



An Analysis of Norovirus Percent Positivity Trends Using the National Respiratory and Enteric Virus Surveillance System (NREVSS) Database, Minnesota, USA, 2019-2024



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Background

- Norovirus is the leading cause of acute gastroenteritis in the US, representing a significant burden on healthcare systems
- Individual cases are not reportable to the state; only outbreaks are reportable
- Passive surveillance, including the NREVSS database, is used to monitor the virus
- Laboratories use PCR to test samples for norovirus positivity
- Enrolled laboratories report total number of tests and total number of positive tests each week
- Though NREVSS does not encompass all cases of norovirus (i.e., asymptomatic and less severe cases that do not require treatment at a medical facility), its data is useful in modeling viral activity and transmission

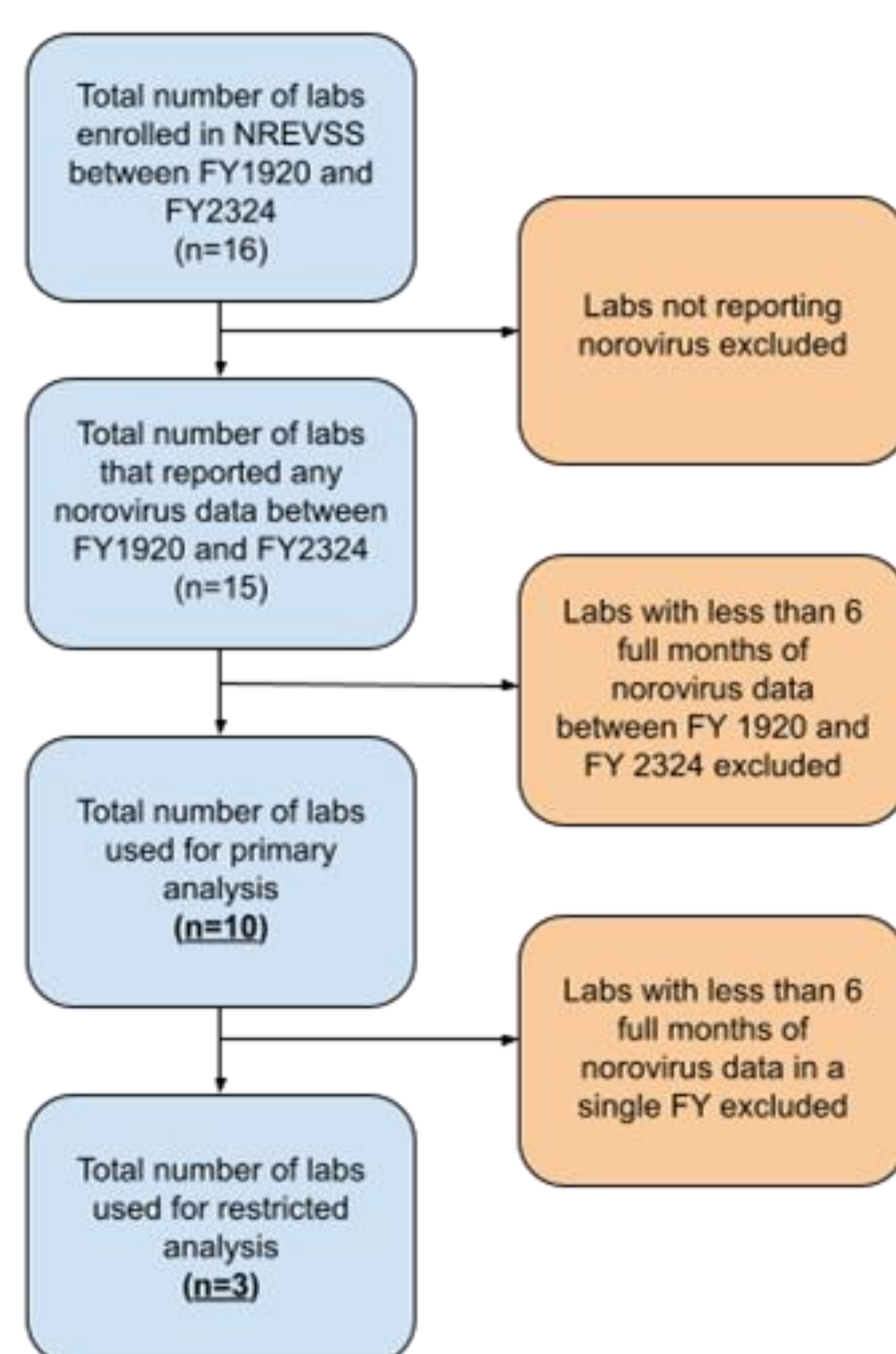
Objectives

- Examine trends in the viral activity of norovirus in Minnesota using percent positivity data
- Utilize data from laboratories reporting to the NREVSS database in Minnesota between 2019 and 2024
- Study how different laboratory characteristics affect norovirus percent positivity

Methods

- Data cleaned and standardized
- Primary analysis:** conducted with laboratories that reported at least 6 months in any SY
- Restricted analysis:** conducted with laboratories that reported at least 6 months in all SYs
- Laboratories categorized based upon size and geographic location

Figure 1: Exclusion Criteria for Laboratories



Results

- Minnesota norovirus percent positivity peaks annually in March and total tests remain relatively stagnant over the study period (see Figures 2 and 3)
- Seasonality shifts and lower percent positivity rates were observed from May 2020 - December 2021 (see Figure 4)
- Trends observed in the 10 laboratories of the primary analysis were similar to trends observed in the 3 laboratories of the restricted analysis (see Figures 2 and 5)
- Percent positivity trends of large laboratories more closely align with trends in all Minnesota NREVSS-enrolled laboratories than percent positivity trends of medium laboratories (see Figure 6)
- Percent positivity trends of laboratories in the 7-county metro area more closely align with trends in all Minnesota NREVSS-enrolled laboratories than percent positivity trends of laboratories in greater MN (see Figure 7)

Figure 2: Percent Positivity of NREVSS-Participating Laboratories, July 2021 - June 2024

