

Abstract

Background: *Candida auris* is an emerging multidrug-resistant fungus associated with outbreaks in healthcare settings. Chronically ill patients can become colonized with *C. auris* with subsequent transmission to other patients and contamination of the healthcare environment where it persists on high-touch surfaces. Following identification of a clinically infected patient with biliary drains in the intensive care unit (ICU) and a patient newly positive on surveillance screening, an investigation was initiated starting with environmental culturing.

Methods: After completion of a literature review, high-touch surfaces inside the patient room and shared mobile equipment housed in the ICU were identified and swabbed. Polyurethane sponges with a neutralizing buffer were used to sample the environment and subsequently cultured on selected liquid media. Media that appeared cloudy were then tested for qualitative reverse transcription-polymerase chain reaction (RT-PCR) detection of *C. auris*.

Results: Five environmental swabs resulted as culture positive for *C. auris*: patient bed panels, an equipment tower behind the patient bed, the inside of a supply drawer, a line procedure cart housed on the unit, and a pupillometer. While awaiting results, a third case with recent ICU admission was identified on surveillance screening. Infection Prevention and Control coordinated thorough cleaning of all patient rooms and shared equipment in the ICU with stakeholders whose teams are responsible for cleaning and disinfection with bleach. Bleach cleaning was continued until negative environmental cultures were obtained from implicated areas.

Conclusion: Existing literature and evidence have identified that ambiguous cleaning responsibility has led to outbreaks of pathogens that can remain in the environment for long periods of time. This investigation found that a patient with drains who is infected with a *C. auris* can create increased opportunities for cross-contamination. Prompt response must be coordinated across multidisciplinary groups to permit cleaning, re-education, and reconciliation of equipment responsibilities.

Objectives

- Review:** *Candida auris* can remain in the environment for long periods of time, potentially leading to an outbreak.
- Recognize:** Patients infected with *C. auris* and without proper containment of drains and compliance with transmission-based precautions can lead to environmental contamination.
- Collaborate:** Describe how multidisciplinary teamwork must be coordinated to ensure that proper measures are taken to decrease the risk of spread of *C. auris* in a healthcare setting.

Methods

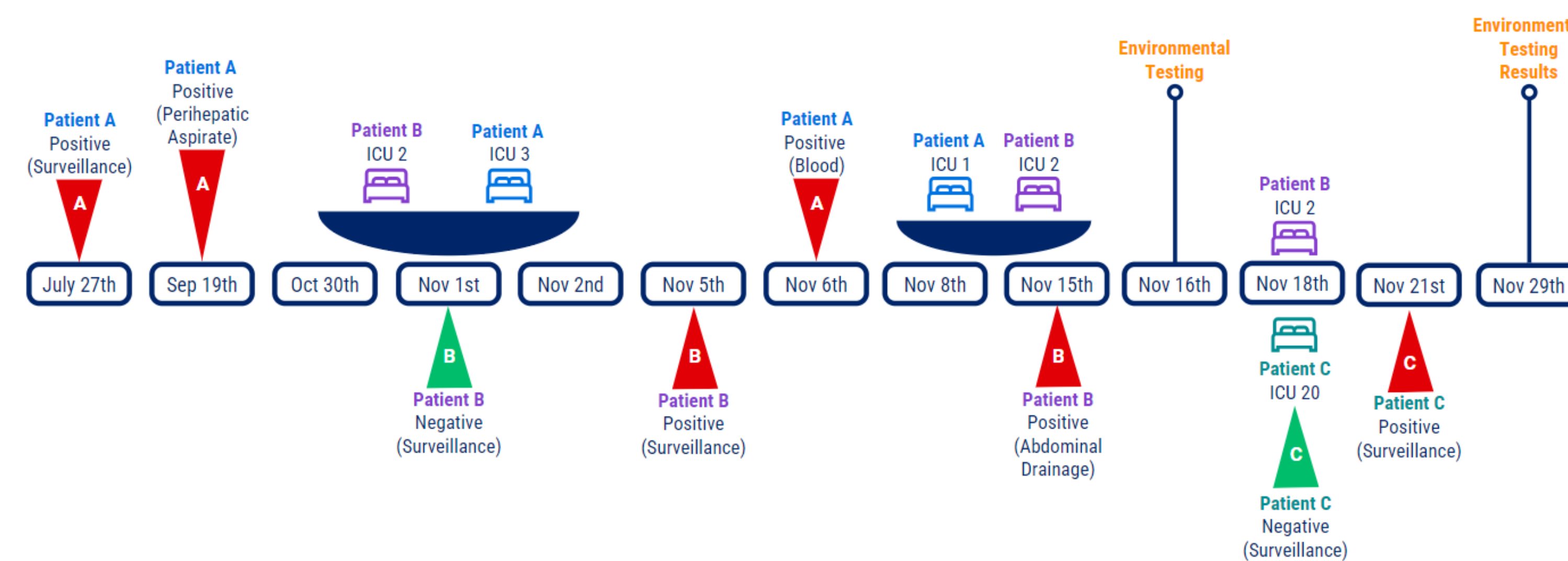
Infection Prevention & Control initiated multidisciplinary meetings with Environmental Services, Nursing, Advanced Practice Providers, Respiratory Therapy, and others to discuss environmental culturing and cleaning after identification if increased positive surveillance testing for *C. auris* was noted in the Intensive Care Unit (ICU).

