Challenges in identifying *Candida auris* in hospital clinical laboratories: a need for hospital and public health laboratory collaboration in rapid identification of an emerging pathogen

Amanda J. Durante PhD[1,2], Meghan H. Maloney MPH[1], Vivian H. Leung MD[1,3], Jafar H. Razeq PhD[1,4] and David B. Banach MD[2]

[1]Connecticut Department of Public Health, Healthcare-Associated Infections/Antimicrobial Resistance Program, Hartford, CT, [2]University of Connecticut School of Medicine, Farmington, CT, [3]Epidemic Intelligence Service, Division of Scientific Education and Professional Development, Centers for Disease Control and Prevention, Atlanta, GA and [4]Katherine A. Kelley State Public Health Laboratory, Rocky Hill, CT

To the Editors—Candida auris is an emerging fungus that poses a considerable threat to US healthcare facilities and their patients. Patients exposed to *C. auris* can develop invasive infection, which can be fatal,[1] or can become colonized, which poses long-term transmission risks. Once introduced into a healthcare facility, *C. auris* can spread through contact with affected patients and contaminated surfaces.[2] The organism can persist in the environment,[3] and quaternary ammonium disinfectants demonstrate poor activity against it.[4] *Candida auris* is often multidrug-resistant,[1,4] and its detection is challenging because it can be misidentified by some biochemically based identification methods. For example, the API 20 C (bioMerieux, Marcy-l'Etoile, France) can misidentify *C. auris* as *C. sake* or *Rhodotorula glutinis,* and the Vitek 2 (bioMerieux) can misidentify *C. auris* as *C. haemulonii* or *C. duobushaemulonii*.[5] Rapid and accurate *C. auris* detection would help hospitals to guide infection control activities intended to prevent the spread of the fungus within and between facilities and to properly plan antifungal treatment. We surveyed laboratories that serve Connecticut's acute-care hospitals to assess their capability to identify *C. auris*. The information was collected to guide statewide hospital prevention efforts.

During August 2017, we conducted an online survey of *C. auris* identification and susceptibility testing methods and protocols of hospital-based laboratories. The survey was adapted from an instrument designed by the New Jersey Department of Public Health and was distributed through the Connecticut Laboratory Response Network. Frequency distributions and cross tabulations of survey data were calculated, and results were reviewed by public health and healthcare stakeholders to identify *C. auris* detection gaps. The Centers for Disease Control (CDC) reviewed this study for human subjects protection and deemed it to be a nonresearch study.

Of 23 hospital laboratories, 21 responded to the survey. Of the responding laboratories, 4 contract commercial laboratories for fungal identification, while 17 perform onsite identification. The 17 hospital laboratories that perform onsite fungal identification reported their testing methods. These 17 laboratories serve 80% of Connecticut's acute-care hospitals. Of these 17 hospital laboratories, 16 (94%) perform species-level identification for all sterile site isolates. Species-level identification is performed for all respiratory *Candida* isolates at 9 of these laboratories and for all urine *Candida* isolates at 11 of these laboratories. Only 5 laboratories routinely use matrix-assisted laser desorption/ionization-time of flight (MALDI-TOF) mass spectroscopy for species-level *Candida* identification with a database that can accurately identify *C. auris*, although none use automated *C. auris* alert flags. Furthermore, 11 laboratories routinely use systems for species-level *Candida* identification that can misidentify or fail to identify *C. auris,* including the Vitek 2 (6 laboratories), the API 20 C (3 laboratories), the Remel RapID YEAST PLUS (Thermo Fisher Scientific, Lenexa, KS) (1 laboratory), and culture on corn meal agar (1 laboratory). Of these laboratories, 5 have a protocol for the investigation of suspect isolates; however, only 2 have automated alert flags for suspect *C. auris* misidentifications. Only 2 laboratories perform onsite antifungal susceptibility testing on *Candida* isolates.

Our survey findings demonstrate considerable diversity in *Candida* identification methods used by Connecticut hospital laboratories and highlight challenges in rapid *C. auris* detection. Only a minority of laboratories have the capacity to accurately detect *C. auris,* although most use systems for which fungal misidentifications have been characterized (Vitek 2 and API 20 C). This characterization provides an opportunity to implement automated alert flags and protocols for the investigation of potentially misidentified *C. auris* that are not routinely used.