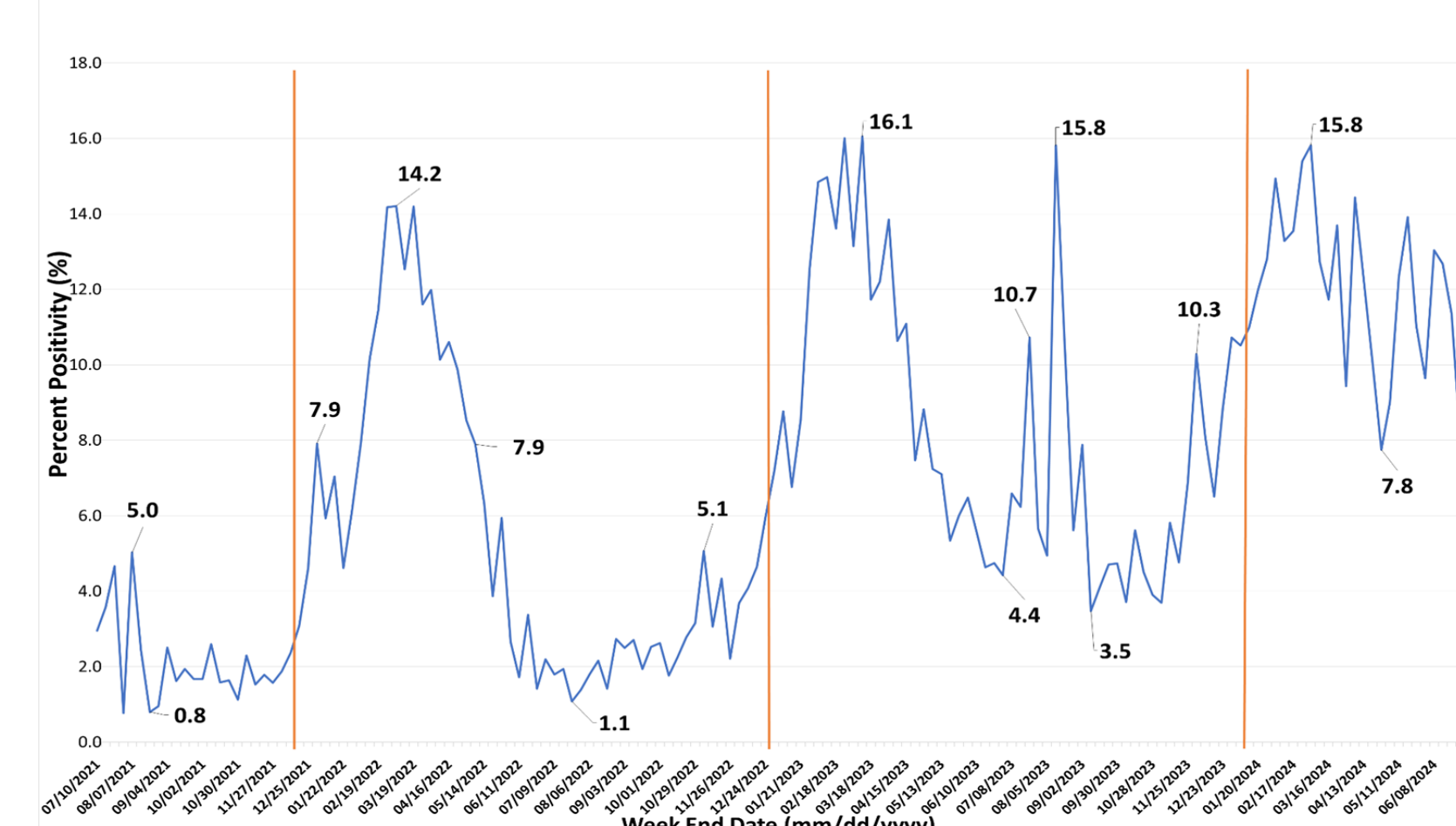


Figure 3: 3-Week Moving Average and Total Tests Conducted by NREVSS-Participating Laboratories, July 2021 - June 2024