Environmental culturing was completed by sampling the environment using polyurethane sponges with a neutralizing buffer and cultured on selected liquid media followed by reverse transcription-polymerase chain reaction if media appeared cloudy.

Environmental management included the below:

- Unit:** daily bleach cleaning of all patient rooms and clinical support areas (e.g., clean utility room, nurses' stations and servers, etc.)
- Patient rooms:** replace curtains around swivettes (one time), daily bleach clean all pumps and monitors, ventilators, supply drawers
- Clean supply room/clean storage areas:** bleach clean shelving and all cubbies (one time)

Results



Environmental testing was completed on items identified after completion of a literature review on *C. auris* (N=30).

Positive cultures were obtained from shared equipment and equipment inside a patient's room (n=5).

Figures 1-5. Environmental sampling yielded positive culture results from these items:

- 1) Procedure line cart (shared);
- 2) Pupillometer (shared);
- 3) Patient bed panels (ICU 1);
- 4) Supply drawer interior (ICU 1);
- 5) Left monitor behind bed (ICU 1)



- Bleach cleaning of the entire unit and all equipment, including shared mobile equipment, was implemented following notification of positive culture results.
- Environmental culturing was repeated after 4 days:
 - N=59, mix of equipment in patient rooms that housed patients with *C. auris* and shared equipment based on culture results from first round of testing.
- Bleach cleaning continued until all environmental samples returned negative.

