

Multidrug-resistant organism prevention in Iowa – A tale of two facilities



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The Iowa Department of Health and Human Services implemented programming to rapidly respond to multidrug-resistant organisms occurring at long-term care facilities throughout the state. This story highlights disease prevention responses in two different facilities.

The “What”



Antimicrobial resistance is linked to more than 2.8 million illnesses and 35,000 deaths in the United States annually. Early detection of new resistance mechanisms and robust prevention efforts, including early detection and response, help control the spread throughout healthcare facilities. This is especially important for residents of long-term care facilities (LTCF) who are highly vulnerable to infections caused by multidrug-resistant organisms (MDROs), sometimes carried by residents returning from other healthcare settings. Thus, the Iowa Department of Health and Human Services (HHS) has used the Epidemiology and Laboratory Capacity for the Prevention and Control of Emerging Infectious Diseases (ELC) funding to implement ContainNET, an infection prevention and control assistance and surveillance program, and associated lab activities, to respond rapidly to MDRO events occurring at LTCFs throughout the state and stop MDRO spread between LTCFs and the broader healthcare system.



A historically majority-rural state, Iowa ranks 18th nationally for the percent population of residents aged 65 years or older (17.9%). As technologies continue to advance, the percentage of rural residents is also shifting, with approximately 64% of Iowans living in urban settings according to 2020 census data. This puts Iowa in a critical public health transitional period, with Iowa HHS needing to greatly expand their surveillance and prevention efforts surrounding issues impacting the aging population as they move from their sometimes-isolated rural homes to congregate-housing environments. Currently, there are more than 400 licensed LTCFs and seven facilities providing high-acuity care in Iowa. The need for facilities offering high-acuity services in Iowa is likely to increase greatly moving forward, giving Iowa HHS the opportunity to establish a strong surveillance and education foundation now before the state experiences a sharp increase in demand.



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The “So What”

This story can be described as A Tale of Two Facilities.

Facility #1 had one of the first Carbapenem-resistant Enterobacterales (CRE) detected in the state, an *Escherichia coli* isolate harboring a specific gene that resulted in a multi-patient outbreak. Within three years, *Providencia stuartii*, *Klebsiella pneumoniae*, and *Proteus mirabilis* were also isolated from the original patient, all harboring the same gene. Six months after confirming the *K. pneumoniae*, the bacterium harboring the same gene was isolated from a patient who resided down the hall from the index patient. Following a point-prevalence-study (PPS) at the patient’s residential facility, five residents of the same unit were confirmed to be colonized with various bacteria carrying the resistance gene: *E. coli*, *K. pneumoniae*, *P. stuartii*, *P. mirabilis*, and *Citrobacter freundii*. In total, 26 isolates spanning five species and five patients were found within a four-year period, all harboring the same evolutionary history. The Iowa HHS healthcare-associated infections (HAI) team conducted response-driven onsite infection control assessments, providing recommendations and assistance that eliminated this gene within the facility.

In addition to the intra-facility CRE transmission, a Carbapenem-resistant *Acinetobacter baumannii* (CRAB) was detected in early 2022. Again, the Iowa HHS HAI team quickly responded, requesting PPSs, which identified several patients colonized with CRAB. Following the HAI team’s recommendations, facility #1 was able to perform regular PPSs over the ensuing months and ensure

mitigation was successful allowing the facility to revert to quarterly PPSs and mitigate additional outbreaks through present day.

Facility #2 also had an outbreak of CRAB cases in 2022 in multiple patients, which the facility believed were all separate introductions from previously hospitalized patients. Initial screening in facility #2 identified two different CRAB sequence types circulating, with one patient harboring both strains. Over the course of the response, a total of 28 CRAB isolates from 15 patients were detected, and through whole genome sequencing, 26 of these isolates were found to be genetically related, indicating that transmission occurred within the facility. The Iowa HHS HAI team recommended several mitigation steps that the facility instituted, and routine screening continues through present day. Furthermore, ongoing admissions screening efforts at facility #2 led to the first detection of in-state *Candida auris* transmission, allowing Iowa HHS to complete an in-depth epidemiologic investigation that found and contained the source.

ContainNET’s continued legacy is enabling facilities in Iowa to rapidly identify MDROs upon admission and instantly implement the appropriate precautions.

The “Now What”

This work highlights the importance of communicating colonization screening results between hospitals and residential facilities, as well as the importance of adhering to infection control protocols for MDRO-colonized patients. Ongoing PPSs at facility #1 and facility #2 demonstrate that transmission has ceased after cohorting colonized patients and enacting appropriate infection-control

precautions. Plus enabled the early detection and response of *Candida auris* in Iowa. ContainNET’s continued legacy is enabling facilities in Iowa to rapidly identify MDROs upon admission and instantly implement the appropriate precautions. It has also helped strengthen the relationships between Iowa HHS and the healthcare community.

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