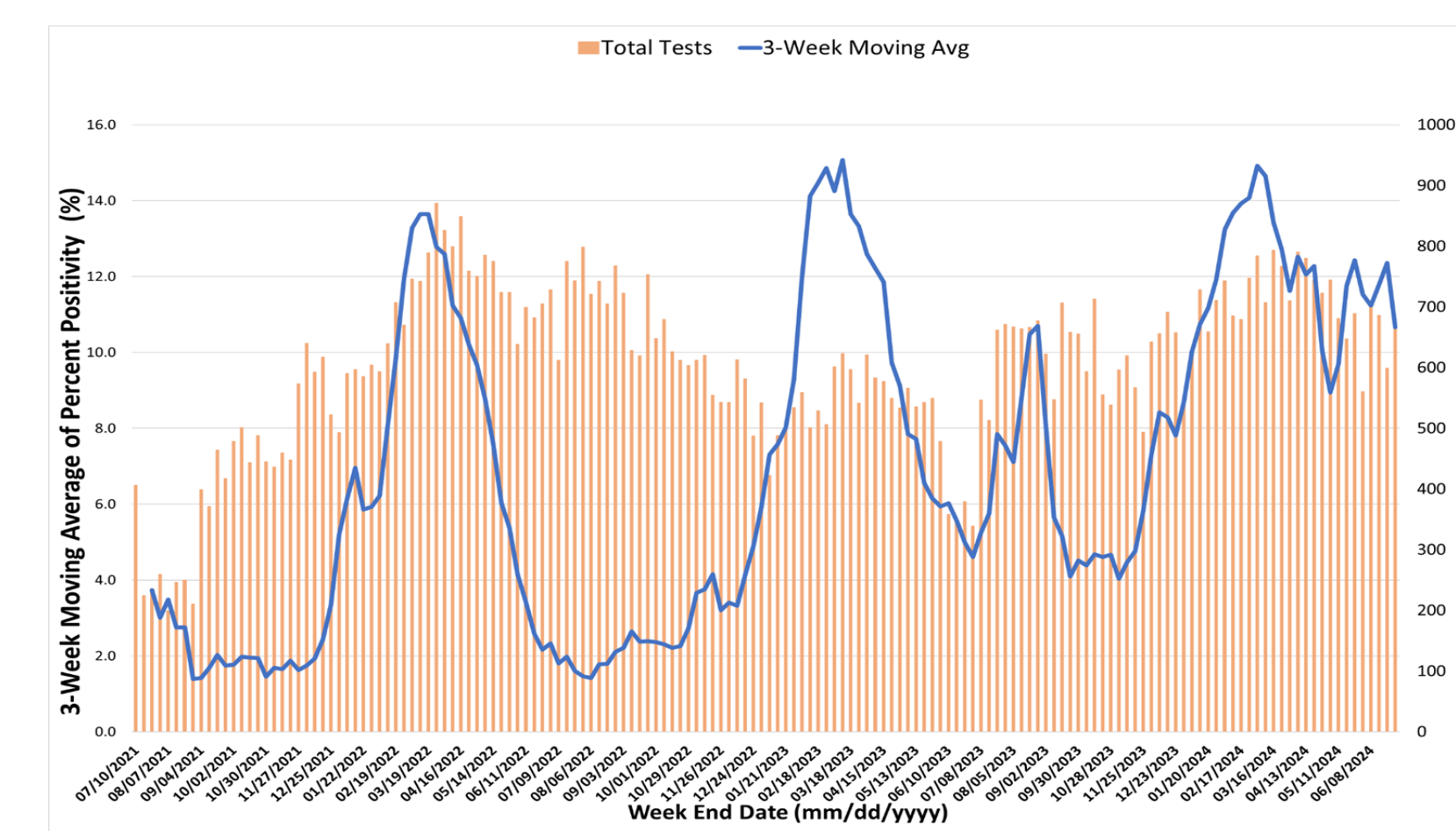


Figure 4: 3-Week Moving Average and Total Tests Conducted by 3 Consistently-Reporting NREVSS-Participating Laboratories, July 2019 - June 2024

