

globally. Understanding the epidemiology of these infections in vulnerable groups such as cancer patients is important for hospital infection control and their effective management. In this report we present diagnostic, clinical, antifungal resistance and outcome data of 11 cases of *C. auris* infection from an oncology center in India. **Methods:** *C. auris* strains were identified by Sanger-based DNA sequencing of the internal transcriber spacer (ITS) gene. Antifungal susceptibility testing (AFST) was performed using the broth dilution method. Identification and AFST were checked by the WHO Collaborating Center for Reference & Research on Fungi of Medical Importance. Patients had both empirical as well as directed therapy with antifungal agents based on AFST results and clinical assessment. **Results:** Between November 2018 and March 2019, 11 cases of *C. auris* (8 from patients with solid-organ tumors and 3 from hematological malignancy) were detected. Two distinct genetic clusters were identified by ITS gene sequencing; one of these clusters showed 100% homology with a previously unknown *C. auris* isolate (GenBank accession no. MK881076) and the other cluster had a 100% identity score with isolates from Japan and South Korea (GenBank accession nos. MH071441, KY657027, and EU884189). All 11 strains were resistant to fluconazole. With voriconazole, 1 isolate was susceptible, 3 were

resistant, and 7 showed dose-dependent susceptibility. Two isolates were resistant to amphotericin B. Resistance to caspofungin or anidulafungin was noted in 1 of 11 isolates (9%); most showed intermediate susceptibility (63% to caspofungin). Among all of the patients, 72% were from the intensive care unit (ICU) or the high-dependency unit. The 30-day all-cause mortality was 5 of 11 (45%) in the *C. auris* group and 4 of 11 (36%) the control group (ie, infections with other *Candida* spp during same period). Duration of ICU stay in the *C. auris* group was 12 days and in the control group it was 6 days. The median cost (in terms of hospital bill at the time of discharge or death) for management of *Candida auris* infection and the primary medical condition was US\$10,121 for the *C. auris* groups and US\$8,608 for the control group. Most cases (10 of 11) were detected in wards without isolation rooms, and 8 of the 11 *C. auris* cases (73%) were detected in patients in the intensive care unit. **Conclusions:** Morbidity, mortality, ICU stay, and healthcare costs are significant in *C. auris* infection.

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#### Presentation Type:

Poster Presentation

#### *Candida auris* Outbreak Control in Critical Care Units in a Tertiary-Care Hospital in Nairobi, Kenya

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|                  | Area 1<br>ICU/HDU/Surgical Bay | Area 2<br>General/Emergency ward | Area 3<br>Private ward |
|------------------|--------------------------------|----------------------------------|------------------------|
| <b>Cluster 2</b> |                                |                                  |                        |
| MR/19/001858     | ▲ ■                            | -                                | ■                      |
| MR/18/010448     | -                              | ▲ ■                              | -                      |
| MR/18/017471     | ▲ ■                            | ■                                | -                      |
| MR/13/004285     | -                              | ▲                                | -                      |
| MR/19/005106     | ▲                              | ■                                | -                      |
| <b>Cluster 1</b> |                                |                                  |                        |
| MR/18/011942     | ▲ ■                            | ■                                | -                      |
| MR/18/017317     | ▲ ■                            | -                                | -                      |
| MR/17/010086     | ▲ ■                            | ■                                | -                      |
| MR/17/010584     | -                              | ▲ ■                              | -                      |
| MR/16/010836     | ▲ ■                            | ■                                | -                      |
| MR/17/012502     | ▲ ■                            | -                                | -                      |

▲ Patient's location at the time of positivity ■ Patient location before positivity

Fig. 1.

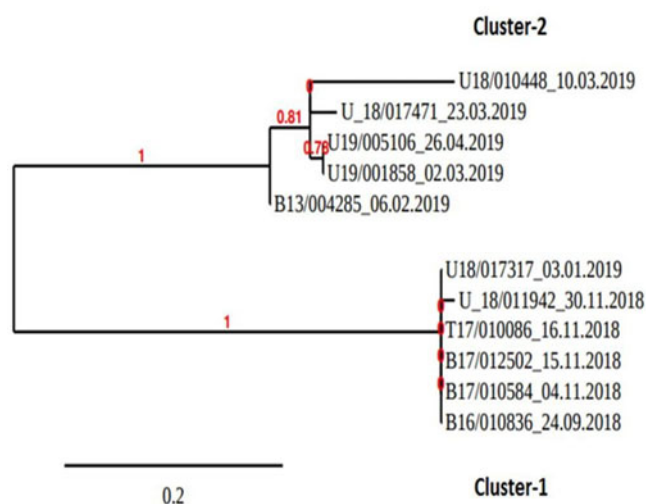


Fig. 2.

**Background:** *Candida auris* is an emerging pathogen associated with nosocomial outbreaks. During January to May 2019, 11 invasive cases of *C. auris* were identified in the intensive care unit (ICU) and high-dependency unit (HDU) at a hospital in Nairobi, Kenya. We report on the interventions implemented to control the outbreak. **Methods:** Intensified infection prevention and control (IPC) interventions were implemented. All patients infected or colonized with *C. auris* were placed in single-patient rooms with strict contact precautions. Cleaning of the patient care environment was enhanced by instituting a 3-step procedure of cleaning with soap and water, disinfecting with 0.5% chlorine, and rinsing with water. Glo-Germ gel was used to evaluate the cleaning processes, and percentage of missed surfaces was calculated. Hand hygiene training and compliance observations were conducted to enforce adherence to hand hygiene. The IPC team provided training and observational feedback of IPC to staff, patients, and their families. The IPC interventions were guided by screening activities. To monitor ongoing transmission, a biweekly point-prevalence survey (PPS) was performed to screen all previously negative ICU and HDU patients for *C. auris*. Furthermore, admission and contact screening were added to

