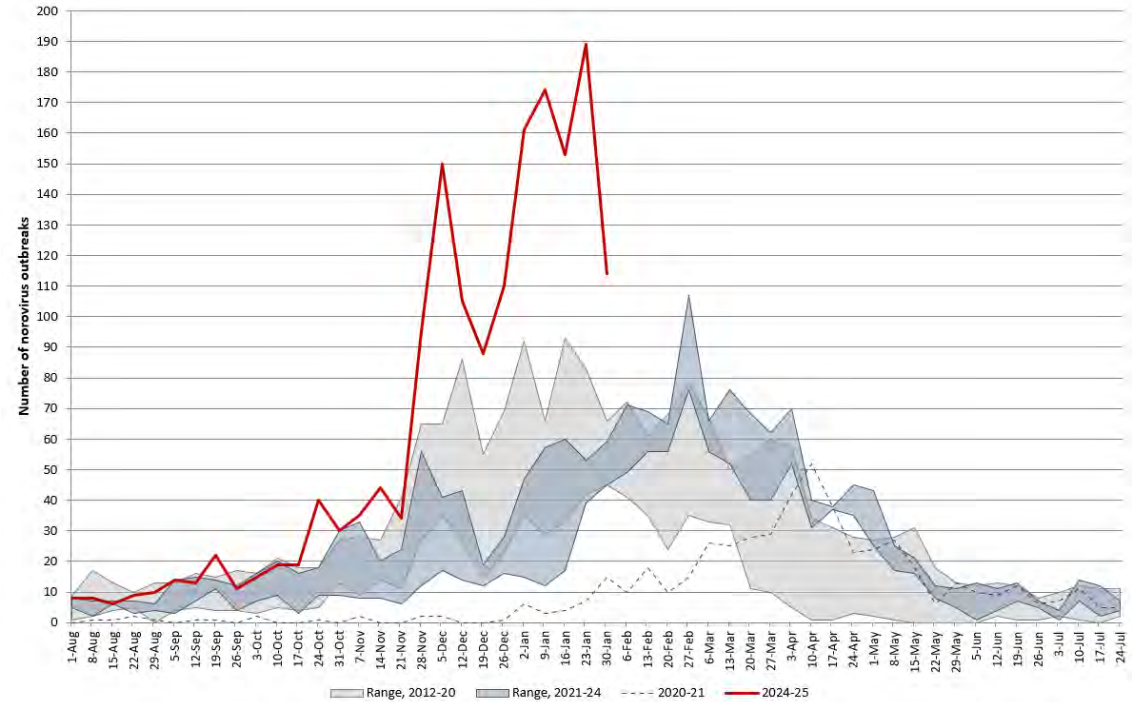
GII.17



GII.4



United States outbreaks




HEALTHY | REAL HOME

'Quad-demic' Hitting US With Flu, COVID-19, RSV, Norovirus Surging

By **Ilana Y. Lee**, Senior Contributing Writer | **Ilana Y. Lee, M.D., MSA**, covers health, med... [1-Click Author](#)

Jan 26, 2025 (11:00 AM EST)

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With the current quad-demic, there are precautions that you can take. For example, after respiratory ... [+] ANADOLU VIA GETTY IMAGES

This is not how you want to go viral. The U.S. is currently going through surges of not one, not two, not three, but four different viruses. That's prompted folks to nickname the current situation a "quad-demic." Here's what you can do to protect yourself.


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Norovirus hospital cases reach highest level ever

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Nick Trigg
Health correspondent • @nickstrigg



There are a record number of patients in hospital with Norovirus in England.

Data from NHS England showed 1,160 patients a day on average were in hospital with the vomiting bug last week – double the level at the same period last year.

It comes after a 22% rise on the week before, pushing it to the highest level since records began in 2012. It means more than 1% of beds are occupied by patients ill with the bug.

But Norovirus puts added pressure on hospitals because of the need to isolate and clean infected wards – nearly 300 empty beds a day were taken out of action because of this.

Flu cases continue to fall, however, with just over 1,700 beds occupied by patients with the virus.

Horrible bug

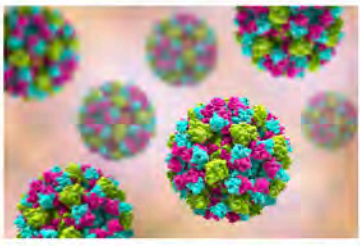
REACT

New Strain of Norovirus May Be Causing Uptick In Cases

Learn more about norovirus, how to prevent contracting it, and why this year has seen such a surge in cases.

By **Ornella La Rosa Luchini**
Feb 7, 2025 8:00 AM

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Norovirus illustration. This is not an example of the new strain, but the norovirus in general. (Credit: Katarzyna Kwiz/Shutterstock)

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Every winter, public health departments report a rise in illnesses. Most of these infections are expected during the colder months, and the data features the usual lineup of suspects — acute bronchitis, influenza, pneumonia, and respiratory syncytial virus (RSV).

This year has also seen a surge in norovirus, a highly contagious stomach bug. Starting November 2024, the percentage of positive tests for norovirus began to increase, which is to be expected in the colder months when people begin to congregate inside more. But by January 2025, almost one-quarter of the tests were positive, nearly double the rate of last season's outbreak, according to the Centers for Disease Control and Prevention (CDC).

Although the stats may seem scary, scientists know why norovirus infections are soaring this year. And they have advice on how people can protect themselves.