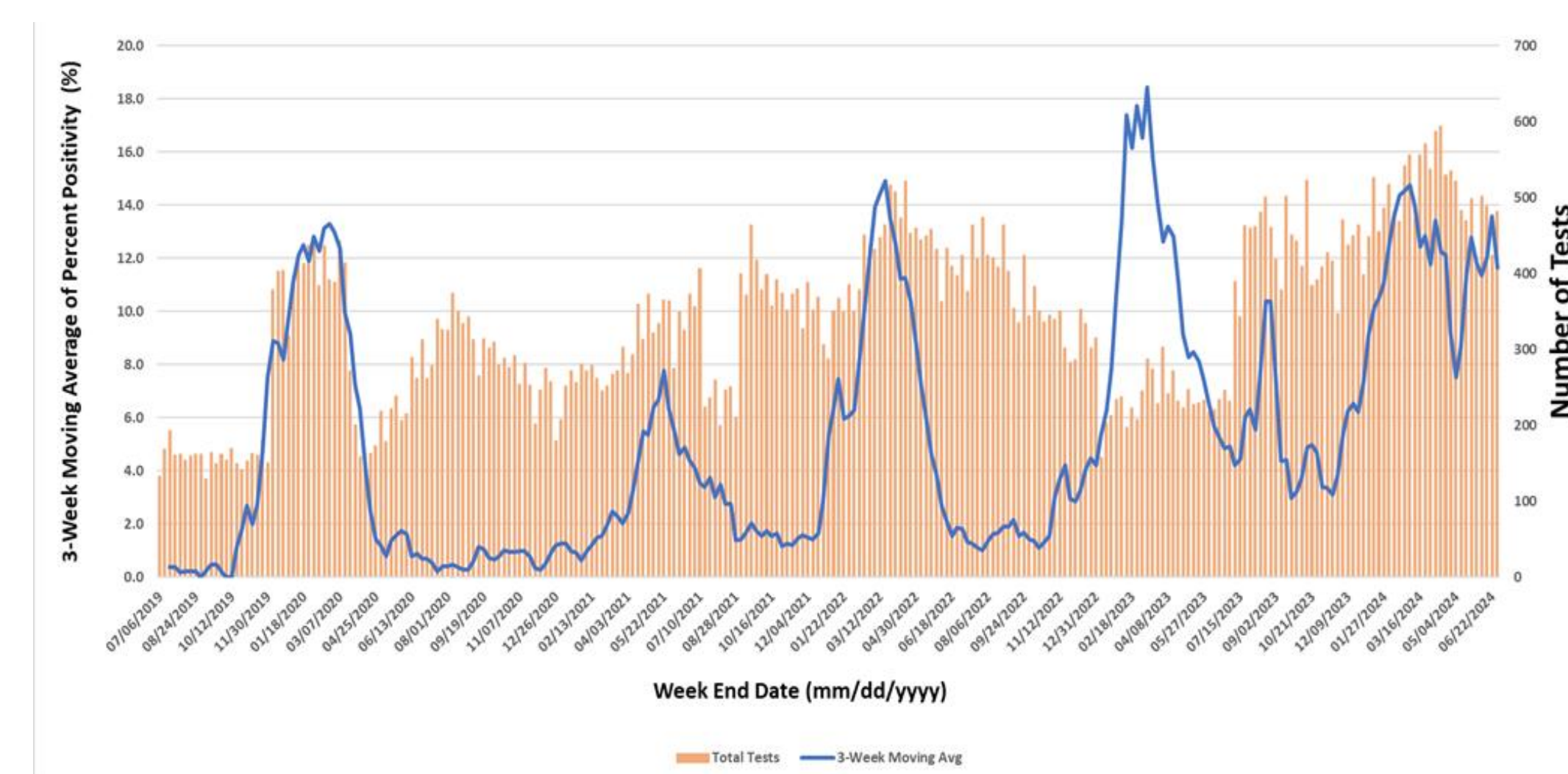


Figure 5: 3-Week Moving Average and Total Tests Conducted by 3 Consistently-Reporting NREVSS-Participating Laboratories, July 2021 - June 2024

