



Today's presentation

Gut Guardians: Harnessing Probiotic Drinks as a Shield Against *C. diff* Invaders

Presented by:

Prinu Gabriel, MS, ASCP(SM), CIC

Helen Myers, RN, BSN



Helen Myers, BSN, RN

- Graduated from TCU, Harris College of Nursing with her BSN in 2001.
- Vascular Access Team (VAT) nurse at THFW for 18 years and then transitioned to -
- Infection Preventionist at Texas Health Fort Worth (THFW) since 2022.
- Research includes:
 - DVT formation in patients with a PICC catheter as lead investigator as a VAT RN and presented at the Association for Vascular Access (AVA) National Conference and abstract published in Journal of Association for Vascular Access (JAVA) in Winter issue 2009.
 - Effect of PICC team placement of peripheral IV's, published in Jan/Feb 2020 Journal of Infusion Nursing (INS) titled "Pain Perception of a Structured Vascular Access Team Approach to Short Peripheral Catheter (SPC) Compared to SPC Placement by Bedside Nurses.
- Helen is an active member of APIC DFW and participates in several committees within the THFW.
- She is a strong advocate for evidenced-based practices and continues to learn and grow in the Infection Prevention field.



Prinu Gabriel, MS, ASCP(SM), CIC

- Master's Degree in Science specializing in Molecular Biology and post graduate diploma in Medical Microbiology.
- Certification as a specialists in microbiology (SM) from American Society for Clinical Pathology (ASCP) .
- Certification in Infection Control (CIC).
- Worked as a Clinical Microbiologists for 10 years and then transitioned to -
- Currently the Director for Infection Preventionist at Texas Health Fort Worth (THFW) since 2010.
- Teaches as an adjunct Professor for Indian River Community College, FL in Life Science and Microbiology.
- Serves in several committees at THFW including Hospital Quality and Patient Safety, Environment of Care, Hospital System Infection Prevention Cabinet.
- Member of APIC, APIC DFW, and APIC teaching faculty.
- Serves as item writer for the CIC preparation course.
- Prinu is a strong advocate for evidence-based practices, communication and enjoys teaching.



Objectives:

- Describe the rising threat of antimicrobial resistance.
- Discuss the transmission of *C. diff* bacteria.
- Describe the potential benefits of probiotics on the gastrointestinal flora.
- Discuss three prevention strategies for reducing *C. diff* transmission.

Gut Guardians: Harnessing Probiotic Drinks as a Shield Against *C. diff* Invaders

Prinu Gabriel, MS, ASCP(SM), CIC
Helen Myers, RN, BSN
Shirley Martin, PhD, RN, CPN

Background

Patients with *Clostridioides difficile* (*C. diff*) infection (CDI) had the most significant death risk across all disease types during the Covid-19 pandemic. We observed increase in inpatient CDI above the Centers for Medicare & Medicaid Services (CMS) benchmarks in 2021 and 2022. Persons receiving antibiotics are 7 to 10 times more likely to develop CDI. The American Gastroenterology Association (AGA) recommends use of 6 probiotics strains to prevent CDI in patients on antibiotics. However, this practice has not been fully implemented or studied in a hospital setting.

Learning Objectives

- Explain how CDI negatively impacts outcomes in hospitalized patients.
- Discuss the effects of antibiotics in the gastrointestinal tract.
- Describe the potential benefits of probiotics on gastrointestinal flora.

Methods

The project was conducted as a prospective evidence-based quality improvement project on 11 units with high *C. diff* rate from April to September 2023. The intervention was a commercially available probiotic drink with 5 of the 6 probiotic strains recommended by AGA. Patients on day 1 or 2 of first antibiotic treatment were offered the probiotic drink twice daily. Patients on dialysis, tube feed, NPO, clear liquids and immunocompromised were excluded. Patients were educated to continue the probiotic drink during the antibiotic therapy and 7 days post completion. Results were favorable, so this practice was expanded house wide in October 2023. We tracked occurrence of CDI, patient tolerance and doses of the probiotic drink, length of stay, and number of antibiotics administered.

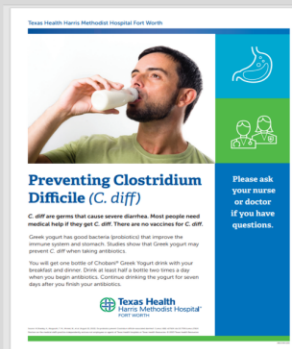
Probiotic Strains per AGA Guidelines

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Probiotics strains per AGA guidelines	Activia (93mL)	Chobani Greek Yogurt (207mL)	Lifeway Kefir (946mL)	Danactive (93mL)	Lala Foods (207mL)
Saccharomyces boulardii					
Lactobacillus acidophilus (CL1285)		X	X		X
Lactobacillus casei (LBC80R)		X	X	X	
Lactobacillus delbrueckii subsp bulgaricus	X	X		X	X
Bifidobacterium bifidum		X			X
Streptococcus salivarius subsp thermophilus	X	X		X	X



