



"Enteric virus serotypes causing gastroenteritis outbreak in Thailand during the last decade"

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**Viral Watch: From Zoonotic Threats and Environmental Monitoring to
Emerging Disease Preparedness**
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Introduction (1)

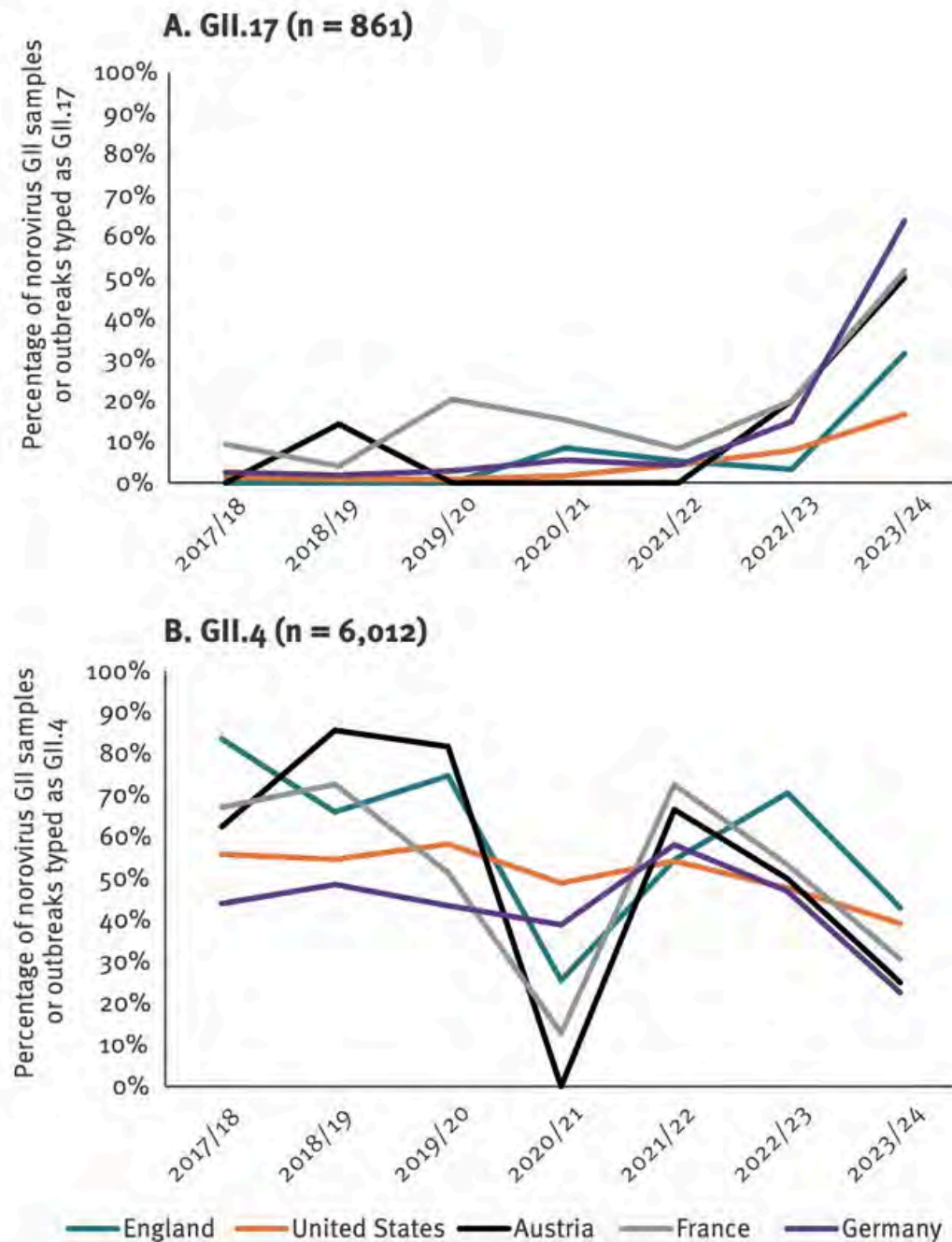
- **Viral gastroenteritis**, also known as the stomach flu, is a common illness in children that causes inflammation of the stomach or intestines. **Rotavirus** is the most common cause of severe diarrhea in children. Other viral causes include **norovirus**, **enteric adenovirus**, **astrovirus**, and **sapovirus**.
- **Symptoms** include nausea, vomiting, diarrhea, belly cramps, fever, headache, and muscle aches. Diarrhea can last up to two weeks, but vomiting usually doesn't last more than three to four days.
- **Treatment** : Most children get better at home with rest. It's important to drink plenty of water to avoid dehydration. Oral rehydration therapy is as effective as intravenous (IV) fluid therapy for mild-to-moderate dehydration.