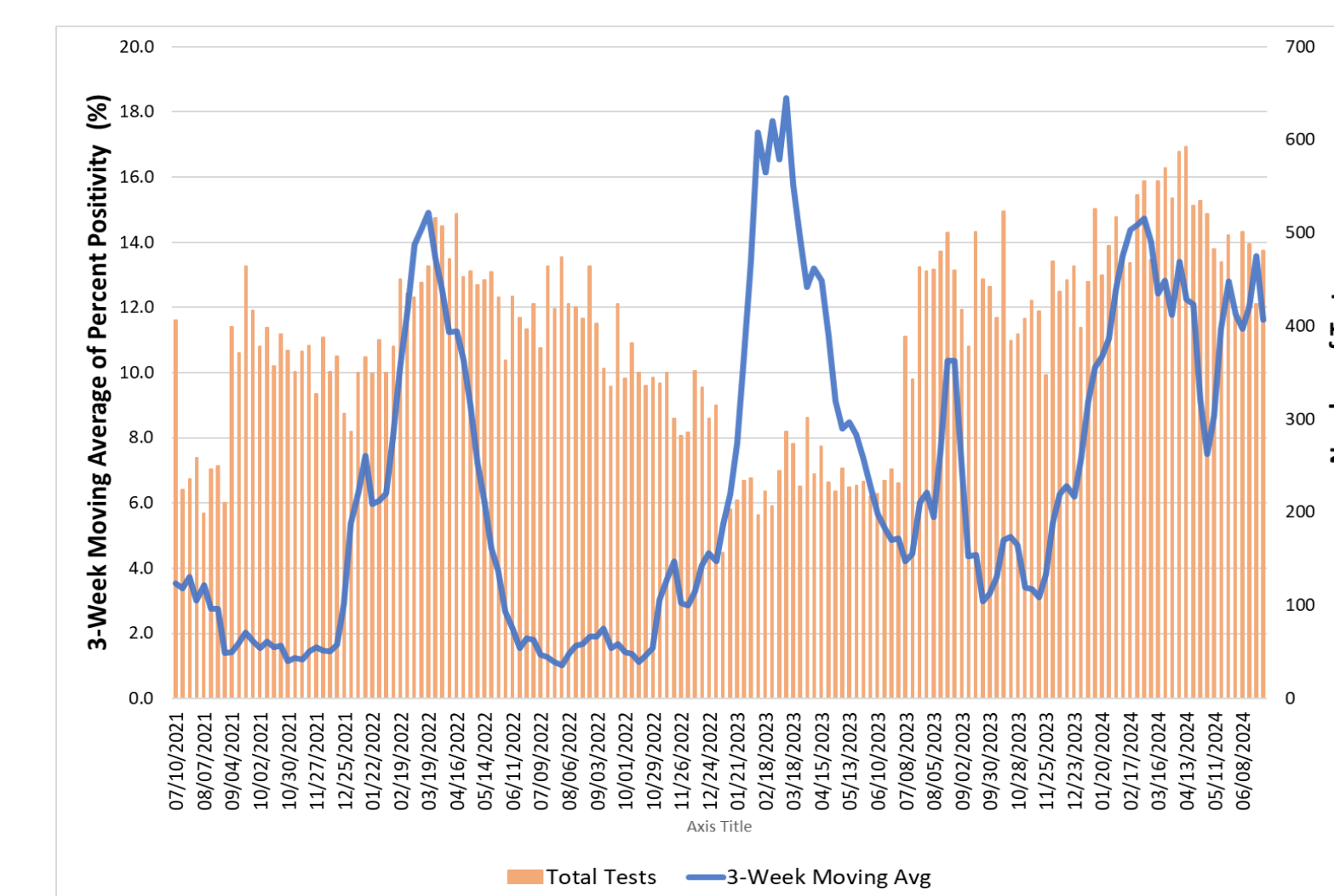


Figure 6: 3-Week Moving Average in Medium and Large NREVSS-Participating Laboratories, July 2022 - June 2024

