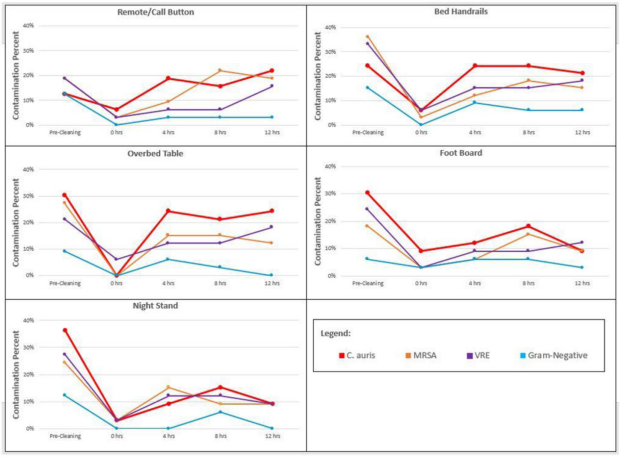

Figure 3. Environmental contamination with *Candida auris* and other multidrug-resistant organisms (MDROs) by time since room cleaning/disinfection.

gram-positive organisms predominating over gram-negative organisms on environmental surfaces. Limitations include lack of organism sequencing or typing to confirm environmental contamination was from the room resident. Rapid recontamination of environmental surfaces after manual cleaning and disinfection suggests that alternate mitigation strategies should be evaluated.

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Presentation Type:
Poster Presentation - Oral Presentation
Subject Category: Infection Control in Low- and Middle-Income Countries

Carbapenem-resistant *Acinetobacter baumannii* at a tertiary-care hospital in Botswana: Focus on perinatal environmental exposures

Background: Bloodstream infections (BSIs) due to carbapenem-resistant *Acinetobacter baumannii* (CRAB) are difficult to treat and are associated with high mortality, particularly in neonates. Healthcare-associated CRAB infections have been linked to environmental reservoirs and are associated with seasonal clustering. CRAB outbreaks are being reported more frequently in sub-Saharan Africa, but published reports from this region that incorporate comprehensive surveillance data and environmental investigations are rare. **Methods:** We reviewed microbiology surveillance records at a 530-bed, public, tertiary-care hospital in Botswana from January 1 to December 13, 2021, and we collected data regarding age, specimen type, and onset date for all cultures from unique patients growing *Acinetobacter* spp. An automated blood-culture system was used for organism detection, manual biochemical tests were used for identification, and disc and agar diffusion methods were used for antimicrobial sensitivity testing. During this time, we conducted 4 point-prevalence environmental sampling surveys at this hospital's 36-bed neonatal unit from January through June 2021 in addition to 3 neonatal CRAB cluster investigations. Environmental samples from surfaces, hands of caregivers and healthcare workers, and equipment were collected using flocked swabs. Extended-spectrum β-lactamase–producing organisms from environmental samples were identified using selective and differential chromogenic media (CHROMagarTM ESBL). **Results:** Overall, 48 *Acinetobacter* infections were identified, including 28 BSIs (among 3,699 blood cultures processed, approximately one-third of which were from neonates). More than half of cases were perinatal, which included 16 neonatal BSIs (median age, 4 days; case fatality rate, 56%), and 1 fatal case of postpartum sepsis in a 37-year-old mother. Among isolates tested, 35 (92%) of 38 demonstrated carbapenem resistance. Treatment information was not available for all neonatal patients, but delays in appropriate antimicrobial therapy were cited in all fatal cases. Most neonatal CRAB cases clustered in time and space (Fig. 1). For example, 15 (71%) of 21 neonatal cases occurred in the same unit and same week as another case. In the neonatal unit, CRAB clusters were associated with increased *Acinetobacter* recovery during environmental point-prevalence surveys (Fig. 1). *Acinetobacter* contamination was identified on feeding equipment (breast pumps, feeding tubes), respiratory equipment (suction machines or catheters, ventilator humidifiers), and hands of caregivers and healthcare workers. **Conclusions:** We report hyperendemic rates of CRAB infections with evidence of spatotemporal clustering, especially among neonates. Higher CRAB incidence coincided with increased *Acinetobacter* recovery during environmental sampling. We identified plausible transmission vehicles (respiratory or feeding devices, hands) in the neonatal care environment highlighting the value of environmental sampling to support CRAB investigations and reinforcing the importance of comprehensive and consistent disinfection practices, especially in resource-limited settings where equipment is shared or reused.