Patient Education



Results

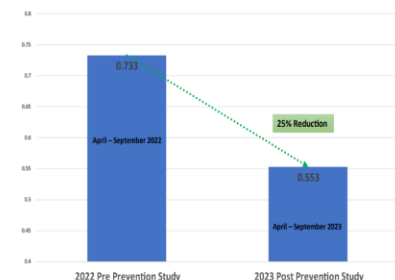
We enrolled 905 patients to this project. None of the patients that received the probiotic developed hospital-acquired (HAI) CDI. We noted a 25% decrease in the total HAI CDI standardized infection ratio (SIR) in the 2nd and 3rd quarters of 2023 compared to the same period in 2022. Overall CDI SIR decreased 30% in 2023 in comparison to 2022. Patients tolerated the probiotic drink with few to no complaints. Length of stay averaged 6 days with patients receiving an average of 2 types of antibiotics.

Conclusions

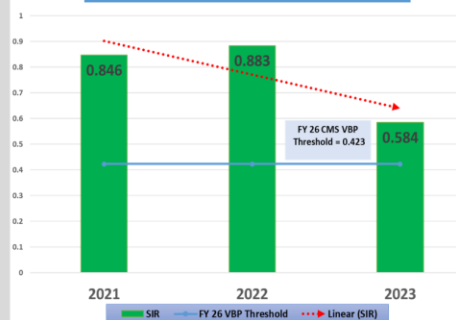
We find the probiotic drink effective in reducing CDI in hospitalized patients on antibiotics. Probiotic drink is low cost, easy to implement, and well-tolerated. Based on the positive results, the practice continues throughout the hospital while continuing to monitor CDI SIR.

Data Analysis

C diff HAI SIR – Pre and Post Prevention Study SIR – Standardized Infection Ratio



C diff HAI SIR Compared to CMS Value Based Purchasing Threshold 2021-2023



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- Grace L Su, Cynthia W. Ko, et al. AGA Clinical Guidelines on the Role of Probiotics in the Management of Gastrointestinal Disorders. *Gastroenterology* 2020; 159:697-705
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Acknowledgements

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Today's presentation

Sustained Reduction of Microbial Burden and
Healthcare Associated Infections (HAIs)
Impact in Skilled Nursing Facility through
Advanced Photohydrolysis (AP) Technology

Presented by:
Kimberly Trosch



Kimberly Trosch, BSN, BME, RN

- Graduated from Duquesne University with a dual degree Bachelor in Science, Nursing and Bachelor of Science, Biomedical/Medical Engineering
- Experience as an operating RN, caring for her patients and advancing her medical knowledge in medical devices.
- Served in an engineering role focused on product development, clinical research, and market strategy.
- Before joining ActivePure Technologies, worked in medical device sales, managed a multi-product portfolio.
- Currently Director of Clinical Affairs, ActivePure since 2023.
- Member of APIC & APIC DFW.
- Passionate about healthcare innovation that combines a variety of engineering techniques, clinical research, and extensive academic knowledge to solve clinical problems.



Objectives:

- Describe the relationship between the unique environment of long-term care facilities and the rising threat of antimicrobial resistance.
- Define advanced photohydrolysis (AP).
- Explain how AP recreates the natural process of photolysis.
- Explain how AP can deactivate pathogens to help prevent infections.

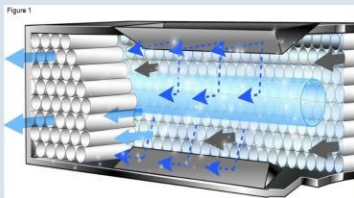
INTRODUCTION

Despite evolution in disinfection practices and treatments, there is an increasing spread of multi-drug resistant organisms (MDROs) and healthcare-associated infections (HAIs). Without new treatments or countermeasures, antimicrobial resistance (AMR) and untreatable infections will continue to rise¹. The study hypothesized that utilization of facility-wide, continuous disinfection technology will reduce microbial burden in the environment of care, resulting in a decrease in HAIs and improved patient outcomes.

MATERIALS & METHODS

A controlled experimental study was performed in long-term care (LTC) facilities in Pennsylvania and New Jersey from January 2023 to April 2023 to surveil environmental surface and floor aerobic bacteria, fungi, and methicillin resistant *Staphylococcus aureus* (MRSA) colony forming units (CFUs) and airborne aerobic bacteria and fungi CFUs before and after AP technology activation. Sampling occurred at baseline and again every 4 weeks for 3 consecutive months. Two control centers in regional proximity were also prospectively studied. Aggregate HAI counts (catheter associated urinary tract infections [CAUTIs], central line associated bloodstream infections [CLABSIs], Clostridioides difficile [C. diff], Non-ventilator associated healthcare acquired pneumonia [NV-HAP], MRSA) were recorded and compared to the same extended observation period (February-July) one year prior (2022).