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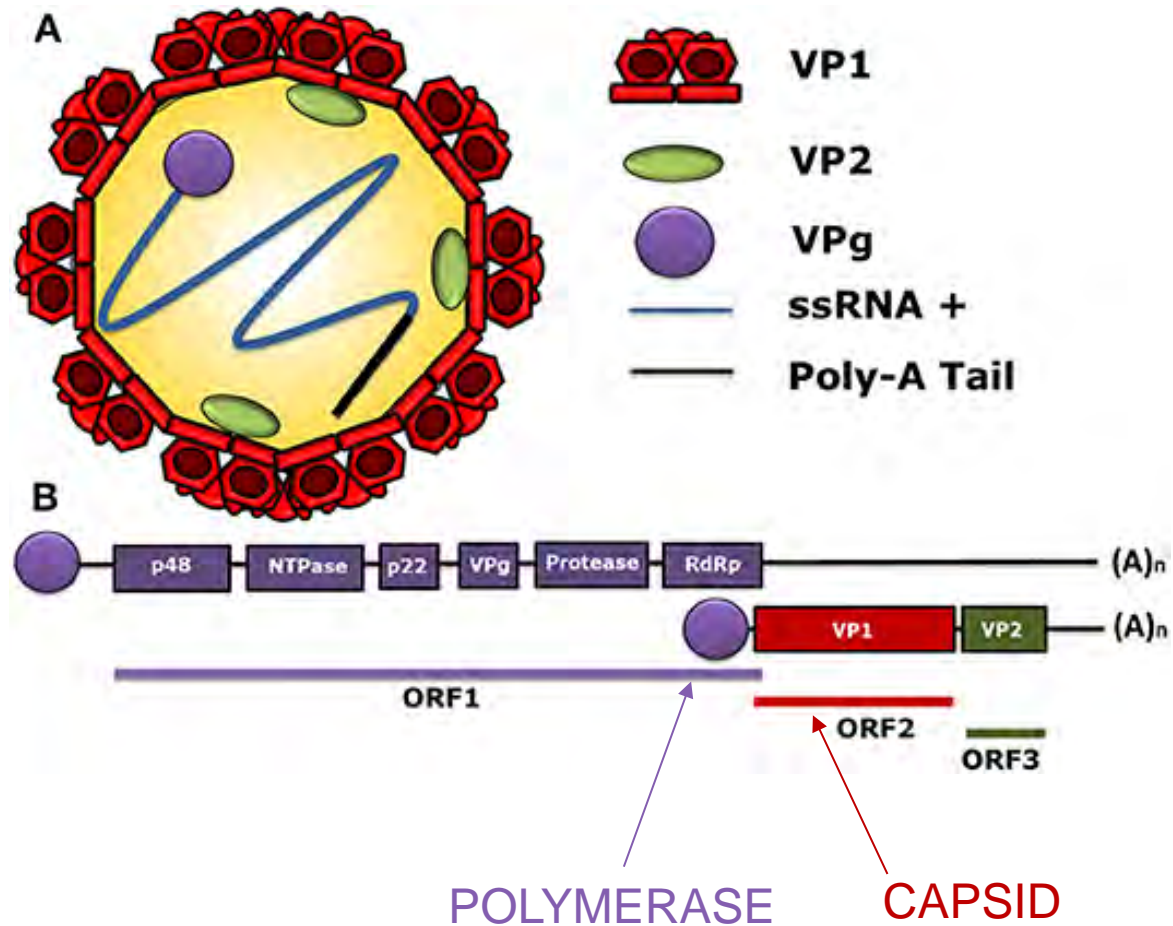
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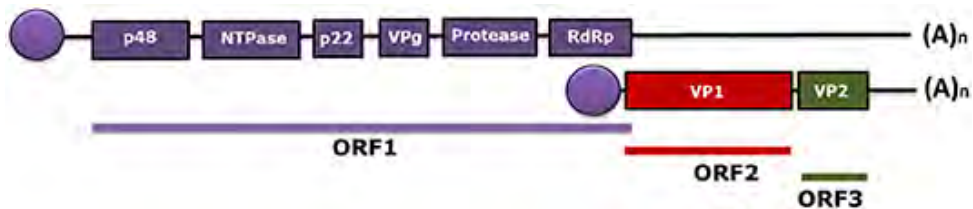
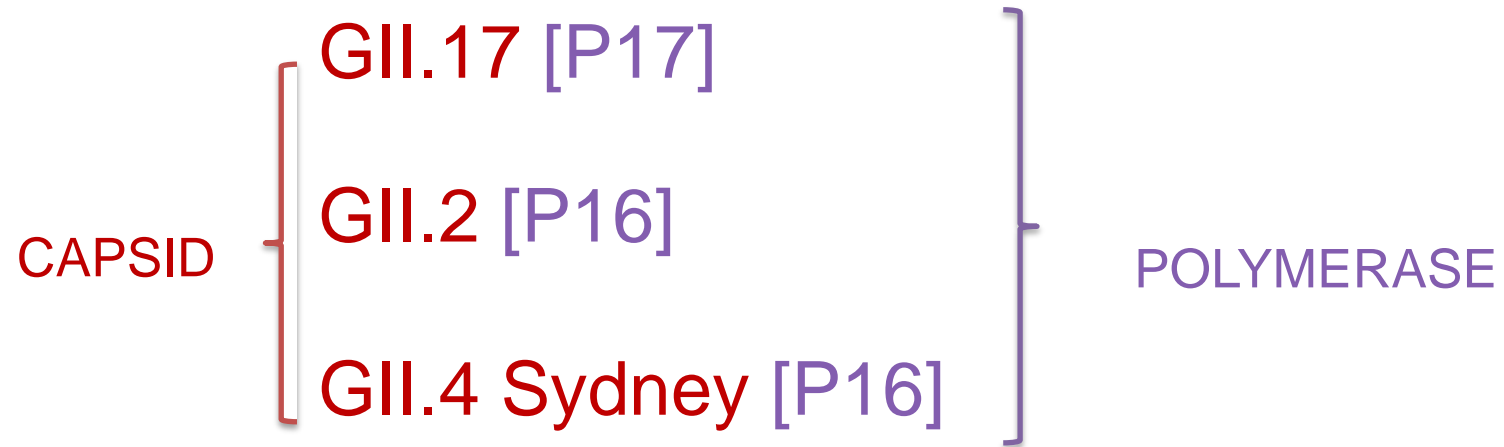
New Molecular Tool in Cancer Treatment Shows Promise for Treating HIV

Mass Fluoridation Controversy Could Prevent Bad Flu Season, Will Also Make Virus Evolve

