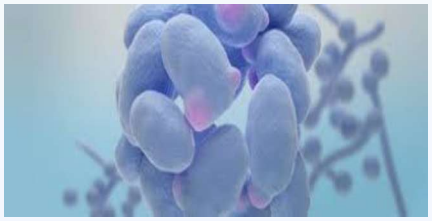
Effect of Dry Hydrogen Peroxide on *Candida auris* in ICU Settings

J. Sanguinet[1], G. Marshall[1], M. Foreman[1], J. Peruchini[1],
R. De Guzman[1], J. Murawsky[2]
Sunrise Hospital & Medical Center, Las Vegas, NV[1]
HCA Healthcare, FarWest Division, Las Vegas, NV[2]

Contact Information:
Sunrise Hospital & Medical Center
Infection Prevention
Gerard.Marshall@hcahealthcare.com
Jennifer.Sanguinet@asante.org



BACKGROUND

- *Candida auris (C. auris)* is a pathogen that causes high morbidity in patients due to its resistance to antimicrobials.
- Endemic patient colonization poses an infection risk that may be mitigated by no touch disinfection systems through interruption of the infection chain reservoir step.
- Dry Hydrogen Peroxide (DHP) technology is designed to provide continuous and automated delivery of DHP to reduce the microbial contamination in the hospital setting.
- Initial studies explored Dry Hydrogen Peroxide (DHP) systems with significant microbial load reductions[1].
- Follow-up research confirmed DHP's effectiveness on soft surfaces like curtains and in reducing *C. auris*[2–3].
- In response to a *C. auris* surge from 14 in 2020 to over 400 by 2023 a screening protocol was implemented to identify high-risk patients[4].
- To strengthen disinfection, along with strict isolation measures, over 400 DHP units were installed in HVAC systems throughout the facility.
- Length of intensive care unit stay has been shown to increase the risk of acquiring a multi-drug resistant organism.[5]

OBJECTIVES

- Evaluate the efficacy of continuous dry hydrogen peroxide (DHP) exposure on *C. auris* hospital onset colonization.
- Evaluate risk assessed patients in two comparable intensive care units and the interruption of the transmission of *C. auris* post hospital admission.
- Identify if there was a statistically significant difference in the average ratio of hospital-onset *C. auris* days to critical care days for patients with hospital-onset *C. auris* within two different intensive care units.

METHODS

- Conducted in a large tertiary care center between October 2024 - January 2025
- Polymerase chain reaction (PCR) testing was completed for all patients upon admission to each location to detect the presence of *C. auris* from skin samples collected from each patient's groin and axilla
- Post-admission testing was completed for all non-positive patients present in each unit every Tuesday and Thursday.
- Positive patients were removed from further testing.
- DHP-emitting systems were installed in the Medical Intensive Care Unit (MICU) patient rooms, while no DHP was installed in the Trauma Surgical Intensive Care Unit (TSICU).
- TSICU (No DHP) and MICU (DHP)
  - Separate ventilation systems in separate buildings:
  - Similar bed sizes,
  - Similar average patient length of stays
  - Ability to compare critical care
- All screened for *C. auris* risk factors
- The statistical approach of the N-1 Chi-squared test (proportion comparison) was chosen to allow for standardized definitions of both the numerator and denominator of the statistic[6].

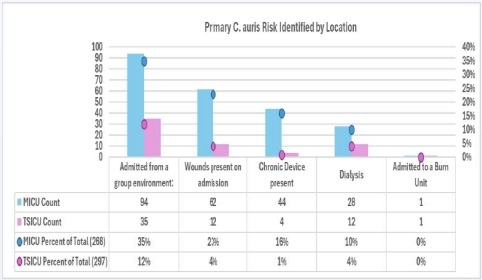
RESULTS

- A total of 268 *C. auris* risk assessments for MICU and 297 risk assessments for TSICU were evaluated.
- MICU population showed a higher risk for *C. auris* in each risk category compared to TSICU excluding Burn admission.
  - Dialysis in MICU was more than double the percentage for TSICU.
  - Admission from a group environment in MICU was almost triple the risk population found in TSICU.
  - Wounds present on admission were a risk of more than five times in MICU compared to TSICU.
- The length of stay in TSICU was approximately 2.3 days less compared to MICU.
- There is a statistically significant difference (P<.01, df=1, Chi-square 15.670) between the average ratio of hospital onset *C. auris* days to critical care days for TSICU and MICU indicating that there is a potential for the intervention (DHP) to be the reason.

Data Point Comparisons: MICU vs. TSICU

	MICU	TSICU
Average Length of Stay	22.27	19.96
Bed Capacity	35	36
Hospital-onset Critical Care days	857	587
Hospital-onset *C. auris* days	989	1038
Hospital onset *C. auris* patients	144	113
Average Ratio of Hospital-onset *C. auris* days to Critical Care days	11.6	31.7

***C. auris* Risk Assessment Results: MICU vs. TSICU**



CONCLUSIONS

- DHP was effective in reducing the proportion of hospital-onset *C. auris* colonization when comparing the MICU (DHP installed) to the TSICU (without DHP).
- Effect was observed despite the MICU having a longer average length of stay and a higher percentage of patients with known risk factors for *C. auris*.
- Findings support DHP as a valuable no-touch disinfection method.

REFERENCES

1. Sanguinet, J. & Edmiston, C. (2021, March 15). Evaluation of dry hydrogen peroxide in reducing microbial bioburden in a healthcare facility. *American Journal in Infection Control.* DOI: https://doi.org/10.016/j.ajic.2021.03.004
2. Sanguinet, J & Le, C. (2021, June). An effective and automated approach for reducing infection risk from contaminated privacy curtains, *American Journal of Infection Control*, DOI: https://doi.org/10.1016/j.ajic.2021.06.004
3. Sanguinet J, Marshall G, Moody J, Sands K. Effect of dry hydrogen peroxide on Candida auris environmental contamination. Antimicrob Steward Healthc Epidemiol. 2023 Sep 29;3(Suppl 2):s67–8. doi: 10.1017/ash.2023.316. PMCID: PMC10594231
4. Sanguinet J, Marshall, G, Foreman M, DeGuzman R, Peruchini, J, Tchiloyans C, Lee, C, Ahrens M. (2025). Candida auris: Patient risk identification in Las Vegas. *Am J Infect Control.* 53;6:Supplement S43-S44 June 2025. DOI: https://doi.org/10.1016/j.ajic.2025.03.116
5. Zhang, N., & Li, S. (2025). Distribution and Risk Factors Analysis of Multidrug-resistant Bacterial Infections in ICU Ward Patients. *Advances in Modern Chinese Medicine Research*, *1*(1), 21-27.
6. MedCalc Software Ltd. Comparison of proportions calculator. https://www.medcalc.org/calc/comparison_of_proportions.php (Version 23.3.2; accessed August 3, 2025)

MATERIALS

- Nylon/Nylon-flocked swab (E-Swab) collection and transport systems
- PCR testing was completed by the Southern Nevada Public Health Lab

ACKNOWLEDGEMENTS

Southern Nevada Public Health Lab- PCR Testing
Nursing staff ICU & TSICU Sunrise Hospital Medical Center-Collection of patient specimens