Introduction (2)

- **Prevention:** Vaccines are available to protect children from rotavirus. To prevent the spread of illness, keep your child home until symptoms resolve, wash hands frequently, and avoid sharing personal items.
- **Mode of transmission:** spreads through the fecal-oral route and person-to-person contact, or touches a contaminated object, like a toy or diaper, and then puts their hands near their mouth. Eats or drinks food or water that has been contaminated with the virus.
- **Viral gastroenteritis outbreak:** occurs when multiple people in the same place experience vomiting or diarrhea at the same time. It's very common in places like schools and childcare centers, and can be difficult to control.

Viral gastroenteritis outbreak in global (1)

Percentage of GII norovirus outbreaks or samples typed as genotype GII.17 or GII.4 by season, four European countries and the United States, 2017–2024 (n = 6,873)

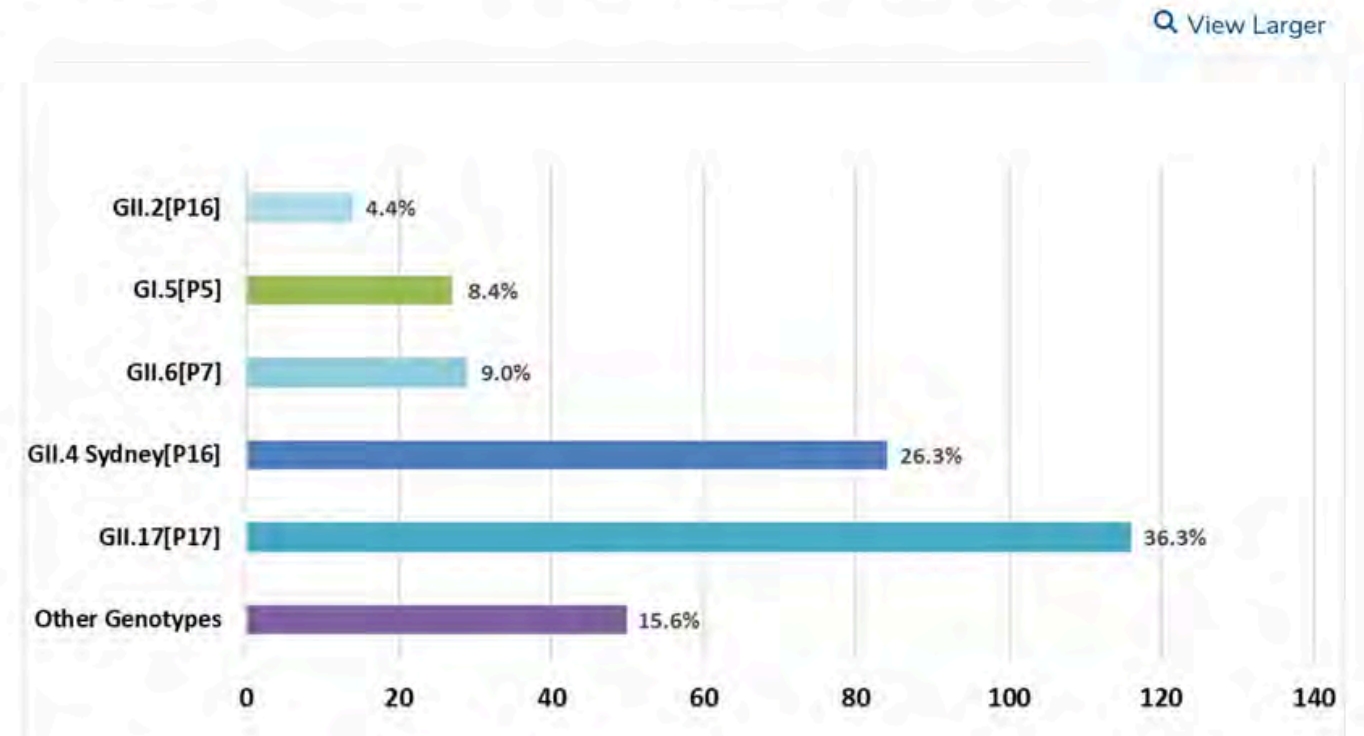


About the current norovirus season

- During August 1–November 6, 2024, there were 211 norovirus outbreaks reported by NoroSTAT-participating states. During the same period last seasonal year, there were 189 norovirus outbreaks reported by these states.

Genotype distribution of norovirus outbreaks

September 1, 2023 – October 31, 2024 (n=320)



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Viral gastroenteritis outbreak in global (2)

> Clin Infect Dis. 2022 Feb 11;74(3):437-445. doi: 10.1093/cid/ciab460.

Sustained Declines in Age Group-Specific Rotavirus Infection and Acute Gastroenteritis in Vaccinated and Unvaccinated Individuals During the 5 Years Since Rotavirus Vaccine Introduction in England

Charlotte M Gower¹, Julia Stowe¹, Nick J Andrews², Jake Dunning³, Mary E Ramsay¹, Shames N Ladhani^{1,4}