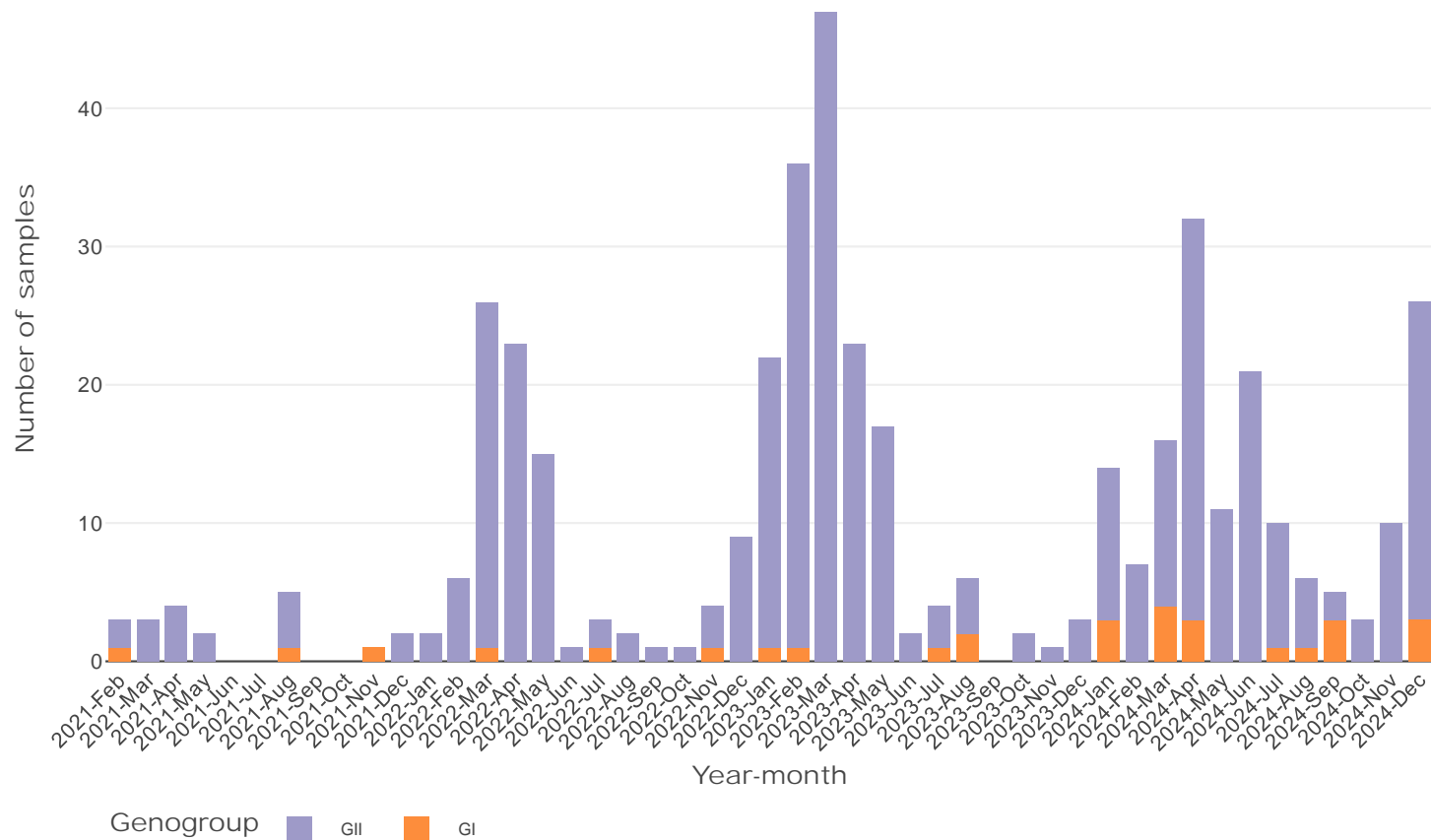
Norovirus Genotyping



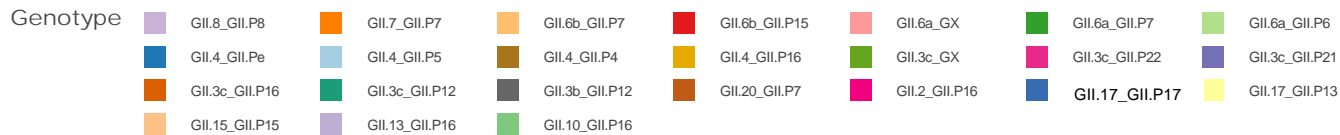
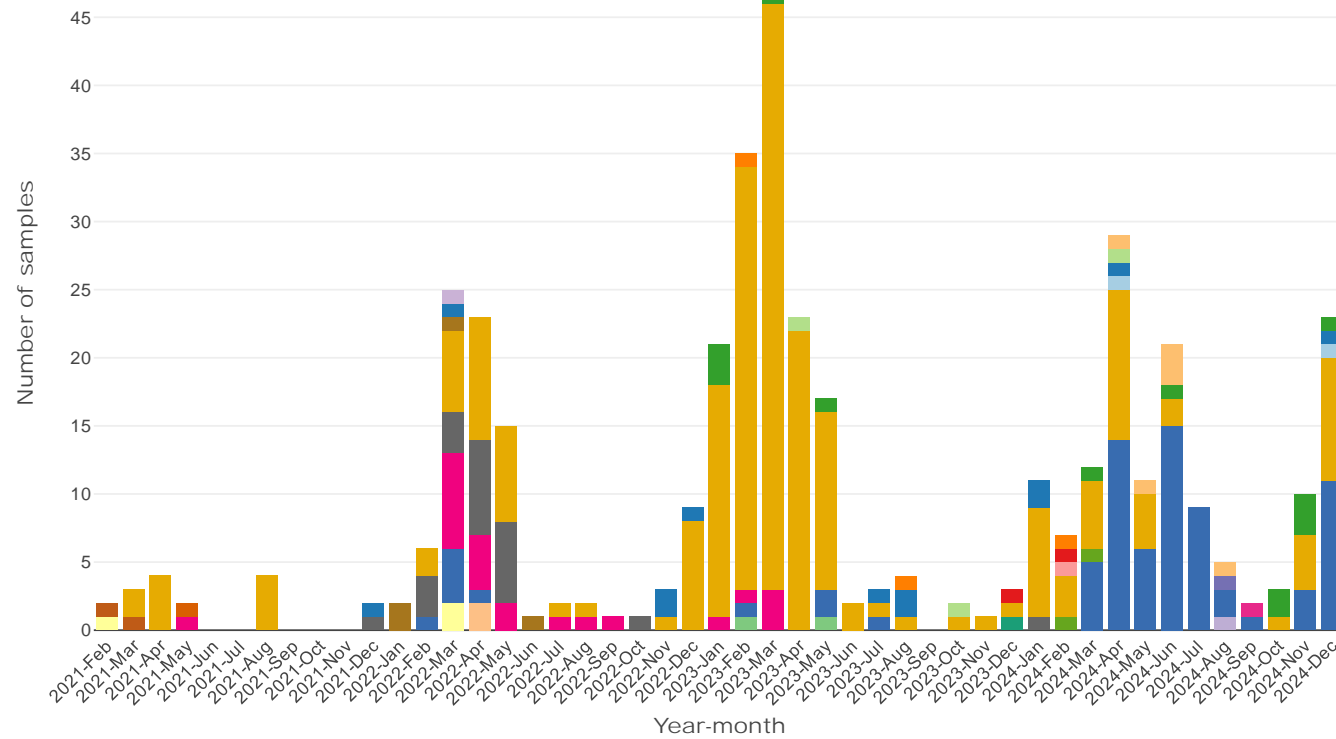
Dual Target – To Describe Recombination



Norovirus in BC – Genogroup II is most common



Strain Replacement: GII.17[P17] may be replacing GII.4[P16] in 2024/2025 season



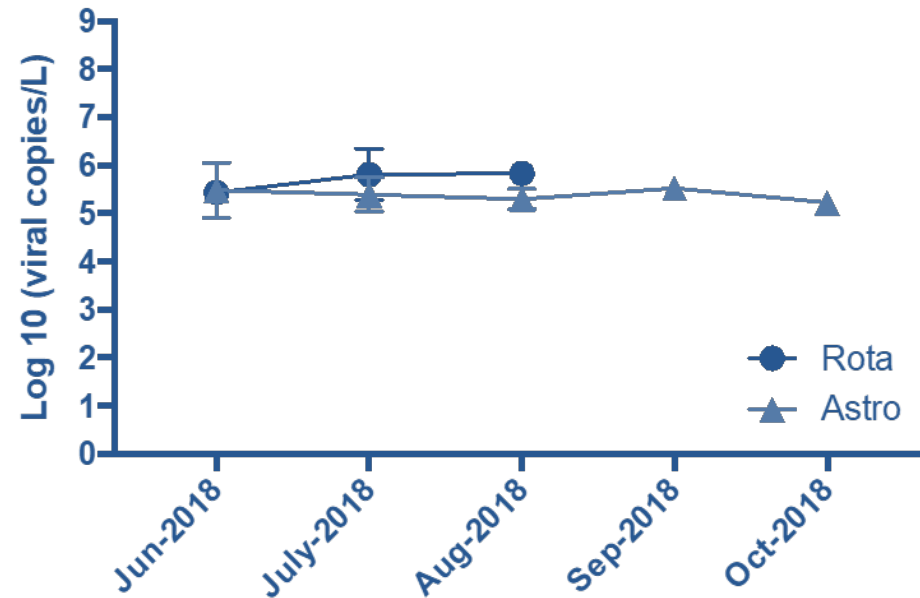
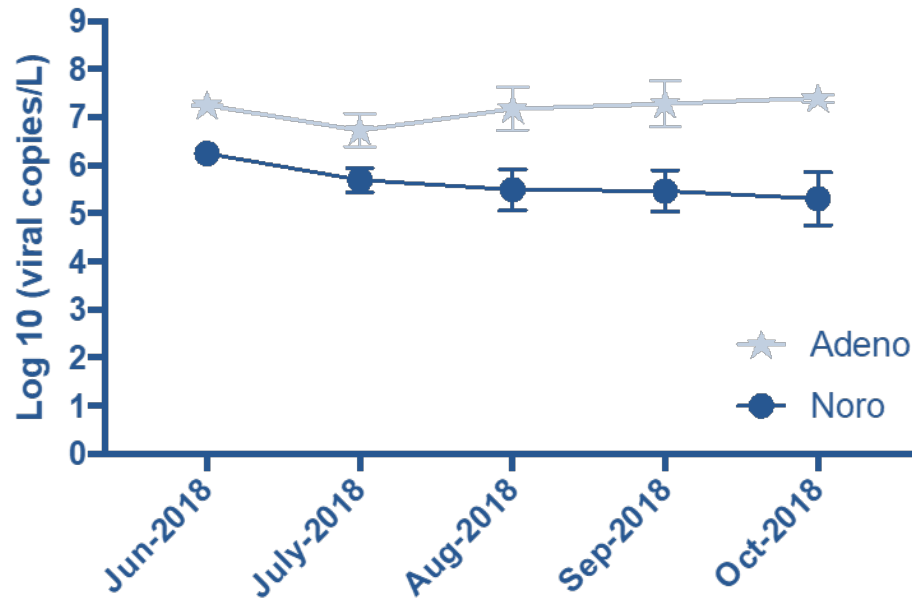
Norovirus Surveillance Gaps

- In BC, gastrointestinal outbreaks are reportable, but individual cases are not
 - Testing is de-centralized
 - Data are not gathered centrally for GI outbreaks
- Outbreaks can be declared and managed without testing (Kaplan criteria)
- Difficult to compel outpatients to produce a stool specimen
- Diarrheal guidelines advise against testing in patients with diarrhea < 7 days unless outbreak or clinically vulnerable

