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Major Article

State-level adoption of national guidelines for norovirus outbreaks in health care settings

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Background: Clinical decision support (CDS) systems can help investigators use best practices when responding to outbreaks, but variation in guidelines between jurisdictions can make such systems hard to develop and implement. This study aimed to identify (1) the extent to which state-level guidelines adhere to national recommendations for norovirus outbreak response in health care settings and (2) the impact of variation between states on outbreak outcomes.

Methods: State guidelines were obtained from Internet searches and direct contact with state public health officials in early 2016. Outcomes from norovirus outbreaks that occurred in 2015 were compared using data from the National Outbreak Reporting System.

Results: Guidelines were obtained from 41 of 45 (91%) state health departments that responded to queries or had guidelines available on their Web sites. Most state guidelines addressed each of the national recommendations, but specific guidance varied considerably. For example, among 36 states with guidance on numbers of stool specimens to collect, there were 21 different recommendations. Furthermore, having guidelines consistent with national recommendations was associated with fewer outbreaks reported and more outbreaks with confirmed etiology.

Conclusions: This study identified substantial variation in state health care–associated norovirus outbreak response guidelines, which must be considered when developing related CDS systems. More research is needed to understand why this variation exists, how it impacts outbreak outcomes, and where improvements in evidence-based recommendations and communication of national guidance are needed.

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In the United States, there is growing interest in nationally interoperable public health informatics undertakings that work across sectors and jurisdictional boundaries, such as electronic case reporting¹ and Public Health 3.0.² However, public health remains largely local and fragmented, with policies and information systems often developed for a single state or local jurisdiction.² Understanding existing guidelines and expectations currently applied in jurisdictions across the country is an important first step toward such ambitious development projects.

Clinical decision support (CDS) systems can help investigating officials follow best practices when responding to infectious disease outbreaks,³ but variation in local guidelines would make such systems difficult to develop and implement. It was our efforts to develop such a system for acute gastroenteritis (AGE) outbreak response and the impact of variation in guidelines for norovirus in health care settings on our approach that led to the present study. In 2011, the Healthcare Infection Control Practices Advisory Committee (HICPAC) published guidelines concerning norovirus outbreaks in health care settings⁴ (hereinafter referred to as the HICPAC guidelines). These guidelines gave detailed recommendations for prevention and control of norovirus and similar AGE outbreaks in health care settings based on the existing literature and other evidence. Noroviruses are responsible for at least 50% of AGE outbreaks worldwide, causing approximately 20 million illnesses each year.⁵ Local or state health departments investigate outbreaks to institute interventions and prevent future outbreaks. The results are

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reported to the Centers for Disease Control and Prevention's (CDC) National Outbreak Reporting System (NORS), an Internet-based system launched in 2009 for foodborne and waterborne outbreaks; AGE outbreaks caused by contact with infected persons, animals, or environmental sources; and AGE outbreaks caused by other or unknown modes of transmission.⁵

Many state and local jurisdictions had released their own guidelines prior to the HICPAC guidelines, and most have since published or updated their own norovirus or general AGE outbreak guidelines with recommendations tailored to the perceived needs of their individual jurisdictions. Health care facilities are the most common setting of reported AGE outbreaks,⁶ and most of these guidelines are specific to the management of outbreaks in such settings. This emphasis on health care–associated AGE outbreaks can also be explained by the vulnerable populations that reside in such settings, the potential for successful interventions, and the regulatory relationships that exist between public health entities and health care facilities in many states. The guidelines may also include guidance on investigation activities (eg, when to conduct environmental health assessments), administrative details (eg, how local health departments should report findings to the state), regulatory requirements (eg, when to close a health care facility's food services), or any other topics deemed by a state to be important to outbreak response.

Beyond their use by a state health department, state guidelines may also be used by local health departments or health care facilities or adapted when these entities create their own guidelines. Failure to adopt national guidelines could result in the use of ineffective strategies for outbreak response and lead to disparities in outbreak data collection and reporting between jurisdictions. The objectives of this study were (1) to identify the extent to which state-level guidelines adhere to national guidelines for response to norovirus outbreaks in health care settings, and (2) to explore whether the differences in guidelines may impact the information about outbreaks reported to NORS. The impact of such differences is currently unknown. A better understanding of the potential relationships between guidance and outbreak outcomes would improve the interpretability of national outbreak data, potentially lead to improved guidelines, and encourage development of CDS.