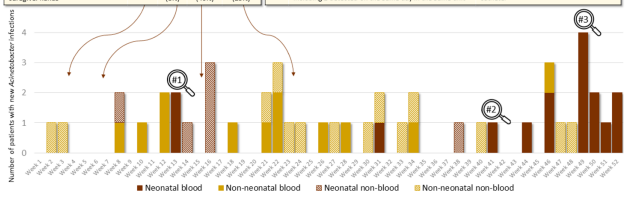
Figure 1. Weekly incidence of *Acinetobacter* infections at a tertiary hospital in Botswana, by specimen and patient type, corresponding with results from environmental sampling conducted as part of four point-prevalence surveys and three cluster investigations, 1 January – 31 December 2021

Point prevalence surveys conducted from Jan. – Jun. 2021, assessing contamination of environmental samples from neonatal unit and hands of healthcare workers/caregivers

	Jan 2021	Feb 2021	Apr 2021	June 2021
Acinetobacter spp. recovered from NICU environmental samples	0/123 (0%)	16/70 (23%)	21/69 (30%)	13/126 (10%)
Acinetobacter spp. recovered from healthcare worker hands	--	1/24 (4%)	2/5 (40%)	2/11 (18%)
Acinetobacter spp. recovered from caregiver hands	--	1/13 (8%)	8/20 (40%)	2/8 (25%)

Cluster investigations of Carbapenem-resistant *Acinetobacter baumannii* (CRAB) infections in the neonatal unit

	Cluster description	Environmental sampling results
#1	3 neonatal CRAB infections including 2 bloodstream infections detected on the same day in the same unit	*Acinetobacter* spp. isolated from suction catheter, bed rail
#2	CRAB bloodstream infection in a 5-day-old neonate adjacent to a 2-month-old infant whose endotracheal tube grew CRAB	*Acinetobacter* spp. isolated from caregiver's hands, breast pump, bed rail, suction catheter & tubing, portable suction machine, and ventilator humidifier
#3	4 neonatal CRAB bloodstream infections in 1 week including 2 detected on the same day in the same unit	*Acinetobacter* spp. isolated from suction catheter



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Presentation Type:
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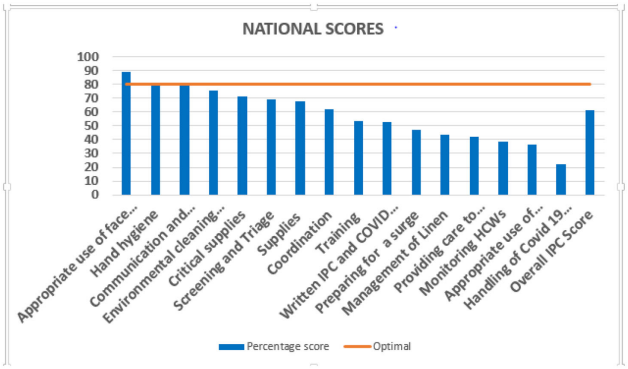
Subject Category: Infection Control in Low- and Middle-Income Countries

Readiness assessment: Implications for COVID-19 infection prevention and control (IPC) preparedness in health facilities

Evelyn Wesangula; Veronica Kamau; Felister Kiberenge; Emmanuel Tanui; Susan Githii; Linus Ndegwa; George Owiso; Irungu Kamau and Jennifer Njuhigu

Background: Monitoring uptake of infection prevention and control (IPC) interventions is critical for the targeted and rational use of limited resources. A national facility readiness assessment conducted in August 2020 provided key information for targeted interventions to strengthen priority IPC areas. We assessed the level of COVID-19 preparedness in the facilities, identified priority COVID-19 IPC gaps, and generated a baseline report to further guide IPC investments at all levels. **Methods:** The Kenya Ministry of Health in collaboration with the CDC and International Training and Education Center for Health adapted a WHO Facility Readiness Assessment tool to include COVID-19–specific areas. In August 2020, data were collected using tablets through an Android-based electronic platform and were analyzed using descriptive statistics. Assessments were conducted in public, private, and faith-based health facilities nationally after 4 months of preparedness and investment in the healthcare system. **Results:** We assessed 684 facilities of the targeted 844 (81%). Overall facility readiness in Kenya was rated above average (61%), and the performance score significantly increased with the Kenya Essential Package for Health level, with level 5 and 6 facilities scoring an average of 83% and 79% respectively. Of the assessed facilities, 82% had an appointed IPC coordinator. Only 14% of the facilities had all the



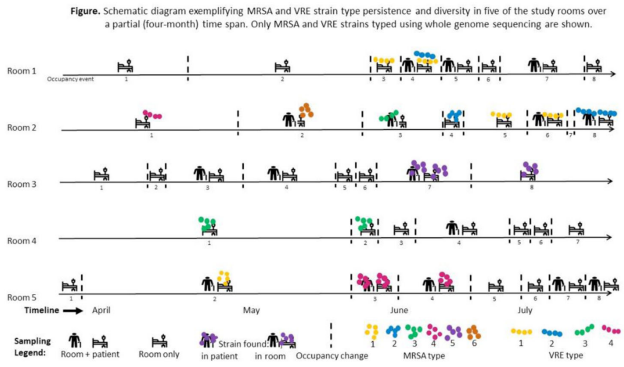


Fig. 1.

required guidelines, policies, and the appropriate COVID-19 case definitions. 67% of the facilities had updated supply inventories for past week. Only 50% of the facilities had adequate supplies of N95 masks. The assessment revealed that 52% of healthcare facilities had trained their healthcare workforce; morticians were the least trained (only 17% of facilities). Moreover, 41% of the facilities had clear work plans for monitoring healthcare workers exposures to COVID-19, but only 33% of the facilities had policies on the management of infected healthcare workers. **Conclusions:** The findings provided critical information for stakeholders at all levels to be used for policy decisions, to prioritize key intervention areas in leadership and governance of facility IPC programs, for guideline development, and for capacity building and targeted investment in IPC to improve COVID-19 facility preparedness.

