Presentation Type:
Poster Presentation

From Outbreak to Compliance and Beyond: UAB Medicine's Successful Implementation of a Water Safety Program

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Background: Pre-emptive management of the water supply can reduce hospital-onset legionellosis associated with building water systems. In 2014, an outbreak of *Legionella* pneumonia occurred in a 1,150-bed academic medical center (with ~0.557 km^2 or ~6 million ft^2 of space) among hematology-oncology patients. A comprehensive water safety and management program was implemented after the outbreak was controlled. We describe our experience implementing this prevention program. **Methods:** After the *Legionella* outbreak was controlled, an air and water safety committee (AWSC) was established and cochaired by the healthcare epidemiologist and the chief facilities officer. The AWSC established protocols for proactive environmental testing and the development of the an infection control risk assessment (ICRA) dedicated to water safety known as the water system construction and renovation risk assessment (WSCRRA).The water system management plan (WSMP) was developed (prior to the publication of ASHRAE 188) to direct the risk assessments and mitigation of any risks throughout the campus. **Results:** The WSMP identifies critical control measures, points, and limits that need to be maintained to control and monitor *Legionella* growth in the water systems. A control point is any step in a process at which biological, chemical, or physical factors can be controlled. The UAB Medicine WSMP includes 7 control points that are monitored on a daily basis. Examples of these control steps include monitoring of the hot water temperatures at the water heaters and distal outlets, managing the levels of mono-chloramines and chlorines in the water system, and managing water system components. To validate the efficacy of the WSMP, >610 water samples are collected from 19 hospital buildings over a year to be tested for *Legionella*. The results of water testing have shown significant decrease in distal site positivity due to managing and controlling these control points. This WSMP also evaluated the efficacy of 2 different methods for disinfecting water systems on campus as a corrective measure to *Legionella* growth. These methods are hyperchlorination and temporary copper silver ionization; based on the culture results of the water samples collected post disinfection, WSMP data show that the copper silver ionization method was more effective than hyperchlorination in controlling *Legionella* growth and decreasing the distal site positivity. **Conclusions:** The WSMP has provided ongoing management of building water systems and proactive actions around construction and renovation projects that involve water systems to prevent healthcare-acquired legionellosis. We strongly recommend other healthcare facilities to implement a similar program to avoid outbreaks.

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Genomic Epidemiology of Carbapenemase-Producing Enterobacterales (CPE) in Toronto, Canada

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Table 1.

Cluster	No. Cases	No. affected units	Days between detection of first and last case	Carbapenemase gene	Organism, Sequence Type	SNP differences between core genomes	No. additional cases that WGS suggests may also be in cluster
A	9*	2	700	7 bla_{NDM-1} 1 bla_{NDM-16}	*Klebsiella pneumoniae* ST147 (7), ST340 (1)	0-31**	2
B	3	1	87	bla_{KPC-2}	*Klebsiella pneumoniae* ST258	1-2	0
C	2	1	4	bla_{VIM-1}	*Pantoea spp.*	8	0
D	4	1	181	3 bla_{KPC-2} 1 bla_{KPC-34}	*Klebsiella pneumoniae* ST258	1-3	1
E	2	1	28	bla_{KPC-3}	*Enterobacter cloacae* ST97	1	0
F	2	1	119	1 bla_{KPC-6} 1 bla_{KPC-29}	*Klebsiella pneumoniae* ST258	4	0

*1 isolate unavailable.
**ST340 isolate >20,000 SNPs away from ST147 isolates. 0-5 SNP differences between all ST147 isolates except one 29-31 SNPs away.

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Objective: We investigated whether whole-genome sequencing (WGS) data altered interpretations of clonal transmission as determined by conventional epidemiology and pulsed-field gel electrophoresis (PFGE) at a tertiary-care hospital (hospital Z, HZ). **Methods:** We included all carbapenemase-producing Enterobacterales (CPE)–colonized or –infected patients identified via population-based surveillance from 2007 through 2018, who were admitted to HZ during and/or in the year prior to or following CPE detection. HZ reported clonal transmission clusters using epidemiology and PFGE for CPE identified at HZ or reported to HZ by other hospitals as potentially acquired at HZ. We assessed single-nucleotide polymorphism (SNP) phylogenies and case epidemiology. **Results:** Overall, 85 CPE-colonized or -infected patients were included: 50 were detected at HZ and 35 were detected at another local hospital but were admitted to HZ in the previous or following year. HZ reported 6 transmission clusters (Table 1). SNP analyses confirmed clusters B, C, E, and F. In cluster A, SNP analyses cast doubt on 2 of 9 cases (possibly representing plasmid transmission) but also identified 2 additional cases with isolates highly related (0–3 SNP differences) to other isolates. One case may be the index case: a travel-related case who stayed on the same unit as case 1, 4 months before case 1 detection. The second case stayed in a room previously occupied by 5 cluster A cases. In cluster D, SNP analyses found 1 additional case whose isolate was highly related (ie, 17–19 SNP differences) to other isolates. This case was identified a year before cluster D at another hospital that shares patients with HZ; however, the case's admission to HZ was after all cluster D cases were detected and no direct epidemiologic link was identified. **Conclusions:** WGS data can identify cases belonging to transmission clusters that conventional epidemiologic methods missed.

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Guiding Principles and Practices for Healthcare Outbreak Notification and Disclosures: CORHA Policy Workgroup Framework

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Background: Outbreaks of infections in healthcare negatively impact patient outcomes and experience. Transparency is critical to engendering trust and optimizing health. Consistent guidance is not available regarding when to report a possible outbreak of healthcare-associated infections (HAIs) to public health and when to notify a limited population or to publicly disclose the occurrence of HAI. Recent analyses of state public health policies revealed that most states address reporting of outbreaks using terms such as clusters, unusual occurrences, or incidences over baseline. Specific wording about healthcare outbreaks or guidance for notifying patients or public is often absent. Thus, HAI outbreak notification and disclosure guidance and practices vary significantly around the country. A best-practice guidance document will provide clarity for when such reporting should occur. **Methods:** The Council for Outbreak Response: HAI and Antimicrobial-Resistant Pathogens (CORHA) has undertaken the task of developing this guidance by forming a multidiscipline policy work group with representation from its partner organizations. This work group has been tasked with creating a general framework that will guide notification and disclosure in the context of a possible HAI outbreak. The draft guidance document has been developed over several months of telephone and in-person conferences among work group members. **Results:** The standardized actions stemming from the guiding principles and recommended practices for conducting step 1 (immediate notification, initial and critical communications that occur when an outbreak is first suspected), were arranged in a table format with rows representing stakeholders and constituents to be notified and columns demonstrating the actions to be taken (Fig. 1). As an investigation progresses, notification should be revisited, especially if an investigation's scope expands. The principles and practices for step 2 (expanded notification) have also been drafted in a table format. Next, the draft guidance addresses step 3 (public disclosure), outlining indications, practical guidance, and considerations in an outline and/or summary format. Real-world examples demonstrating application of the framework are being developed as supplementary resources to the framework. Current work group activities include engaging bioethicists, media reporters and patient advocates to review and comment on the guidance to ensure that it is clear, consistent and practical. **Discussion:** The draft guidance provides a framework for standardized actions for HAI outbreak notification and disclosure in a stepwise fashion, modeling public health practices and grounded in bioethical principles. The final product will provide valuable, practical advice for effectively sharing information with affected or potentially affected individuals and their caregivers in a timely manner.

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