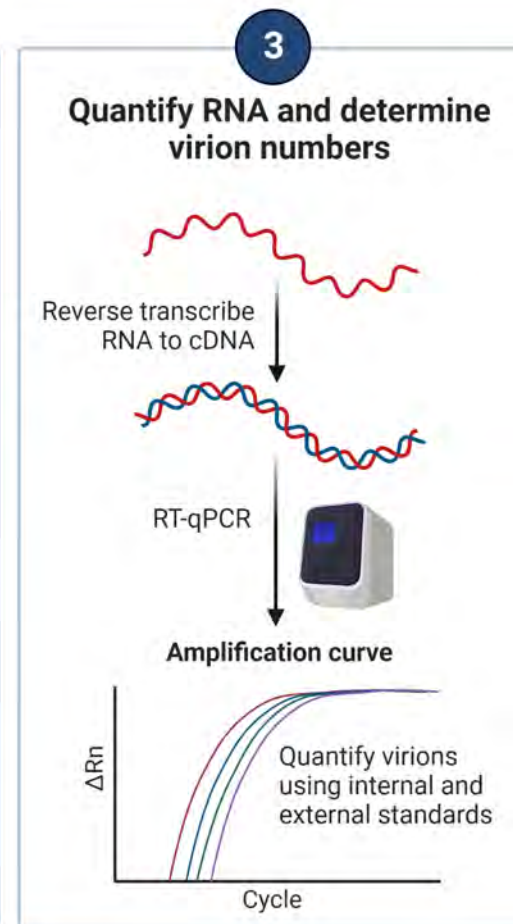
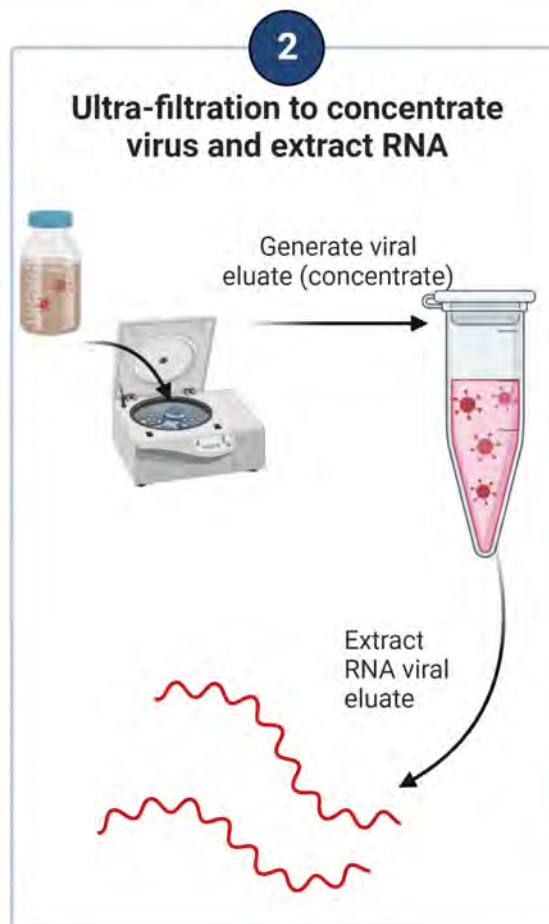
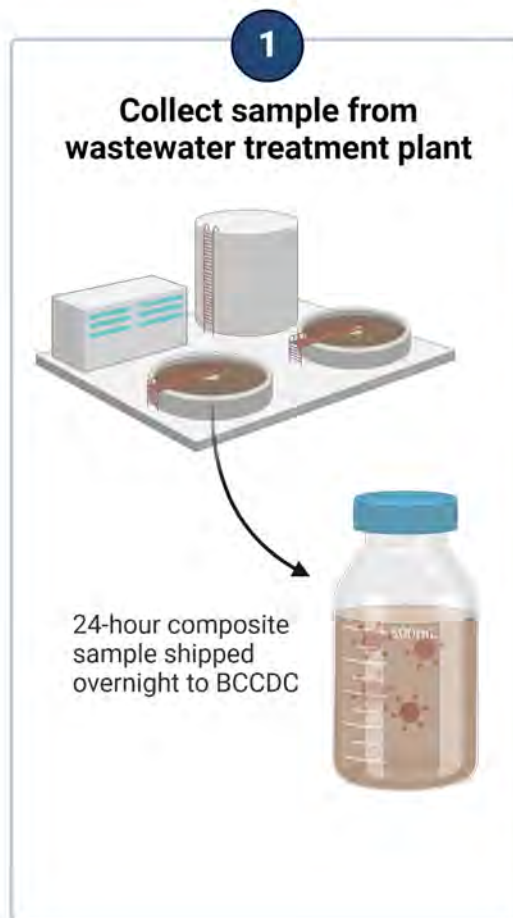
Wastewater surveillance can address these gaps



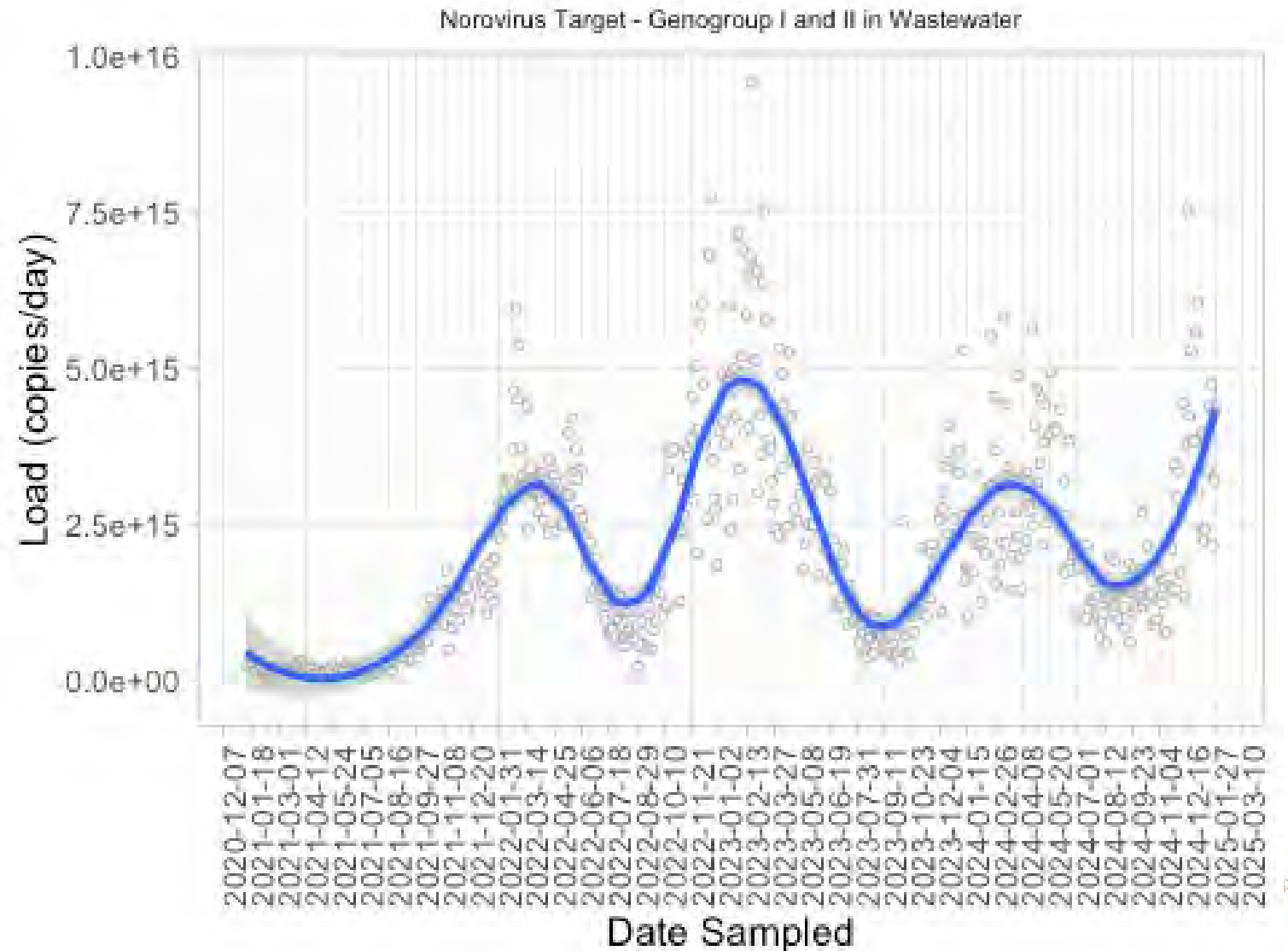
BCCDC's Wastewater Journey Began With Enteric Viruses in 2018



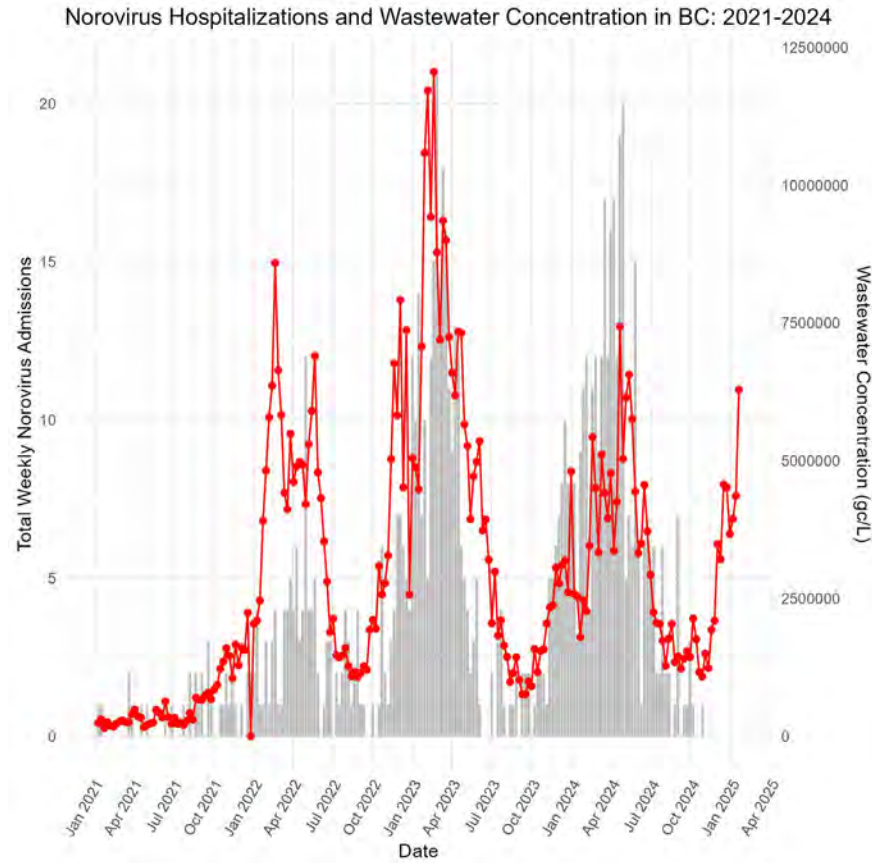
Leveraging enteric research methods a method for SARS-CoV-2



