

# Trends in Laboratory Rotavirus Detection: 2003-2014

## Article Publication

### Background

- Rotavirus infections were once the most common cause of severe diarrhea in children in the United States, leading to hundreds of thousands of physician and emergency-department visits each year.<sup>1</sup>
- A vaccine for rotavirus was approved by the FDA in 2006, and a second one was approved in 2008.
- **Objective:** The investigators examined long-term trends in rotavirus antigen detection, herd immunity, waning vaccine effectiveness, and season length after approval of the rotavirus vaccines.

### Methods

- Specimens were submitted to Quest Diagnostics for rotavirus antigen detection between September 2003 and August 2014. De-identified test results of 276,342 children <10 years of age were analyzed.
- Test results were reported for 3 different time periods:
  - Pre-vaccine period: September 2003 to August 2006
  - Transition period: September 2006 to August 2007
  - Post-vaccine period: September 2007 to August 2014
- Results from “unlikely vaccinated” patients (born on or before July 31, 2006) and “likely vaccinated” patients (born on or after September 1, 2007) were analyzed to assess herd immunity and vaccine effectiveness.
- The length of each rotavirus season was estimated by 2 methods.
  - CDC method<sup>2</sup>: the start of the season was defined as the first of two consecutive weeks in which the positivity rate was at least 10%, and the end was defined as the end of the last consecutive 2-week period in which the positivity rate was at least 10%
  - Investigators’ method: the period in which the central 60% or 80% of positive results occurred

### Results

- Rotavirus antigen positivity rates declined by 73.3% from the pre-vaccine period (21%) to the post-vaccine period (5.6%).
- The declining positivity rates in “unlikely vaccinated” patients were observed in all age groups after vaccination licensure, suggesting herd immunity due to vaccination.
- The positivity rate in “likely vaccinated” patients increased as testing age increased in the post-vaccine period, suggesting waning immunity as children became older.
- Rotavirus season length was shorter in the post-vaccine period than the pre-vaccine period when calculated using the CDC method, but longer when calculated using the investigators’ method.

### Conclusions

- Rotavirus detection decreased after introduction of the vaccine, consistent with the decline reported by the CDC.<sup>2</sup>
- There was evidence of herd immunity in “unlikely vaccinated” patients and waning immunity with age in “likely vaccinated” patients.
- Season length increased in the post-vaccine period based on the investigators’ methodology.

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#### Webpage

<https://www.ncbi.nlm.nih.gov/pubmed/27664085>

#### References

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2. Aliabadi N, Tate JE, Haynes AK, et al. *MMWR Morb Mortal Wkly Rep*. 2015;64:337-342.