Background: The introduction of an oral live-attenuated monovalent rotavirus vaccine (Rotarix®) into the UK infant immunization program in July 2013 was associated with large reductions in laboratory-confirmed rotavirus infections and hospitalizations due to acute gastroenteritis (AGE) within 12 months. Here we report the 5-year impact of the program in England.

Methods: Individuals with laboratory-confirmed rotavirus infections during 2000–2018 and all-cause hospitalizations for AGE during 2007–2018 were identified using national electronic records. Age-specific incidence rate ratios (IRR) and estimated numbers of cases averted in each of the 5 postvaccination years were calculated.

Results: There were 206 389 laboratory-confirmed rotavirus infections and 3 657 651 hospitalizations for all-cause AGE. Reductions of 69–83% in laboratory-confirmed rotavirus infections in all age groups and 77–88% in infants aged <1 year in each of the 5 postvaccine years are reported, with 11 386–11 633 cases averted annually. All-cause AGE hospitalizations were reduced by 12–35% across all age-groups and by 25–48% in <1 year-olds in the 5 postvaccine years, with 24 474–49 278 hospitalizations averted annually. There was strong evidence of indirect (herd) protection, with at least 50% and up to 80% of the non-specific end point of all-cause gastroenteritis (AGE) hospitalizations averted being in unvaccinated age-groups, primarily older adults. Seasonal changes include a possible shift from annual to biennial peaks with lower peak incidence and longer seasons.

Conclusions: There were large and sustained declines in both laboratory-confirmed rotavirus infections and AGE hospitalizations across all age groups in each of the 5 years since the introduction of the UK rotavirus program.