All laboratories that perform species-level identification do so for all sterile-site isolates. However, species-level identification is not performed on all non–sterile-site isolates at some laboratories, which could further limit *C. auris* detection. Approximately 50% of US clinical *C. auris* isolates are identified from nonsterile sites,[6] although guidance on the optimal strategy for their identification is limited.[7]

These results represent laboratories that serve most of Connecticut's acute-care hospitals. Although our conclusions are strengthened by a high response rate, we recognize the limitation of not having data from commercial laboratories that serve some acute-care hospitals as well as long-term acute-care facilities, where transmission may also occur.[2] *Candida* species-level identification methods used in Connecticut hospital laboratories could limit the sensitivity and timeliness of *C. auris* detection, which could delay the implementation of control measures.

The Connecticut Department of Public Health has advised hospitals without appropriate methodology for *C. auris* species characterization or with isolates that are unidentified or suspect for *C. auris* to contact the health department for guidance.[8] Additionally, as of November 1, 2017, the Connecticut Public Health Laboratory began offering *C. auris* testing, using polymerase chain reaction and MALDI-TOF, to Connecticut

Author for correspondence: Amanda J. Durante, PhD, Immunization Program, Connecticut Department of Public Health, 410 Capitol Avenue, MS # 11MUN, Hartford, CT, 06134-0308. E-mail: amanda.durante@ct.gov

Cite this article: Durante AJ, *et al.* (2018). Challenges in identifying *Candida auris* in hospital clinical laboratories: a need for hospital and public health laboratory collaboration in rapid identification of an emerging pathogen. *Infection Control & Hospital Epidemiology* 2018, 39, 1015–1016. doi: 10.1017/ice.2018.133

healthcare facilities. Challenges of *C. auris* detection emphasize the importance of collaboration between hospitals and the state health department to optimize laboratory capacity for rapid identification of emerging pathogens.

Acknowledgments. The content is solely the responsibility of the authors and do not necessarily represent the official views of the Centers for Disease Control and Prevention or the Department of Health and Human Services.

Financial support. This work was supported by the Centers for Disease Control and Prevention (cooperative agreement no. NU50CK000397).

Potential conflicts of interest. All authors report no conflict of interest relevant to this article.

References

1. Lockhart SR, Etienne KA, Vallabhaneni S, *et al*. Simultaneous emergence of multidrug-resistant *Candida auris* on 3 continents confirmed by whole-genome sequencing and epidemiologic analysis. *Clin Infect Dis* 2017;64:134–140.
2. Tsay S, Welsh RM, Adams EH, *et al*. Notes from the field: ongoing transmission of *Candida auris* in healthcare facilities—United States, June 2016–May 2017. *MMWR Morb Mortal Wkly Rep* 2017;66:514–515.
3. Welsh RM, Bentz ML, Shams A, *et al*. Survival, persistence, and isolation of the emerging multidrug-resistant pathogenic yeast *Candida auris* on a plastic health care surface. *J Clin Microbiol* 2017;55:2996–3005.
4. Cadnum JL, Shaikh AA, Piedrahita CT, Sankar T. Effectiveness of disinfectants against *Candida auris* and other *Candida* species. *Infect Control Hosp Epidemiol* 2017;38:1240–1243.
5. Mizusawa M., Miller H, Green R, *et al*. Can multidrug-resistant *Candida auris* be reliably identified in clinical microbiology laboratories? *J Clin Microbiol* 2017;55:638–640.
6. Atlanta. *Candida auris* clinical update—September 2017. Centers for Disease Control and Prevention website. https://www.cdc.gov/fungal/diseases/candidiasis/c-auris-alert-09-17.html. Published 2017. Accessed November 2, 2017.
7. Atlanta. recommendations for identification of *Candida auris*. Centers for Disease Control and Prevention website. https://www.cdc.gov/fungal/diseases/candidiasis/recommendations.html. Published 2017. Accessed November 8, 2017.
8. Connecticut Department of Public Health. A case of *Candida auris* infection at a Connecticut acute care hospital—June 2017. *Connecticut Epidemiol* 2017;37:9–10.