



Outbreak investigation

Q&A WITH GWEN BORLAUG, MPH, CIC, FAPIC

GWEN BORLAUG, MPH, CIC, FAPIC, recently retired from the Wisconsin Division of Public Health, where she served as the infection prevention epidemiologist and manager of the HAI Prevention Program. She was involved in numerous outbreak investigations, including several incidents of carbapenem-resistant *Enterobacteriaceae* (CRE) transmission in healthcare settings, and was a member of the team that investigated the largest recorded *Elizabethkingia* outbreak. Prior to joining the Division of Public Health, Gwen was an infection preventionist (IP) in an acute care setting.

Q: Can you tell us about an outbreak investigation you have conducted?

A: A case of New Delhi metallo-beta-lactamase carbapenem-resistant *Enterobacteriaceae* (NDM CRE) occurred in a hospitalized patient from India. Approximately six weeks later, the same hospital reported a case of NDM CRE infection in a second patient who had no risk factors for NDM CRE infection. A molecular analysis determined that the isolates were genetically related, and a medical records review revealed the only epidemiological link was that both patients underwent endoscopic retrograde cholangiopancreatography with the same duodenoscope. The scope was removed from service, and exposed patients were tested, which led to the identification of four more patients with the same NDM CRE organism. Although no breaches in scope reprocessing procedures were identified, similar incidents occurred elsewhere at unrelated facilities, which underscored the need to address current scope design and reprocessing procedures.

Q: What are your thoughts on the chief roles of a facility IP when conducting an outbreak investigation?

A: Two key points come to mind. First, the IP is skilled in what is known as *descriptive epidemiology*—collecting the clinical and epidemiologic data critically necessary to describe the outbreak, or cluster

of events, in terms of person, place, and time. With these skills, the IP can collect, organize, and summarize data to share with the facility epidemiologist and others supporting the outbreak investigation. He or she ensures accurate and complete data collection and produces a useful summary and analysis to present to the outbreak investigation team.

Second, the IP plays a crucial role in assessing the facility’s infection prevention practices, to identify gaps or breaches that may have led to the outbreak, and in developing the corrective action plan to control the outbreak.

Q: What are the primary elements of an effective outbreak investigation?

A: First, confirm the diagnosis and that an outbreak exists, and then formulate a case definition. Next, find additional cases and create a line list. Review the data to generate a hypothesis regarding outbreak sources and modes of transmission, and design studies to test the hypothesis. Finally, implement control measures, communicate findings to the outbreak team, and continue surveillance to ensure event incidence has returned to baseline.

Q: What are some of the best ways that an IP consultant can support outbreak investigations?

A: The IP consultant can support and coordinate the often-overwhelming task of data collection, surveillance, and

frequent updating of line lists and epi curves. The consultant can also serve as an objective observer for assessing infection prevention practices and exploring potential sources and modes of transmission.

Q: What tools and resources can IPs use to develop effective outbreak investigation plans?

A: Developing line listings, an epi curve, and patient notification templates will help facilities prepare for outbreaks. Data management systems should accommodate accurate, real-time collection and analysis of large data sets. Surge capacity of ancillary departments, such as the clinical laboratory, and increased supply needs, such as personal protective equipment, should be assessed. Outbreak management plans should have effective internal and external communication methods that include staff, patients, and visitors, as well as state and local department of health contacts. **PS**

Resources

Centers for Disease Control and Prevention. Line list template. January 2008. <https://www.cdc.gov/urdo/downloads/linelisttemplate.pdf>. Accessed February 2018.

Centers for Disease Control and Prevention. n.d. Quick learn lesson: Create an epi curve. <https://www.cdc.gov/training/QuickLearns/CreateEpi>. Accessed February 2018.

Centers for Disease Control and Prevention. Patient notification toolkit. December 2013. <https://www.cdc.gov/injectionsafety/pntoolkit/index.html>. Accessed February 2018.

To read more about the largest recorded Elizabethkingia outbreak, see page 62.