Viral gastroenteritis outbreak in Thailand (1)

Jan-Feb, 2015

Outbreak area and reported cases

- Hotel and resort in Krabi
- reported case ~150 cases

Krabi
Noro GII.17
in case and water

Sample tested in Lab

- Stool = 7
- Drinking and consumable water = 43

Enteric viruses detection result

- Stool : NoV **GII.17=3**, GI.1=1
- Drinking and consumable water : NoV GI.4= 7, **GII.17=4**, GI.2=3, GI.5=3, GII.3=1

Viral gastroenteritis outbreak in Thailand (2)

Jul-Aug, 2015

Outbreak area and reported cases

- Primary school in Bangkok
- reported case ~80 cases

Sample tested in Lab

- Stool = 6
- Ice, drinking and consumable water = 18

Enteric viruses detection result

- Stool : NoV **GI.4=1**
- Ice, drinking water : NoV **GI.4= 2**

Viral gastroenteritis outbreak in Thailand (3)

Nov, 2016

Outbreak area and reported cases

- High school camp in Saraburi
- reported case ~200 cases

Sample tested in Lab

- Stool = 19
- Ice, drinking and consumable water = 27

Enteric viruses detection result

- Stool : NoV **GII.2=6**
- Ice, drinking and consumable water : All negative

Viral gastroenteritis outbreak in Thailand (4)

Dec, 2016

Outbreak area and reported cases

- Kinder garden in Bangkok
- reported case ~80 cases

Sample tested in Lab

- Stool = 4
- Drinking and consumable water = 8

Enteric viruses detection result

- Stool : NoV **GII.2=1**
- Drinking and consumable water : NoV **GI.3=5**

Viral gastroenteritis outbreak in Thailand (5)

Dec, 2016

Outbreak area and reported cases

- High school in Samut Songkhram
- reported case ~80 cases

Sample tested in Lab

- Stool and vomitus = 5
- Drinking water = 3

Enteric viruses detection result

- Stool and vomitus : NoV **GII.2=3, GI.4=1**
- Drinking water : NoV **GI.8=1**

Viral gastroenteritis outbreak in Thailand (6)

Feb, 2017

Outbreak area and reported cases

- High school in Nakhon Sri **Thammarat**
- reported case ~50 cases

Sample tested in Lab

- Stool = 5
- Drinking water = 2

Enteric viruses detection result

- Stool : NoV **GII.2=3**
- Drinking water : All negative

Viral gastroenteritis outbreak in Thailand (7)

Mar, 2017

Outbreak area and reported cases

- High school in Nan
- reported case ~40 cases

Sample tested in Lab

- Stool = 6
- Drinking water = 6

Enteric viruses detection result

- Stool : Rota **G8P[8]=3**
- Drinking water : All negative

Viral gastroenteritis outbreak in Thailand (8)

Mar, 2017

Outbreak area and reported cases

- Community in Kalasin
- reported case ~40 cases

Sample tested in Lab

- Stool = 2
- Ice and drinking water = 7

Enteric viruses detection result

- Stool : Rota **G3P[8]=2**
- Ice and drinking water : All negative

Viral gastroenteritis outbreak in Thailand (9)

Apr, 2017

Outbreak area and reported cases

- High school in Ubon Ratchathani
- reported case ~70 cases

Sample tested in Lab

- Stool = 14

Enteric viruses detection result

- Stool : Rota **G3P[8]=4**

Viral gastroenteritis outbreak in Thailand (10)

Jan-Mar, 2018

Outbreak area and reported cases

- Bangkok and metropolitan (Mostly in Adult)
- reported case >1000 cases

Sample tested in Lab

- Stool = 250
- Ice and drinking water = 108

Enteric viruses detection result

- Stool :
Rota **G3P[8]=33, G2P[4]=30, G9P[8]=26, G1P[6]=15, G1P[8]=9, G3P[4]=3, G8P[8]=3, G3P[6]=2, G9P[4]=2**
Noro GII.4=4, GI.3=3, GII.8=2, GII.17=2
- Ice and drinking water :
Rota **G3P[8]=3, G2P[4]=1**
Noro GI.12=10, GI.1=7, GI.4=4, GI.5=3, GII.3=1, GII.17=1

Bangkok and metropolitan (Mostly in Adult)
Rota G3P[8], G2P[4], G9P[8] G1P[6]

- All negative
- All negative



Viral gastroenteritis outbreak in Thailand (11)

