

A Case of *Candida auris* Infection at a Connecticut Acute Care Hospital - June 2017

The Connecticut Department of Public Health (DPH), in consultation with the Centers for Disease Control and Prevention (CDC), is working with infectious disease, laboratory, and other clinical staff at a Connecticut acute care hospital to investigate the state's first case of *Candida auris* infection. Preliminary case investigation suggests that the patient acquired the infection during a hospital stay in a foreign country. *Candida auris* is an emerging pathogen of concern because it causes serious infections, is often resistant to antifungal medications, and can spread in healthcare settings.

All Connecticut healthcare facilities, including hospitals and nursing homes, should be on alert for cases of *C. auris* infection or colonization. The key to controlling the spread of *C. auris* is rapidly identifying patients infected or colonized with *C. auris*, implementing effective infection control precautions, and conducting thorough environmental disinfection.

As of June 16, 2017, 86 clinical cases of *C. auris* have been identified in eight states. Of these, 78 (91%) were from the Northeast including: 60 (70%) from New York, 17 (20%) from New Jersey, and 1 (1%) from Massachusetts; 4 (5%) were from Illinois (1).

Clinical and Epidemiological Features

- *C. auris* was first identified in 2009, and cases have been isolated from more than a dozen countries including: South Korea, India, South Africa, Kuwait, Colombia, Venezuela, Pakistan, and the United Kingdom.
- Healthcare facility outbreaks have been associated with contact with infected or colonized patients and environmental contamination. Environmental testing of

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patients' rooms identified *C. auris* from mattresses, beds, windowsills, chairs, infusion pumps, and countertops.

- Limited data suggest that the risk factors for *C. auris* infections are generally similar to risk factors for other types of *Candida* infections (such as recent surgery, diabetes, and broad-spectrum antibiotic and antifungal use). In the U.S., people who have recently spent time in nursing homes and have lines and tubes that go into their body (such as breathing tubes, feeding tubes and central venous catheters), seem to be at highest risk for *C. auris* infection. Infections have been found in patients of all ages.
- *C. auris* is frequently resistant to multiple classes of antifungal medications including: triazoles (i.e. fluconazole, voriconazole), polyenes (amphotericin B), and echinocandins (i.e. anidulafungin, caspofungin, micafungin). The first 35 U.S. clinical isolates submitted for antifungal susceptibility testing at CDC revealed 30 (86%) isolates were resistant to fluconazole (minimum inhibitory concentration [MIC] >32), 15 (43%) were resistant to amphotericin B (MIC ≥2), and one (3%) was resistant to echinocandins (MIC >4) (2).

Infection Prevention Recommendations for *C. auris*-colonized or infected patients

To help prevent the spread of *C. auris*, healthcare facilities should use the interim guidance developed by CDC when a case of *C. auris* is suspected or confirmed (3).

- Use Standard Precautions and Contact Precautions
- House the patient in a private room
- Conduct daily and terminal cleaning of a patient’s room with a disinfectant active against *Clostridium difficile* spores (update from previous disinfectant recommendations)
- Notify receiving health care facilities when a patient with *C. auris* colonization or infection is transferred

Laboratory Identification

- *C. auris* can be difficult for clinical laboratories to detect and may require coordinated reference testing for confirmation.
- *C. auris* can be misidentified as a number of different organisms when using traditional biochemical methods for yeast identification (Table).
- If any of the species listed below are identified by the methods listed, or if species identity cannot be determined, further characterization using appropriate methodology should be sought (3).
- If appropriate methodology for species characterization is not available, or if *Candida*

species are unidentified or suspected to be *C. auris*, healthcare facilities should contact the DPH for further guidance and coordination of specimen submission for confirmatory testing.

- An unusual increase in the number of unidentified *Candida* species infections in a patient care unit, including increases in isolation of *Candida* from urine specimens, should prompt suspicion for *C. auris*.