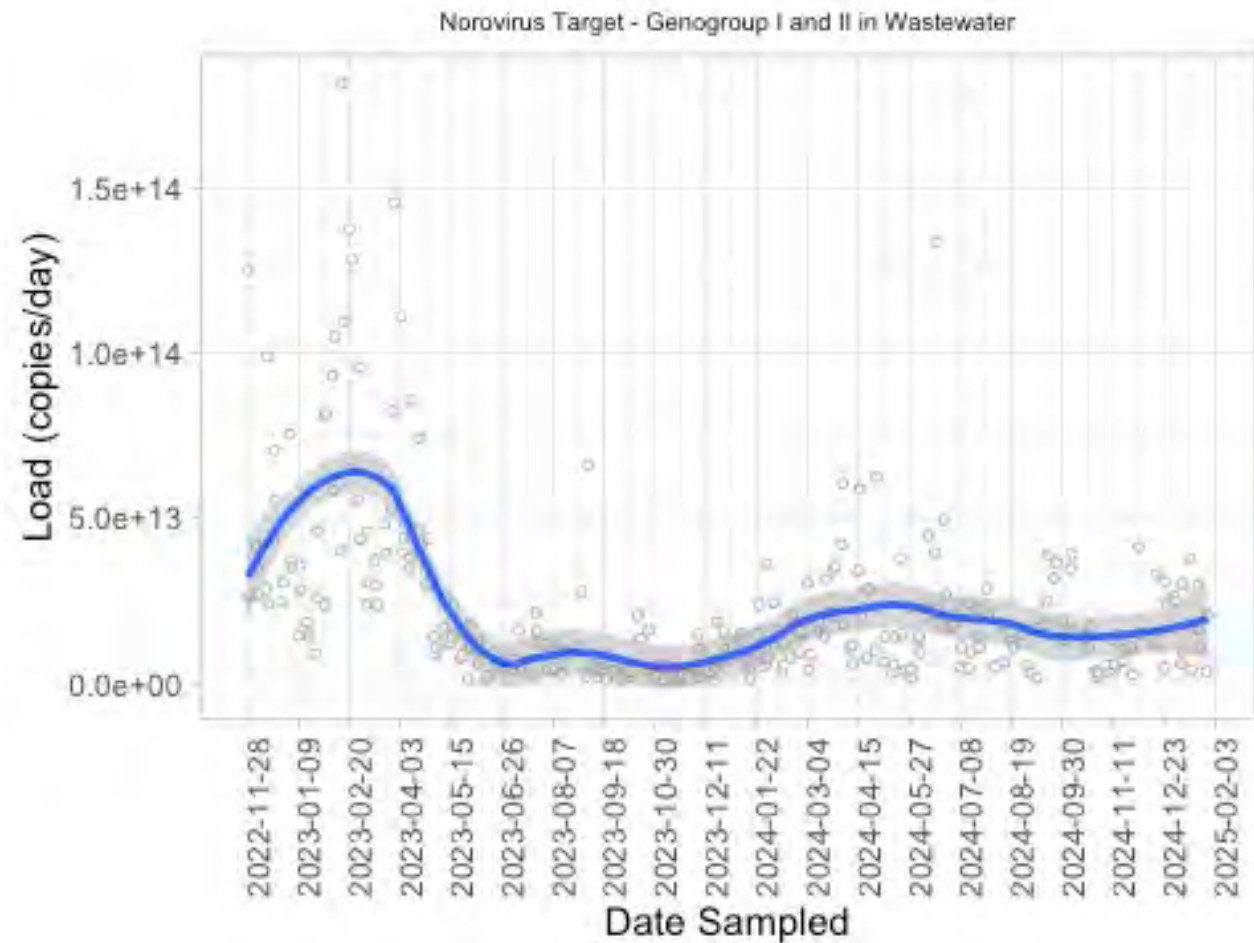
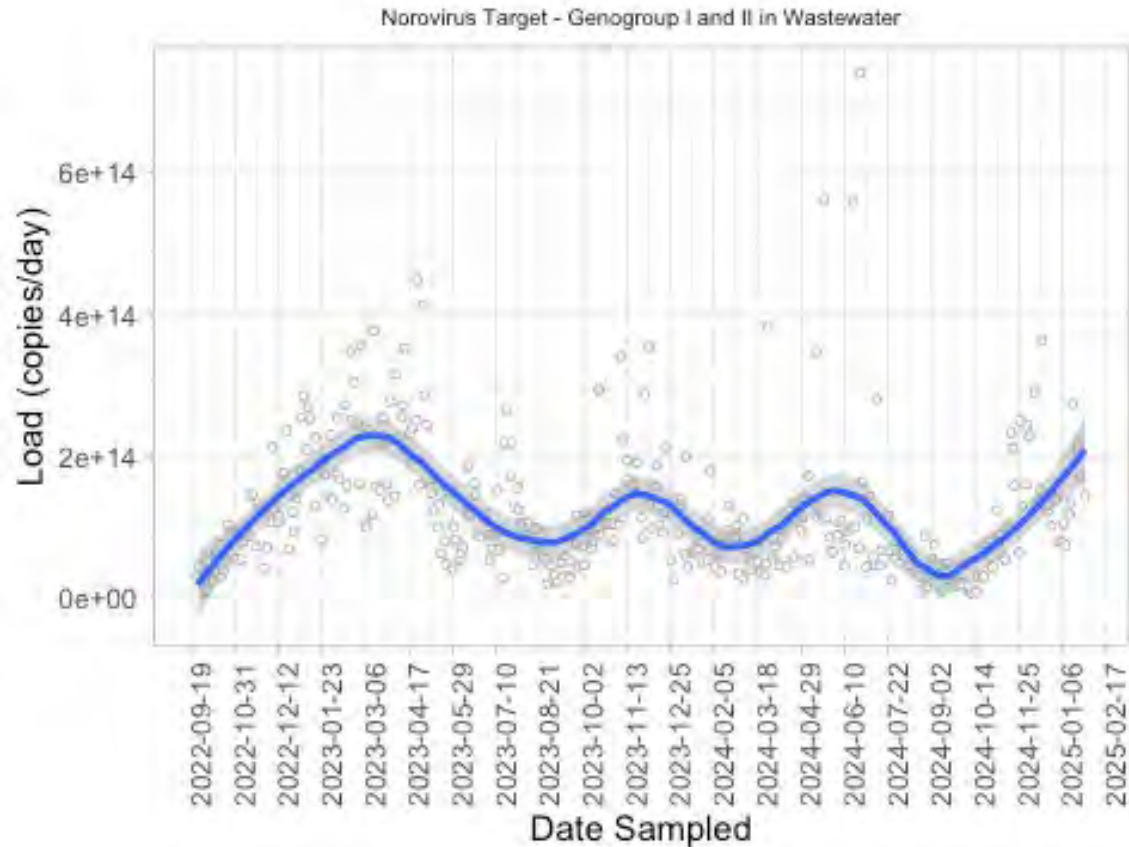
**Inhibition
Control Assay
Already
Multiplexed
with
Norovirus =
BONUS DATA**