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Subject Category: Long-Term Care

Diversity and persistence of MRSA and VRE in nursing homes: Environmental screening and whole-genome sequencing

Marco Cassone; Joyce Wang; Bonnie Lansing; Julia Mantey; Kristen Gibson; Kyle Gontjes and Lona Mody

Background: Transmission of methicillin-resistant *Staphylococcus aureus* (MRSA) and vancomycin-resistant *Enterococcus* (VRE) is of special concern among frail patients in nursing homes. To understand environmental contamination patterns in this setting, we screened a suitable section of a nursing home over time and assessed MRSA and VRE prevalence in patients and their rooms. We were especially interested in assessing whether MRSA and VRE strains persist in rooms during changes of occupancy after patient discharge. **Methods:** We conducted a prospective cohort study of MRSA and VRE colonization and contamination among successive patients in a cluster of 9 single-occupancy rooms. Using flocked swabs, 5 high-touch surfaces were screened 3 times a week for 34 weeks. Patients were also screened (ie, nares, groin, and hands), if they agreed to participate. Whole-genome sequencing was performed on 67 nonredundant MRSA and VRE strains. Single-nucleotide polymorphism heatmaps and similarity trees were generated to evaluate strain diversity and persistence the facility. **Results:** Overall, 146 distinct occupancy events were captured during the study (16.5 average per room; range, 11–22), with 387 study visits and 4,670 total swabs collected. All rooms were contaminated with VRE, and 8 of 9 were contaminated with MRSA at least once during the study period. New contamination of a room with MRSA or VRE was observed in 43 (23%) of 185 opportunities, with potential persistence during occupancy changes in 25 (32.9%) of 76 opportunities. Sequencing of 67 nonredundant isolates identified at least 6 enterococcal clades and 10 MRSA clades (6 USA100 and 4 USA300), indicating a high degree of diversity and probably multiple introductions in the facility during the study time. In 3 separate cases, whole-genome sequencing confirmed persistence of a specific MRSA strain during a change of room occupancy, including 1 case of a MRSA strain persisting in a clean room before admission of the next patient. For VRE, 2 cases of persistence during room occupancy changes were confirmed, along with 6 cases of possible persistence (contamination across noncontiguous room occupancy events). **Conclusions:** Active surveillance screening and a recurring evaluation of terminal cleaning procedures should be considered due to high levels of circulation and persistence of MRSA and VRE in the nursing home setting.

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Subject Category: MDR GNR

Characteristics of patients positive for COVID-19 and multidrug-resistant organisms in Tennessee, 2020–2021

Carolyn Stover; Erin Hitchingham; Kristina McClanahan; Zoe Durand; Rany Octaria; Christopher Wilson and Allison Chan

Background: Multidrug-resistant organisms (MDROs) are a global threat. To track and contain the spread, the Tennessee Department of Health (TDH) performs targeted surveillance of carbapenemase-producing and pan-nonsusceptible organisms. When these MDROs are identified, TDH conducts a containment response and collects epidemiological data, which includes risk factors such as indwelling devices and previous hospitalizations. The impact of the COVID-19 pandemic on these MDROs is not well understood. Therefore, we have described the characteristics of cases positive for both COVID-19 and select MDROs. **Methods:** MDRO investigation data from January 1, 2020—September 30, 2021 were matched with all COVID-19 case data from the TDH statewide surveillance system, National Electronic Disease Surveillance System Base System. MDRO-positive date was defined as the specimen collection date; COVID-19 case date was first defined as the date of symptom onset and if missing, then diagnosis date, and investigation creation date, respectively. Descriptive statistics and Fisher exact tests were calculated using SAS version 9.4 software. **Results:** Among 336 MDRO cases, 50 had a reported SARS-CoV-2–positive result. MDRO types were Enterobacterales (CRE) (n = 31), *Acinetobacter* spp (CRA) (n = 18), and *Pseudomonas aeruginosa* (n = 1). Of these 50 cases, 20 were MDRO-positive before and 30 days after the COVID-19 case date, respectively. Of the 18 CRA cases, 16 (89%), were positive after the COVID-19 case date, compared to 13 (42%) among 31 CRE cases ($P < .01$). Also, 35 patients (70%) had a record of hospitalization, and 22 (63%) had their MDRO specimen collected after the COVID-19 case date ($P = .37$). Of these 22 patients, 4 had their MDRO specimen collected during their COVID-19 hospitalization, with an average duration from admission to MDRO collection date of 17 days (range, 4–36).