Reporting

If either *C. auris* infection or colonization are suspected or confirmed, please notify the DPH Epidemiology and Emerging Infections Program by phone at (860) 509-7994 and the federal Centers for Disease Control and Prevention (CDC) by email at candidaauris@cdc.gov.

References

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2. Centers for Disease Control and Prevention. [Ongoing Transmission of *Candida auris* in Health Care Facilities-United States, June 2016-May 2017](#). MMWR 2017;66(19);514-515.
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Table. Common Misidentified *C. auris* Organisms Found Using Traditional Biochemical Yeast Identification Methods.

Identification Method	Common <i>C. auris</i> Misidentification
VITEK 2 YST	<i>Candida haemulonii</i>
BD Phoenix yeast identification system	<i>Candida haemulonii</i> <i>Candida catenulata</i>
MicroScan	<i>Candida famata</i> <i>Candida guilliermondii</i> (and no hyphae/pseudohyphae present on cornmeal agar) <i>Candida lusitanae</i> (and no hyphae/pseudohyphae present on cornmeal agar) <i>Candida parapsilosis</i> (and no hyphae/pseudohyphae present on cornmeal agar)
API 20C	<i>Rhodotorula glutinis</i> (and characteristic red color not present)

Epidemiology of Carbapenem-Resistant *Enterobacteriaceae*—Connecticut, January 2014–December 2015

Carbapenem-resistant *Enterobacteriaceae* (CRE) are a family of bacteria that cause difficult to treat infections due to their high levels of resistance to carbapenem, a class of potent broad-spectrum beta-lactam antibiotics. Resistance to carbapenems can be the result of multiple resistance mechanisms including: efflux pumps, porin loss, Amp C hyper-expression, and carbapenemase enzymes which actively degrade the carbapenem antibiotics resulting in a loss of activity. Genes encoding these carbapenemase enzymes are frequently located on mobile genetic elements known as plasmids, which can be easily transferred among bacteria. The subset of CRE that carry these carbapenemase genes are referred to as carbapenemase-producing CRE or CP-CRE (1). Much of the current rise in CRE in the United States is likely due to the spread of carbapenemase-producing strains (2).

Carbapenem antibiotics are generally used as a drug of last resort in patients hospitalized with serious infections known or suspected to be caused by multidrug-resistant bacteria. In the United States, the reported percentage of carbapenem-nonsusceptible *Enterobacteriaceae* causing common healthcare-associated infections (HAI) increased from 1.2% in 2001 to 4.2% in 2011 (2). One report cites that CRE can contribute to death in up to 50% of patients with infections (3). To better understand and describe these infections in Connecticut (CT), the Department of Public Health (DPH) initiated laboratory reporting of CRE effective January 1, 2014.

CT DPH initiated CRE surveillance using a phenotypic definition, based on the susceptibility pattern for antimicrobial drugs tested at the clinical laboratory. CRE surveillance in CT includes clinical isolates from any genus of the family *Enterobacteriaceae* obtained from any sterile site, sputum, or urine. Cases were classified as confirmed if they met the genus, clinical source, and antibiogram components of the case definition (1), and as suspect if they had insufficient antibiogram data. Chart review was performed for suspect and confirmed hospitalized cases reported from January 1, 2014–December 31, 2015. Collected data

included: patient demographics, laboratory and clinical information, healthcare exposures and outcomes, antibiotic therapy that the patient received while hospitalized, and antibiotic exposure in the 60 days prior to culture.

Of Connecticut's 29 acute care hospitals 24 (83%) reported at least one case of CRE. The DPH received 296 CRE reports of which, 228 (77%) were reviewed. Of reports reviewed, 85 (37%) were found to be from non-hospitalized patients and were excluded from further analysis. Of the remaining 143, 112 (78%) were classified as confirmed, 26 (18%) as suspect, and 5 did not meet the case definition. The 138 confirmed or suspect reports represent 126 unique patients with a median age of 72 years (range, 1–98); 87 (69%) were White, and 64 (51%) were female.