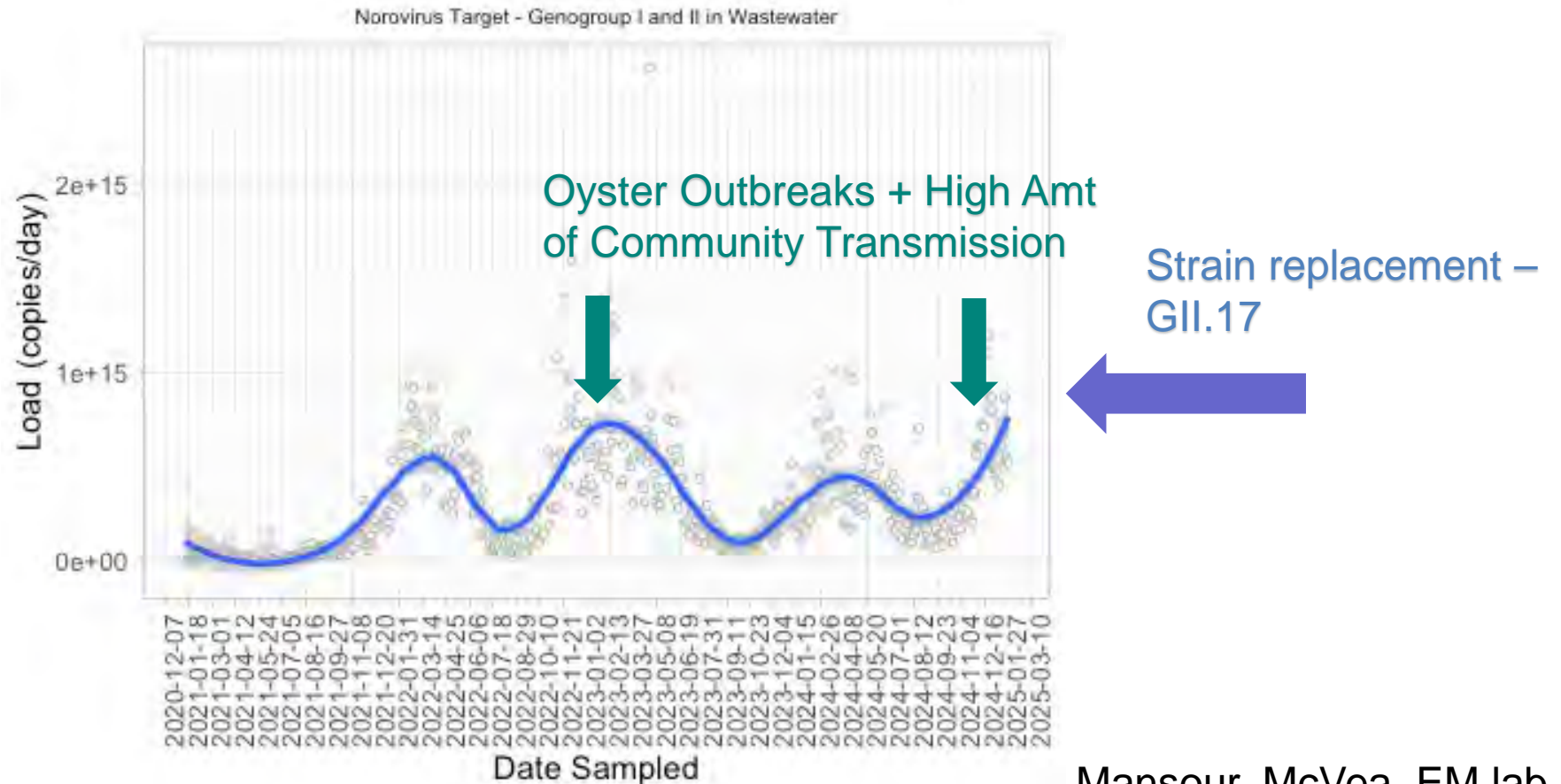
Using Norovirus WW Data To Fill Surveillance Gaps



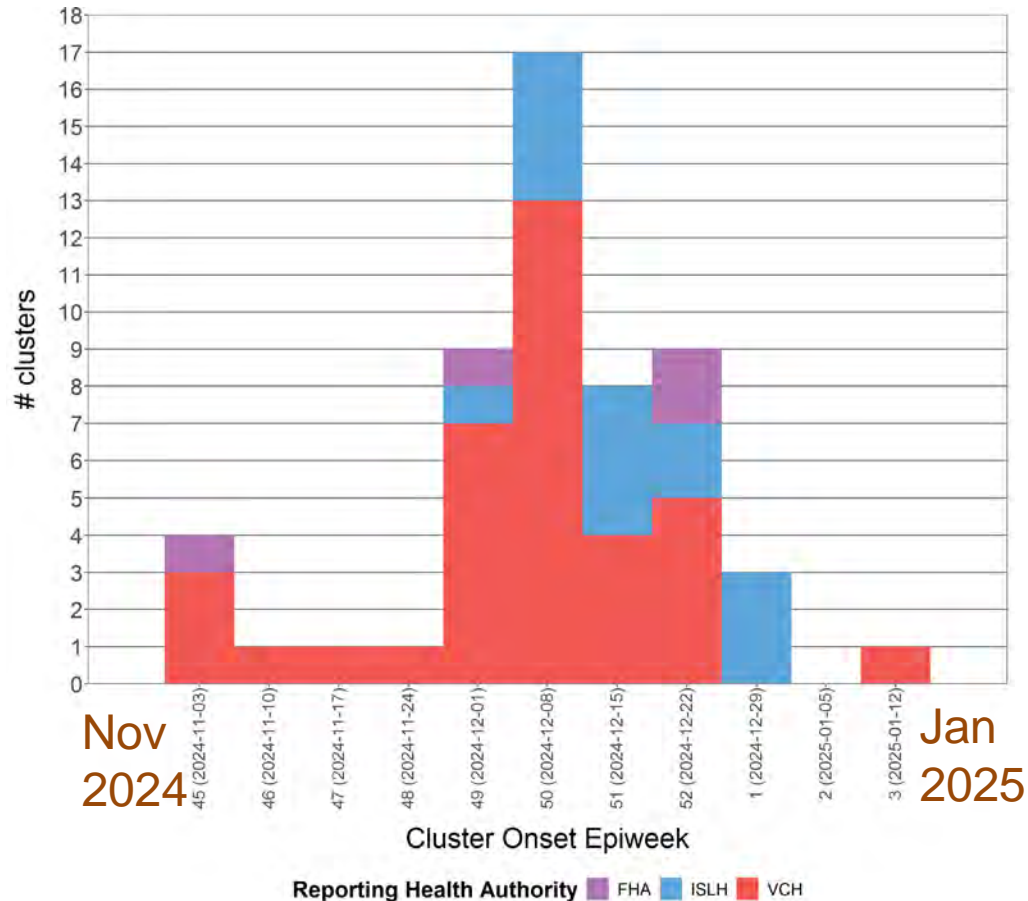
Using Norovirus WW Data to Understand Local and Provincial Trends



Using Norovirus WW Data to Outbreaks and Impact of Strain Replacement



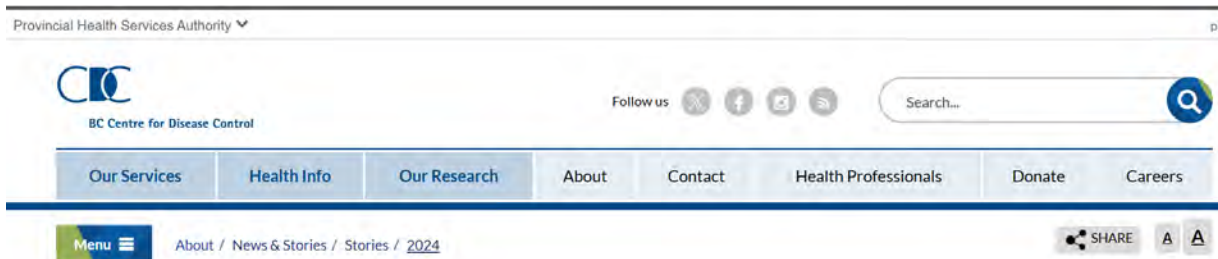
2024/25 Norovirus/oyster outbreak



- 124 cases & 54 clusters
- BCCDC assesses Shellfish-related illness reports
- Response partners:
 - BCCDC: PHR, EHS, PHL, Comms
 - Canadian Food Inspection Agency
 - Department of Fisheries and Oceans
 - Env't & Climate Change Canada
 - Health Canada
 - Public Health Agency of Canada

Caird, EZVB, PHR

Public Health Actions – 1. Public awareness



Increase in reports of gastrointestinal illness following consumption of raw oysters from BC

December 19, 2024

The outbreak related to the consumption of raw oysters has now been declared over.