METHODS

Guidelines collection and verification

In February 2016, Internet searches for norovirus guidelines in each of the 50 U.S. states were conducted using Google Search. Search terms included the individual names of states combined with “state norovirus guidelines.” The first 20 search results were reviewed, and state health department documents addressing norovirus or AGE outbreak response were collected. Next, state epidemiology, infectious disease, and health care–associated infections pages were navigated manually from each state health department Web site and inspected for AGE guidelines. If search functionality was available on a state's Web site, then the search terms “norovirus” and “gastroenteritis” were used, and results that addressed norovirus or AGE outbreak response in the first 20 search results were inspected. Because guidelines designed to address AGE outbreaks in general were not distinguished from guidelines specific to norovirus, we will refer to AGE outbreaks unless specifically referring to individual guidelines or outbreaks solely related to norovirus.

To verify that the guidelines identified were current and the preferred guidance documents, we attempted to contact an authority from each state. A directory of e-mail and Web form addresses was created by manually searching the state health departments' epidemiology, infectious disease, and health care–associated infections Web pages for contact information. For states where the e-mail or

Web form addresses at the department level could not be found, higher levels of electronic contact information were sought using Web sites' navigation trees up to the main health department level. A standard letter requesting verification of online guidelines and copies of any other guidelines was sent via e-mail or Web form to the 45 states for which addresses were obtained in June 2016. States were provided 4 weeks to respond. Once all Internet searches were completed and all state responses collected, available guidelines were reviewed and restricted to those including guidance specific to health care settings.⁷⁻⁵⁴

Guidelines review and tabulation

The HICPAC guidelines for norovirus outbreaks in health care settings include 12 recommendation topics⁴ and were used as a template for comparison. Additional topics were included if a new recommendation occurred in at least 10 state-based guidelines. When analyzing the states' guidelines, general recommendations that fell under one of the HICPAC guidelines' recommendation topics (eg, increased hand hygiene, patient cohorting) were grouped broadly under the associated HICPAC-defined topic, whereas recommendations found only in state guidelines were analyzed in greater detail. Quantitative recommendations, such as the number of stool specimens to be collected or the time range for patient isolation, were grouped based on the specific ranges indicated. Variations between states for each of these recommendations were summarized, and implications for outbreak reporting were identified.

Impact analysis

Data about outbreaks reported to NORS in 2015 (dates of first onset between January 1, 2015, and December 31, 2015) that were attributed at least in part to laboratory-confirmed or suspected norovirus in health care facilities were used to assess the potential impact of variation in guidelines between states. The most recent year for which data were available was 2015. An outbreak was considered health care associated if it was reported as occurring at least in part in one of the following settings (based on where the food was eaten for foodborne outbreaks): hospitals, long-term care facilities, such as nursing homes and assisted living facilities, and other health care facilities.⁵⁵

Outbreak-related elements in the NORS data were stratified using the following criteria from the states' guidelines:

- Number of specimens: (1) median <5 (5 is the HICPAC recommendation⁵⁶) (eg, “1-3 specimens”), (2) median ≥5 (including ranges with no upper bound), or (3) no guidance or unspecified number (eg, “Collect specimens within 48-72 hours”).
- Outbreak detection: (1) ≥2 epidemiologically linked cases occurring within a specified time frame (NORS definition⁵⁷); (2) ≥3 epidemiologically linked cases, “more than expected” case counts, or outbreaks based on unspecified suspicion; or (3) no guidance.
- Ill patient isolation: (1) minimum of 2 days (HICPAC recommendation⁴), (2) <2 days, or (3) no guidance.
- Ill employee exclusion: (1) minimum of 2 days (HICPAC recommendation⁴), (2) <2 days, or (3) no guidance.
- Outbreak resolution: (1) ≥2 incubation periods (a standard time frame in applied epidemiology used to identify transmission from subclinical infections or unrecognized cases⁵⁸), (2) <2 incubation periods, or (3) no guidance.
- Mode of transmission: (1) any guidance or (2) no guidance.
- Environmental health assessments: (1) any guidance or (2) no guidance.

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