Of the 138 CRE cases, 50 (36%) were *Klebsiella pneumoniae*, 47 (34%) *Enterobacter cloacae*, 20 (15%) *Escherichia coli*, and 7 (5%) *Enterobacter aerogenes*; representing 90% of cases (Figure 1). The most common culture source was urine (64%), followed by the respiratory tract (23%) (Figure 2, see page 12). Of all cultures, 63 (46%) were collected in the emergency department (ED) and 41 (30%) in the intensive care unit (ICU); 56 (41%) were hospitalized ≥ 3 days prior to culture. In the 60 days prior to culture, 108 (78%) had antibiotic therapy; 95 (69%) had a history of ≥ 1 additional multidrug-resistant organism (MDRO), and 106 (77%) had ≥ 1 invasive device at the time of culture.

Reported by

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Figure 1. Percentage of organism type for hospitalized confirmed or suspect CRE cases (n=138) - Connecticut, January 2014–December 2015

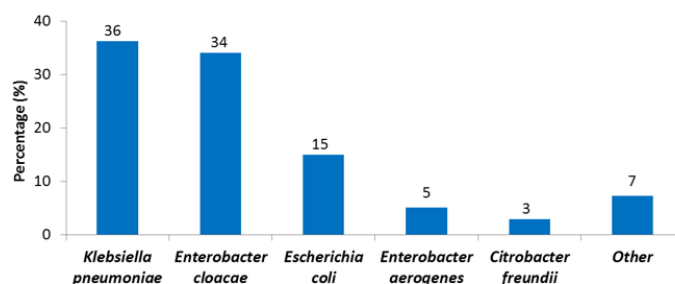
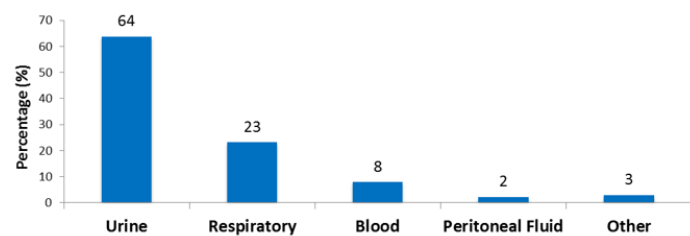


Figure 2. Percentage of specimen source for hospitalized confirmed or suspect CRE cases (n=138) - Connecticut, January 2014-December 2015



Editorial

Overall, CT DPH surveillance data showed most hospitalized cases had at least one known risk factor for CRE, including ≥1 additional MDRO or ≥1 invasive device. Another key finding was that most cultures were collected in the ED or ICU. This emphasizes the importance of proper communication of CRE status within and between facilities involved in a patient transfer.

Identification of CRE isolates carrying plasmid-based carbapenemase genes is of critical importance to control the spread of these highly drug-resistant pathogens; however, detection of molecular mechanisms of resistance has not been widely available in clinical laboratories. Beginning August 1, 2017, the State Public Health Laboratory (SPHL) will begin offering a panel of tests that will characterize CRE strains carrying common carbapenemase genes, as well as those that may carry less common and/or novel resistance genes. The SPHL will also collaborate with the regional reference laboratory in New York State and the Centers for Disease Control and Prevention to search for additional molecular genetic markers associated with potentially novel resistance and healthcare

facility-based clusters. The goal is to facilitate rapid outbreak detection and response, and targeted containment of antibiotic resistance.

The DPH Healthcare Associated Infections Program is exploring options for the development of a multidrug-resistant organism patient registry, which would facilitate inter-facility communication. These activities will help the DPH estimate the prevalence of CRE in Connecticut. Real-time, actionable data will allow hospitals and other healthcare facilities to implement strategies for prevention and control of this serious public health threat (4, 5).

A fact sheet for providers is available at: <http://www.ct.gov/dph/cwp/view.asp?a=3136&q=388278>.

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