Updated February 5, 2025: The outbreak related to the consumption of raw oysters has now been declared over. Between November 1 and January 13, 2025, 124 cases of

British Columbia

Dozens get sick with 'norovirus-like' illness after eating raw B.C. oysters

Health officials say norovirus can be serious for older adults or those who are very young

The Canadian Press · Posted: Dec 19, 2024 12:09 PM PST | Last Updated: December 19, 2024



Public Health Actions – 2. Harvest site closures

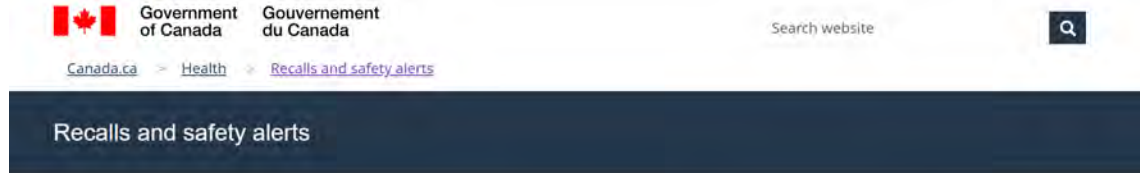
Public Health Actions – 3. Advisory & Recall



← Home / Food / Recalls, Outbreaks & Emergencies / Alerts, Advisories & Safety Information
/ FDA Advises Restaurants and Retailers Not to Serve or Sell and Consumers Not to Eat Certain Oysters from British Columbia, Canada Growing Areas BC 14-8 and BC 14-15, Potentially Contaminated with Norovirus

FDA Advises Restaurants and Retailers Not to Serve or Sell and Consumers Not to Eat Certain Oysters from British Columbia, Canada Growing Areas BC 14-8 and BC 14-15, Potentially Contaminated with Norovirus

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Food recall warning

Certain Taylor Shellfish Canada ULC brand Oysters recalled due to norovirus

► Brand(s)

Last updated: 2024-12-21

Norovirus outbreaks in shellfish in BC

2016/2017

TOFINO-UCLUELET WESTERLY NEWS

Dozens get sick with 'norovirus-like' illness after eating raw B.C. oysters

The Canadian Press
Dec 19, 2024 3:29 PM



Federal agencies have closed some areas of the province to commercial shellfish harvesting while cases of a norovirus-like illnesses are being investigated. (AP File Photo)

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00:01:45

Federal agencies have closed some areas of British Columbia to commercial shellfish harvesting, including parts of Baynes Sound, west of Denman Island, while the cases of a norovirus-like illness are being investigated.

2023

2/27/25, 12:19 PM
FDA issues public warning about certain oysters because of norovirus outbreak | Food Safety News

Food Safety News



FDA issues public warning about certain oysters because of norovirus outbreak

By News Desk on February 23, 2023

The U.S. Food and Drug Administration is helping Canadian officials investigate an outbreak of norovirus infections and is recommending that consumers avoid eating certain oysters to avoid infection.

The FDA is also warning restaurants and retailers to not sell the implicated oysters. If oysters are not in their original packaging — such as when dining out — consumers should ask if the oysters came from the implicated areas. If the restaurant cannot provide the information, the oysters should not be consumed.

2024/2025

HEALTH
Oysters recalled in 3 Canadian provinces over norovirus concerns

By Saba Aziz • Global News
Posted December 21, 2024 4:03 pm • Updated December 21, 2024 4:31 pm • 2 min read



Dozens sickened after eating BC oysters

Global NEWS

WATCH: Dozens sickened after eating B.C. oysters - Dec 20, 2024

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-A A+

Certain oysters have been recalled in three Canadian provinces following a suspected outbreak of **norovirus** in British Columbia that left dozens of people sick.

The Canadian Food Inspection Agency **issued the recall on Saturday** for several lots of Fanny Bay, Sunseeker and Cloudy Bay oysters sold by Taylor Shellfish Canada ULC.

The recall covers Alberta, British Columbia and Ontario.

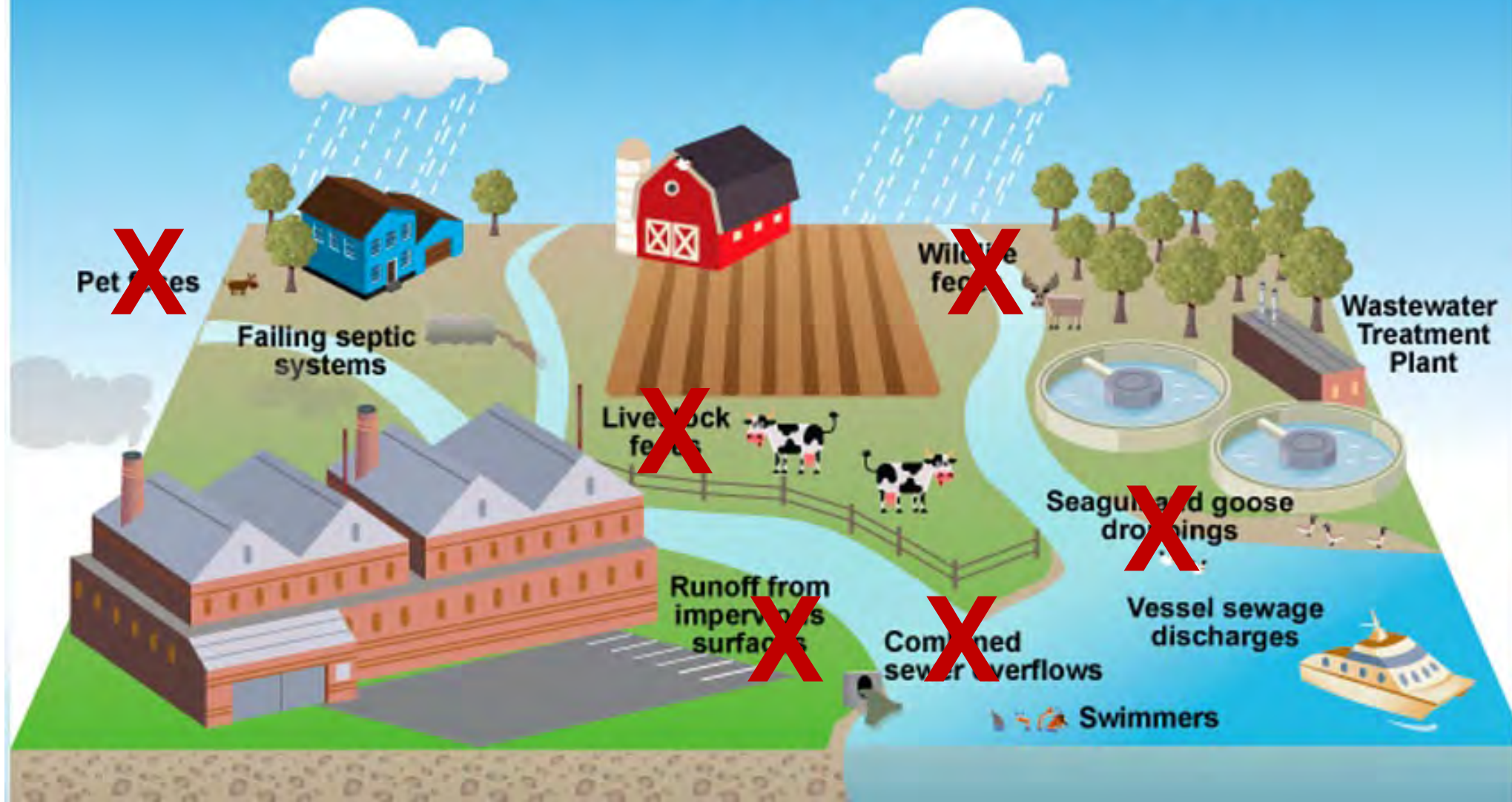
"The affected products are being recalled from the marketplace due to possible norovirus contamination," the CFIA said.

According to the recall, most of the affected oysters were harvested and processed in early December, although some may have been harvested as early as Nov. 27.

The CFIA said it is conducting a food safety investigation, which may lead to additional products being recalled.