Patient Room Equipment Cultured

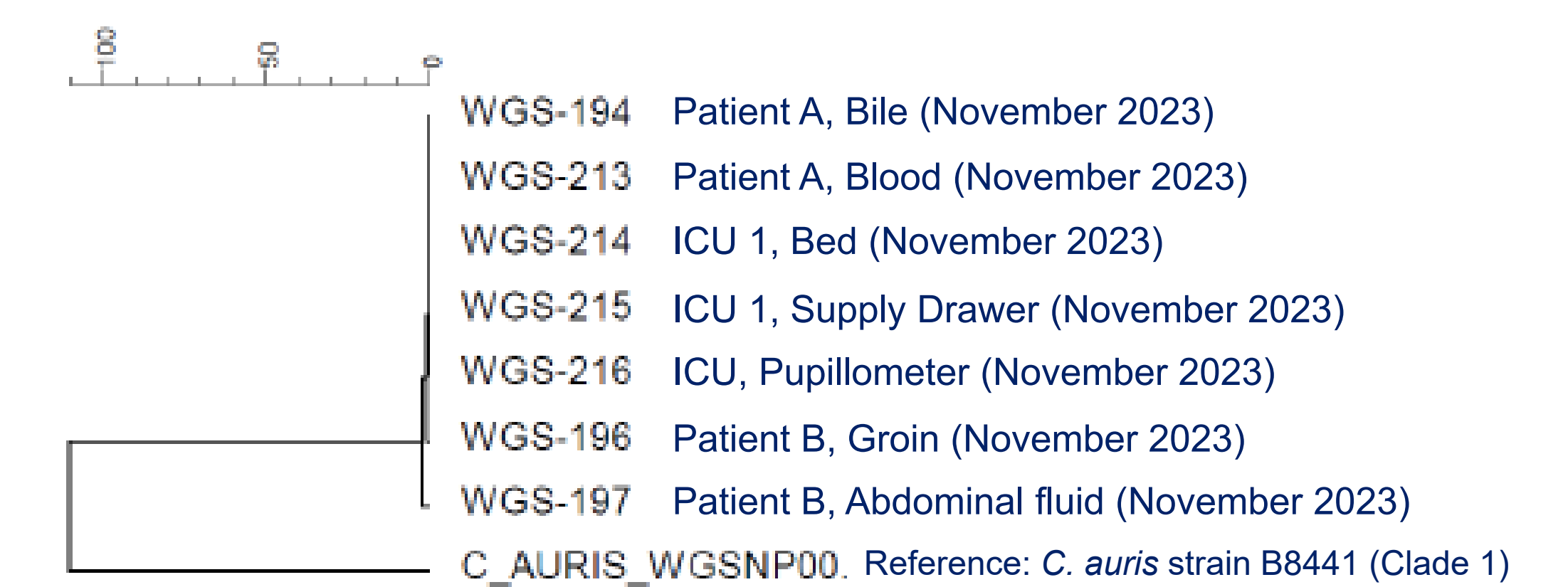
| | | |
|------------------------|------------------------------|------------------------|
| Bed side panel | Left tower (boom) | Supply drawer (inside) |
| Bed rail | Right tower (boom) | Thermometer |
| Bed remote/call button | Medication drawer (interior) | Ventilator |
| Bedside table | Sink | Window |
| IV poles | | Window curtain |
| IV pump | | |

Mobile Equipment Cultured

| | | |
|--------------------|--------------------------|-----------------------|
| Bladder scanner | Glucometer | Tracheotomy cart |
| Bronchoscope tower | Line procedure carts | Transport ventilators |
| Doppler | Portable procedure light | Ultrasound equipment |
| Glidescope | Pupillometer | |

Results continued

Whole genome sequencing of patient samples and environmental samples positive for *C. auris* was completing, revealing isolates were related (<10 SNP differences)..



Conclusion

C. auris is reported in the literature to be both pervasive and persistent in the environment. During this investigation, *C. auris* was cultured from the environment in a room where a patient with a clinical infection (perihepatic fluid with an indwelling drain) was admitted despite transmission-based precautions that included bleach cleaning.

Thorough and repeated bleach cleaning of the environment can disrupt potential reservoirs of *C. auris*. With multidisciplinary collaboration and establishment of responsibility for cleaning and disinfecting patient care equipment, potential environmental risks from infectious organisms can be mitigated.

Continued education surrounding the risks of *C. auris*, including its impact on patients and the environment, is especially needed in high-risk units.

References

1. [CDC Candida auris](#)
2. Eyre DW, Sheppard AE, Madder H, et al. A *Candida auris* Outbreak and Its Control in an Intensive Care Setting. *N Engl J Med.* 2018;379(14):1322-1331. doi:10.1056/NEJMoa1714373
3. Adams E, Quinn M, Tsay S, et al. *Candida auris* in Healthcare Facilities, New York, USA, 2013-2017. *Emerg Infect Dis.* 2018;24(10):1816-1824. doi:10.3201/eid2410.180649
4. Karmarkar EN, O'Donnell K, Prestel C, et al. Rapid Assessment and Containment of *Candida auris* Transmission in Postacute Care Settings-Orange County, California, 2019. *Ann Intern Med.* 2021;174(11):1554-1562. doi:10.7326/M21-2013

Disclosures

The authors have no disclosures to report.

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