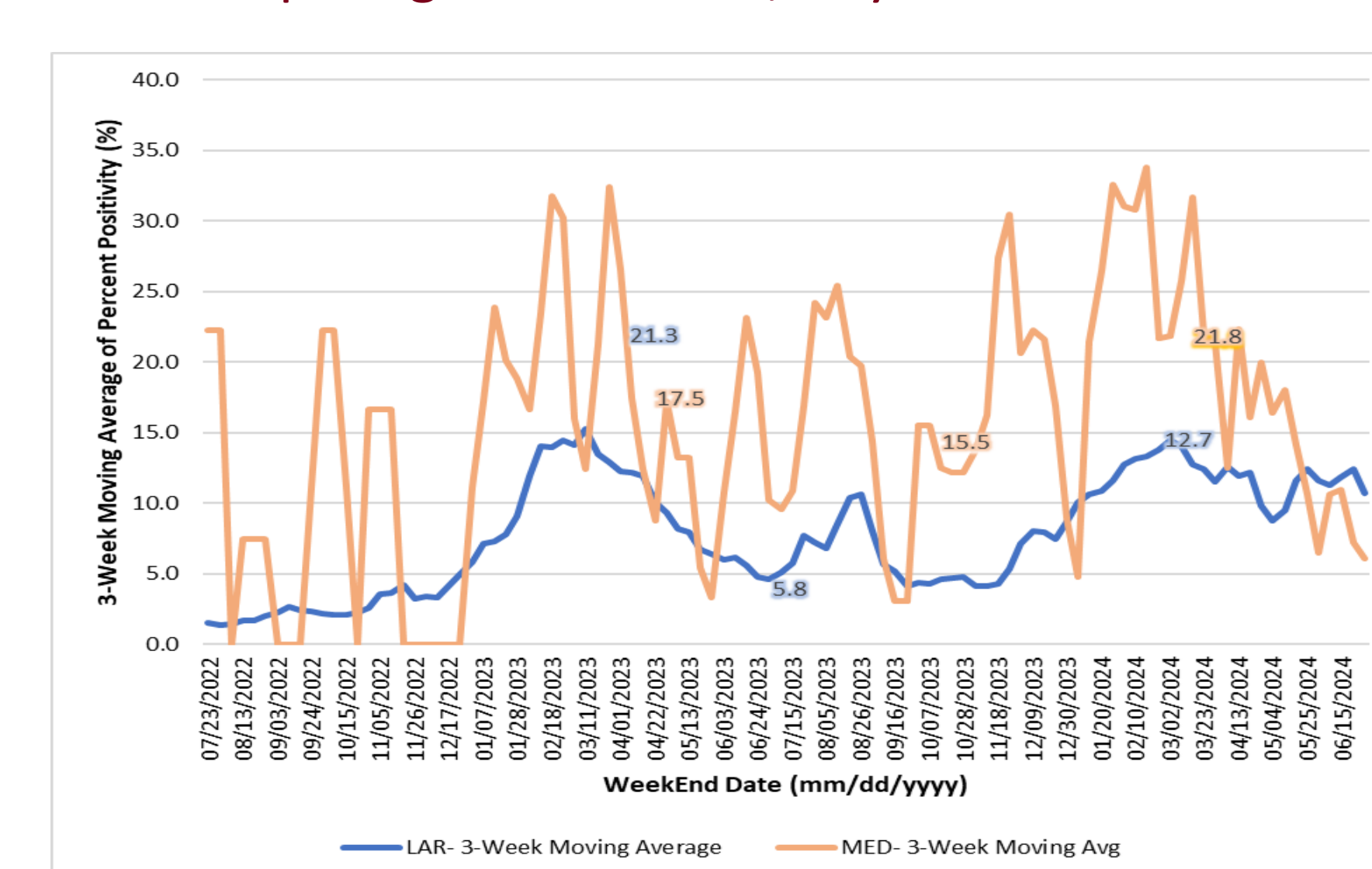