The AP technology recreates the process of photolysis to mechanically deliver continuous diffusion of trace oxidative molecules for persistent disinfection of surfaces and air. The device consists of a 253.8nm UV-C bulb surrounded on both sides by a proprietary, honeycomb shaped photocatalyst that triggers a photochemical reaction with the water (H₂O) molecules in the air to yield oxidative molecules that neutralize pathogenic compounds (Figure 1).



A one-way repeated measures analysis of variance (ANOVA) with post-hoc simple contrast was used to analyze mean CFUs from baseline to final post-activation.

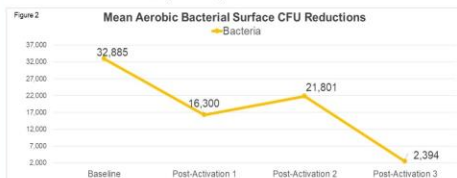
Sustained Reduction of Microbial Burden and Healthcare-Associated Infections (HAIs) Impact in Skilled Nursing Facility through Advanced Photohydrolysis (AP) Technology

Kimberly Trosch RN, BSN • Amy Carenza, BBA • Deborah Bix, MD • Julie Britton, DNP, MSN, GCNS-BC, RN-BC, FGNLA • Charmarie Adkins, MSN, RN, CIC

RESULTS

Mean Surface CFU Reductions:

Aerobic Bacteria: **93%** (p<.001)



Mean Floor CFU Reductions:

Aerobic Bacteria: **92%** (p=.008)

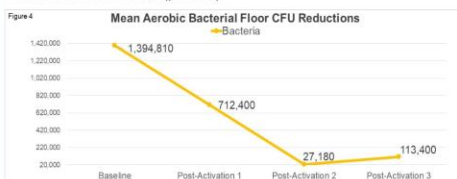
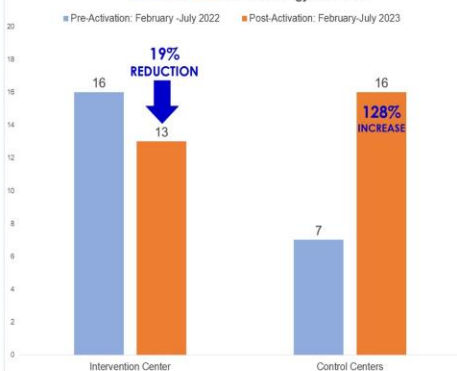
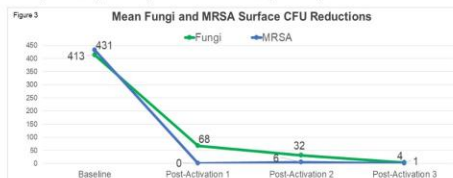


Figure 6: Average HAI Counts in Intervention Center vs. Control Centers Before and After AP Technology Activation



Fungi: **99%** (p<.001) MRSA: **99%** (p=.007)



Fungi: **96%** (p=.012) MRSA: **99%** (p=.006)

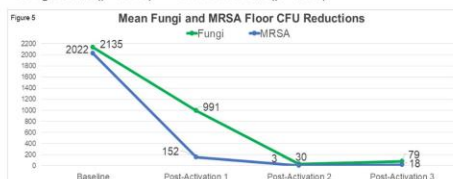
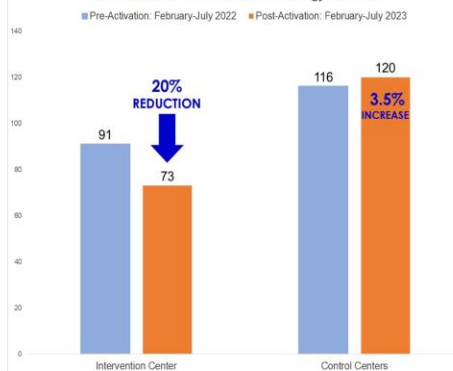


Figure 7: Unplanned Hospital Transfers in Intervention Center vs. Control Centers Before and After AP Technology Activation



CONCLUSIONS

Despite intensive efforts through current cleaning and disinfection practices, serious microbes remain on surfaces, floors, and in the air. This study is on the pioneering edge of demonstrating that continuous and persistent disinfection technology reduces contaminant reservoirs on surfaces, floors, and in the air all without the need for additional skilled labor, increases in cleaning and disinfection practices, or supplemental training. The reduction in environmental contamination clearly decreases infectious reservoirs and improves patient outcomes by reducing the incidence of HAIs in LTC facilities as well as hospital transfers, which are a critical indicator for quality of care. The continuous nature of the AP decontamination technology, the ability to use it in occupied rooms, and its independence of human resources, provides an innovative and safe intervention for complex healthcare environments.