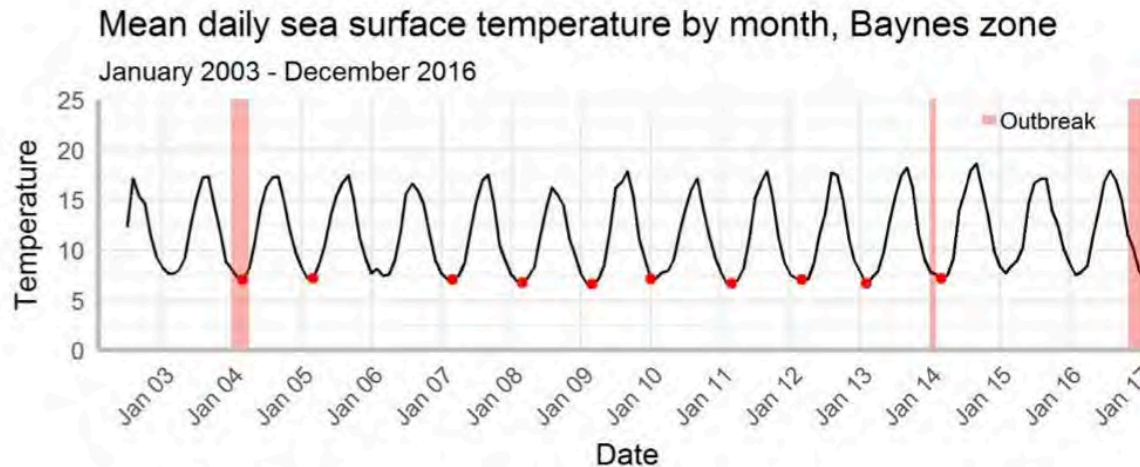
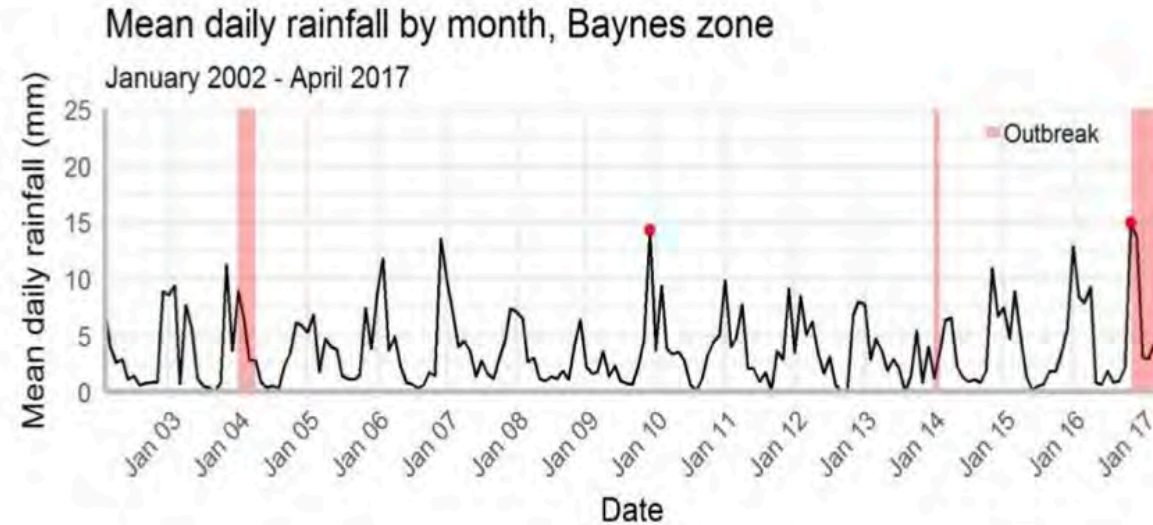
WHAT CAN WE DO?

Fecal Contamination

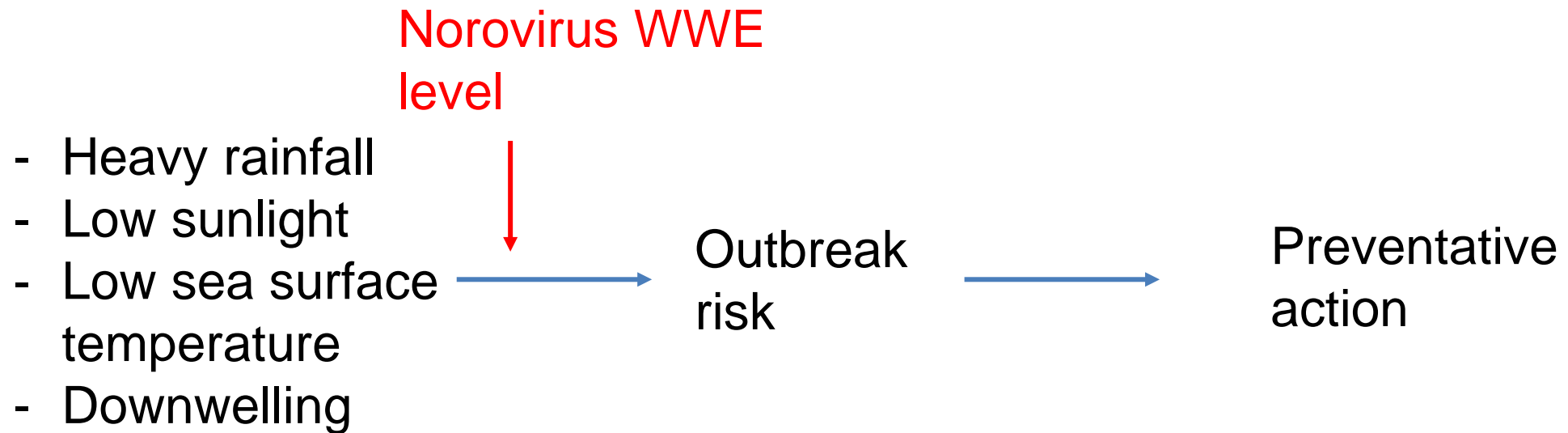


Understanding environmental factors that may be associated with norovirus outbreaks in shellfish

- Heavy rainfall
- Low sunlight
- Low sea surface temperature
- Downwelling



Environmental factors may be associated with norovirus outbreaks in shellfish





GEMSTONE

Genomic Ecological Microbial Source Tracking for Oceans, Nature and Environment Dec 6, 2023

- Dr. Natalie Prystajeky, BCCDC PHL & UBC
- Lorraine McIntyre, BCCDC
- Dr. Mike Lee, BCCDC & UBC
- Nico Prins, BC Shellfish Growers Association
- Andrew Sheriff and Kate Mussett, Malahat Nation
- Carly Marshall and Michael Donoghue, UBC CDC



BC Centre for Disease Control



Malahat



BC SHELLFISH
GROWERS ASSOCIATION



“WHO POOPED IN THE RIVER?”



Image courtesy of LuminUltra Inc. Laboratory

GEMSTONE Overview

1. Establishment of Project Steering Committee
2. Development of Assay
 - Testing indicators: *Enterococci*, fecal coliforms & *E. coli*
 - qPCR of *Bacteroides* in two multiplex parts:
 - Human vs. non-human source contamination
 - If Non-human detected: 4 additional *Bacteroides* species (based on steering committee, environmental scan, assay)
 - Include norovirus into qPCR
3. Validation of assays
4. Pilot launch: June 2024. Testing of 3 sites biweekly with more sampling during high risk periods
5. Observational data (collaborators input) and climate/satellite geospatial/vessel data → data analysis
6. Technology and knowledge dissemination: MST toolkit, training, presentations, technical and non-technical reports

WHAT CAN WE DO?

Prevention

INDIVIDUALS

- Wash hand with soap and water (sanitizer not adequate)
- Sick individuals should stay home until 48 hours after resolution
- Clean & disinfect contaminated areas with bleach-based sol'n
- Cook shellfish esp. during periods of high transmission

ORGANIZATIONS

- Policies to detect & reduce transmission in facilities
- Hand washing stations
- Facilitating sick individuals to stay home
- Outbreaks: case isolation, enhanced cleaning, safe activities

Acknowledgements

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- Christine Tchao
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- Lorraine McIntyre
- Kuljeet Chattha
- BC RHAs
- Hannah Caird
- Chelsea Treloar
- Quinn Stewart
- Sharon Relova
- Neha Singh
- Keturah Kalio
- Heather Amos
- Joshua Grant
- PHAC
- CFIA
- DFO
- ECCC



BC Centre for Disease Control



Ministry of Health



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SERVICES AND SOLUTIONS FOR A LIVABLE REGION



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Province-wide solutions.
Better health.





QUESTIONS