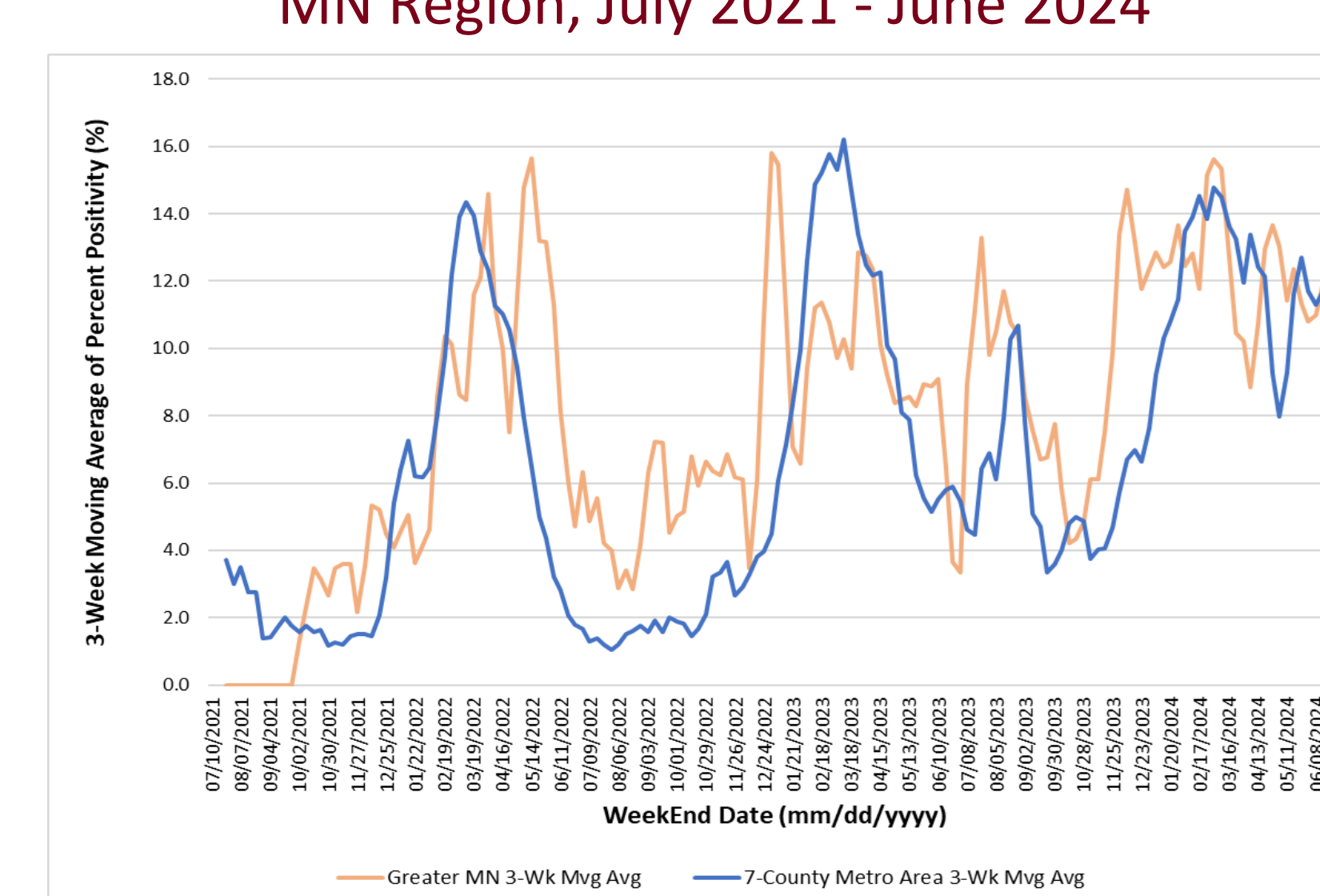