Jul, 2019

Outbreak area and reported cases

- Hotel in Surat Thani
- reported case ~70 cases

Sample tested in Lab

- Stool and vomitus = 4
- Drinking and consumable water = 7

Enteric viruses detection result

- Stool : Noro **GII.2 = 1**
- Vomitus ; Noro **GII.2 = 2**, **GII.3=1**
- Drinking and consumable water : All negative

Viral gastroenteritis outbreak in Thailand (12)

Aug, 2022

Outbreak area and reported cases

- Hotel in Phuket
- reported case ~70 cases

Sample tested in Lab

- Stool = 10
- Drinking and consumable water = 10

Enteric viruses detection result

- Stool : Noro **GII.3 = 4**
- Drinking and consumable water : All negative

Viral gastroenteritis outbreak in Thailand (13)

Sep, 2022

Outbreak area and reported cases

- High school in Pathum Thani
- reported case ~200 cases

Pathum Thani
Rota G8P[8]

Sample tested in Lab

- Stool = 39
- Ice and drinking water = 8

Enteric viruses detection result

- Stool : Rota **G3P[8]=14**
Noro G11.17=2
- Ice and drinking water : All negative

Viral gastroenteritis outbreak in Thailand (14)

Nov, 2022

Outbreak area and reported cases

- Community in Chonburi
- reported case ~50 cases

Sample tested in Lab

- Stool = 6
- Drinking water = 2

Enteric viruses detection result

- Stool : Noro **GII.17 = 2**
- Drinking water : All negative

Viral gastroenteritis outbreak in Thailand (15)

Feb, 2023

Outbreak area and reported cases

- Community in Chonburi
- reported case ~70 cases

Sample tested in Lab

- Stool = 10
- Drinking water = 1

Enteric viruses detection result

- Stool : Noro **GI1.17 = 9**
- Drinking water : All negative

Viral gastroenteritis outbreak in Thailand (16)

Mar, 2023

Outbreak area and reported cases

- Community in Chaiyaphum
- reported case >1000 cases

**Chaiyaphum
Noro GII.17
in case and water**

Sample tested in Lab

- Stool = 118
- Ice, drinking and consumable water = 55

Enteric viruses detection result

- Stool : Noro **GII.17 = 12**, GII.4=6, GII.3=4, GI.3=6, GI.2=1
- Ice, drinking and consumable water : Noro **GII.17 = 2**, GII.3=1

Viral gastroenteritis outbreak in Thailand (17)

Jun, 2023

Outbreak area and reported cases

- Hotel and Community in Phuket
- reported case >5000 cases

Phuket
Noro GII.8
in case and water

Sample tested in Lab

- Stool = 21
- Ice, drinking and consumable water = 73

Enteric viruses detection result

- Stool : Noro **GII.8 = 14**
- Ice, drinking and consumable water : Noro **GII.8 = 3**

Viral gastroenteritis outbreak in Thailand (18)

Jan, 2024

Outbreak area and reported cases

- Hotel and Community in Phitsanulok
- reported case ~100 cases

Sample tested in Lab

- Stool = 7
- Drinking water = 12

Enteric viruses detection result

- Stool : Noro **GII.4 = 4**
- Drinking water : All negative

Period	2015 to 2024 (18 outbreaks)
Noro Outbreak	Jan-Feb 2015: GII.17, related with water
	Jul-Aug 2015: GI.4, related with water
	Nov 2016: GII.2
	Dec 2016: GII.2
	Dec 2016: GII.2
	Feb 2017: GII.2
	Jun 2019: GII.2
	Aug 2022: GII.3
	Nov 2022: GII.17
	Feb 2023: GII.17
	Mar 2023: GII.17, related with water
	Jun 2023: GII.8, related with water
	Jan 2024: GII.4

Conclusion

Rota Outbreak	Mar 2017: G3P[8]
	Mar 2017: G3P[8]
	Apr 2017: G3P[8]
	Jan-Mar 2018: G3P[8], G2P[4], G9P[8], and G1P[6]
	Sep 2022: G3P[8]



Thank you

