

# Systematic Literature Review of Role of Noroviruses in Sporadic Gastroenteritis

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## CME ACTIVITY

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### Learning Objectives

Upon completion of this activity, participants will be able to:

- Describe the frequency of norovirus (NoV) infection worldwide.
- Describe the prevalence of NoV infection among mild-to-moderate community-acquired diarrhea cases.
- Describe the morbidity associated with severe diarrhea due to NoV infection.
- Identify the most common virulent strains of NoV.
- Describe the morbidity and mortality attributed to NoV infection worldwide.

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We conducted a systematic review of studies that used reverse transcription–PCR to diagnose norovirus (NoV) infections in patients with mild or moderate (outpatient) and severe (hospitalized) diarrhea. NoVs accounted for 12% (95% confidence interval [CI] 10%–15%) of severe gastroenteritis cases among children <5 years of age and 12% (95% CI 9%–15%) of mild and moderate diarrhea cases among persons of all ages. Of 19 studies among children <5 years of age, 7 were in developing countries where pooled prevalence of severe NoV disease (12%) was comparable to that for industrialized countries (12%). We estimate that each year NoVs cause 64,000 episodes of diarrhea requir-

ing hospitalization and 900,000 clinic visits among children in industrialized countries, and up to 200,000 deaths of children <5 years of age in developing countries. Future efforts should focus on developing targeted strategies, possibly even vaccines, for preventing NoV disease and better documenting their impact among children living in developing countries, where >95% of the deaths from diarrhea occur.

Despite improved safety of food, water, and sanitation and aggressive promotion of noninvasive interventions (e.g., oral rehydration therapy) and prevention strategies (e.g., increased breastfeeding), diarrhea remains a common cause of illness worldwide. It accounts for ≈1.8 million annual deaths in children <5 years of age (1). Reduction of this disease will require targeted prevention and treatment strategies against the common agents causing severe diarrhea.

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### Article Title

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### CME Questions

1. Norovirus (NoV) has been documented to cause what percentage of all-cause epidemic gastroenteritis worldwide?

- A. 30%
- B. 50%
- C. 75%
- D. 90%

2. Among 13 studies of community- or clinic-based mild-to-moderate diarrhea cases, what was the most likely pooled proportion attributed to NoV infection?

- A. 5%
- B. 12%
- C. 40%
- D. 65%

3. For severe diarrhea seen in emergency departments and/or resulting in hospitalizations, which of the following best describes the pooled proportion of cases attributable to NoV infection as reported in 23 studies?

- A. 2%
- B. 11%
- C. 23%
- D. 35%

4. Which of the following is considered the most common strain of NoV causing diarrhea among NoV cases?

- A. GII.4 cluster
- B. GII.1 cluster
- C. GI.1 cluster
- D. GIII.2 cluster

5. The worldwide morbidity and mortality from NoV among children in developing countries is best described by which of the following estimations?

- A. 5 million hospitalizations
- B. 400,000 deaths
- C. 216,000 deaths
- D. 2.5 million hospitalizations

### Activity Evaluation

1. The activity supported the learning objectives.	Strongly Disagree				Strongly Agree
	1	2	3	4	5
2. The material was organized clearly for learning to occur.	Strongly Disagree				Strongly Agree
	1	2	3	4	5
3. The content learned from this activity will impact my practice.	Strongly Disagree				Strongly Agree
	1	2	3	4	5
4. The activity was presented objectively and free of commercial bias.	Strongly Disagree				Strongly Agree
	1	2	3	4	5