Figure 7: 3-Week Moving Average of NREVSS-Participating Laboratories in the 7-County Metro Area and the Greater MN Region, July 2021 - June 2024



Results contd.

- Confirmation rates of norovirus testing dropped from 2021 to 2022, suggesting a decrease in specificity of diagnostic tests

Table 1: Confirmation Testing Results, Minnesota Department of Health, 2019-2024

Years	No. RT-PCR Positive Norovirus Samples Received	No. Confirmed Positive by RT-PCR at MDH PHL	Confirmation Rate	No. Confirmed Positive Samples with a Determined Genotype (%)	3 Most Common Genotypes
2019-2021	100	90	90%	85 (94%)	GII.4 Sydney [P16] GII.6 [P7] GIX.1 [GII.P15]
2022-2024	145	87	60%	76 (87%)	GII.17 [P17] GII.4 Sydney [P16] GII.4 untypeable [P16]

Conclusion

- Minnesota percent positivity trends follow those observed at the national level
- Total testing remains similar through each SY
- Large laboratories and laboratories in the 7-county metro area correlated with a greater reporting capacity
- Norovirus percent positivity decreased during the COVID-19 pandemic
- Decreases in specificity of the BioFire panel PCR test likely affected trends observed

Future Directions

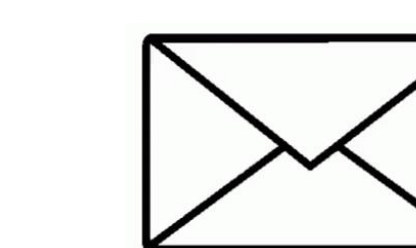
- Expansion of samples by increasing enrollment of laboratories in NREVSS or combining data from non-NREVSS sources
- This will enable a more comprehensive understanding of norovirus transmission and activity

Acknowledgements

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References

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