guide patient placement. Screening was conducted by collecting a composite swab from the bilateral axilla and groin. Samples were incubated in salt dulcitol broth for 5 days at 40°C then subcultured onto Sabouraud dextrose agar. Colony identification was performed using a Vitek 2 system (bioMérieux). **Results:** In total, 177 patients were placed in single-patient rooms under contact precautions during May–August 2019. We conducted 123 environmental cleaning observations, and the percentage of missed surfaces decreased from 71% (10 of 14) in June to 7% (1 of 16) in August. Hand hygiene compliance among ICU and HDU staff was 79% (204 of 257) in May, 71% (159 of 223) in June, 73% (170 of 233) in July, and 81% (534 of 657) in August. In total, 283 screening swabs from 234 patients were processed during May–August 2019. Overall, 18 of 88 PPS swabs (20%), 13 of 180 admission screening swabs (7%), and 0 of 15 contact screening swabs (0%) were positive for *C. auris*. The PPS results showed a rapid decrease in colonization: 6 of 14 (43%) in May, 12 of 54 (22%) in June, 9 of 98 (9%) in July, and 1 of 70 (2%) in August. No new *C. auris* infections were identified from June to October 2019. **Conclusions:** The control of *C. auris* in a hospital outbreak requires multimodal interventions, including enhanced IPC interventions, PPS, admission and contact screening for colonization, rigorous monitoring, and team effort.

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#### **Presentation Type:**

Poster Presentation

#### **Candidemia: Predisposing Factors, Antifungal Susceptibility, Clinical Outcome and Connotations for Management**

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**Objective:** We conducted this study to investigate the epidemiology of candidemia in our setting and to quantify the risk factors associated with disease, overall outcome, and mortality associated with candidemia. **Methods:** In this prospective observational study, we conducted lab-based surveillance with clinical correlation of all cases of candidemia within our ICUs during the period (2016–2018). Clinical assessment was done on day 5 and day 30, and comorbidities, clinical features, and outcome were observed within 30 days after the diagnosis. The diagnosis was made on the basis of positive blood culture for *Candida* spp and a compatible clinical picture. The demographic characteristics, sequential organ failure assessment (SOFA) scores, comorbidities, use of invasive devices, antibiotics administered were observed, and antifungal susceptibility testing was performed according to CLSI guidelines. Type and duration of antifungal administered and outcomes were noted. **Results:** In total, 48 episodes of candidemia, with 29 (60%) males and 19 (40%) females, were identified during the study period. *C. albicans* was the most common species responsible for candidemia, causing 17 of the cases (~35%), whereas rest of the cases were caused by non-*albicans* spp, which included *C. auris*, accounting for 9 (19%) *C. parapsilosis* and *C. tropicalis* 7 (15%) each, *C. glabrata* and *C. famata* 2 (6%), and *C. krusei* was isolated in only 2 cases (4%). Among modifiable risk factors, CVC insertion and antibiotic exposure were the leading factors, seen in 100% of patient. *Candida* colonization was observed in

26 patients (28%), of whom 2 (4%) had multifocal *Candida* colonization. Among evaluable patients, 17 (35%) died within 30 days of the onset of candidemia. *C. tropicalis* was associated with the highest mortality rate, 27% (n = 4) in this cohort. Regarding the crude mortality in the different units, patients in medical ICU had the highest mortality rate (54%). In vitro activity of 3 systemically active antifungal agents was tested against 48 isolates of *Candida* spp. Based on CLSI break points, the susceptibility to voriconazole was 98%; only 1 isolate was resistant to voriconazole. Among candidemia-positive cases, 28 patients (58%) had taken the antifungals for >14 days, whereas 18 (37.5%) were treated for <14 days and 2 (4%) died before the initiation of therapy. **Conclusions:** In our study, *C. albicans* was the most common species responsible for candidemia, but non-*albicans* spp are also emerging, with higher in vitro resistance to antifungals.

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#### **Carbapenem-resistant Enterobacteriaceae carriage risk for parameterization of a regional healthcare network agent-based model**

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**Background:** Carbapenem-resistant *Enterobacteriaceae* (CRE) are increasingly common in the United States and have the potential to spread widely across healthcare networks. Only a fraction of patients with CRE carriage (ie, infection or colonization) are identified by clinical cultures. Interventions to reduce CRE transmission can be explored with agent-based models (ABMs) comprised of unique agents (eg, patients) represented by a synthetic population or model-generated representation of the population. We used electronic health record data to determine CRE carriage risk, and we discuss how these results can inform CRE transmission parameters for hospitalized agents in a regional healthcare network ABM. **Methods:** We reviewed the laboratory data of patients admitted during July 1, 2016–June 30, 2017, to any of 7 short-term acute-care hospitals of a regional healthcare network in North Carolina (N = 118,022 admissions) to find clinically detected cases of CRE carriage. A case was defined as the first occurrence of *Enterobacter* spp, *Escherichia coli*, or *Klebsiella* spp resistant to any carbapenem isolated from a clinical specimen in an admitted patient. We used Poisson regression to estimate clinically detected CRE carriage risk according to variables common to data from both the electronic health records and the ABM synthetic population, including patient demographics, systemic antibiotic administration, intensive care unit stay, comorbidities, length of stay, and admitting hospital size. **Results:** We identified 58 (0.05%) cases of CRE carriage among all admissions. Among these cases, 30 (52%) were ≥65 years of age and 37 (64%) were female. During their admission, 47 cases (81%) were administered systemic antibiotics and 18 cases (31%) had an intensive care unit stay. Patients administered systemic antibiotics and those with an