SUMMARY

The effect of the AP technology on environmental surface and floor aerobic bacteria, fungi, and Methicillin-resistant *Staphylococcus aureus* (MRSA) and airborne aerobic bacteria and fungi was designed as a controlled experimental study, with statistically significant reductions of greater than 92% reported for all surface and floor samples after AP technology activation (Figures 2-5).

Air testing showed reductions of aerobic bacteria and fungi by 87% and 36%, respectively, but were not statistically significant, likely due to insufficient sample size (n=10).

A cumulative count of HAIs that occurred during the extended observation period was compared to the matched period one year prior and showed a 19% reduction in the intervention center while the control centers increased 56% (Figure 6).

Additionally, the intervention center experienced a 20% reduction in unplanned patient transfers to a hospital while the control centers experienced a 3.5% increase during the same matched time period (Figure 7).

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Today's presentation

Improving Maintenance of a Clean, Dry, and Intact
Central Line Dressing to Reduce Risk of CLABSI with
Use of a Topical Product and Liquid Gum Mastic
Adhesive in the Acute Care Setting

Presented by:

Krisi Gaskill, MSN, RN, CIC, RNC-NIC

Kimberly Newman, RN, BSN, CIC



Kristi Gaskill, MSN, RN, CIC, RNC-NIC

- Graduated from Texas Tech University, Bachelor of Science in Nursing, Texas Tech University and Masters of Science in Nursing, Administration, Texas Tech University.
- Certification in Infection Control and Registered Nurse Certified in Neonatal Intensive Care Nursing.
- Experience as a Manager, Supported Living, ENABLE Scotland, North Lanarkshire, Scotland, quality improvement and regulatory compliance.
- LVN/RN, Children's Home Healthcare 6 years.
- NICU RN and Charge nurse, Medical City Arlington and Plano.
- Infection Prevention Coordinator for 2 years, Manager for 1 year and currently Director for Infection Prevention from 2023, Medical City Plano, Medical City Frisco, Medical City Sachse, TX.
- Member of North Texas Division CLABSI Prevention Taskforce Co-chair and the Women's Colleague Network.
- Member of APIC & APIC DFW.
- Presentations & Publications:
 - American Nursing Informatics Association – A Framework of Change & Analytics to Improve Hospital Associated Infections.
 - Doswell Health Informatics Conference – Real-Time Data Display for Real-Time Results: Continuous HAI Reduction Journey.



Kimberly Newman, RN, BSN, CIC

- Graduated
- Administrative Vice President of Infection Prevention, Medical City Healthcare North Texas Division, Dallas since 2021.
- Manager, Infection Prevention & Control, Baylor University Medical Center, Dallas, 6 years.
- Manager, Infection Prevention & Control, Baylor Heart & Vascular Hospital, Dallas, 1 year.
- Director, Infection Prevention & Control, Children's Medical Center, Dallas, 3 years.
- Infusion Nurses Society, 2003 – 2005.
- Member of APIC & APIC DFW since 1994 and has served many hats here at APIC DFW from Board member in 1999 to President Elect in 2006 and President in 2007. And Nominating and Awards Committee, National APIC 2018-2020.
- Abstracts/Posters:
 - Central-line related bloodstream infections in the pediatric GI and cancer populations. Newman, K., Metcalf, P., & Siegel, J.D. (2002). APIC Conference.
 - Contaminated distilled water implicated in an outbreak of non-fermentative gram-negative bacilli bloodstream infections in pediatric cardiac ICU patients treated with extracorporeal membrane oxygenation and/or continuous veno-venous hemofiltration. Newman, K., Metcalf, P., Darling, J., Greenwalt, R., Cavouti, D., & Siegel, J.D. (2003). APIC Conference.



Objectives:

- Explain how compromised central line dressings can increase the risk for CLABSI.
- Explain how the topical hemostatic powder with the liquid gum mastic adhesive improves the cleanliness and integrity of the central line dressing.

Improving Maintenance of a Clean, Dry, and Intact Central Line Dressing to Reduce Risk of Central Line Associated Blood Stream Infection With Use of a Topical Hemostatic Product and Liquid Gum Mastic Adhesive in the Acute Care Setting

Kristi Gaskill, MSN, RN, CIC, RNC-NIC; Kim Newman, BSN, RN, CIC

Background

Increase in central line-associated bloodstream infections (CLABSI) in a 603-bed level 1 trauma tertiary acute care facility

Findings from root cause analyses (RCA) identified disruption in central line dressings due to peeling and/or bleeding at the insertion site as the root cause for CLABSI events

Central line dressing disruption increases risk for CLABSI

Objectives and Methods

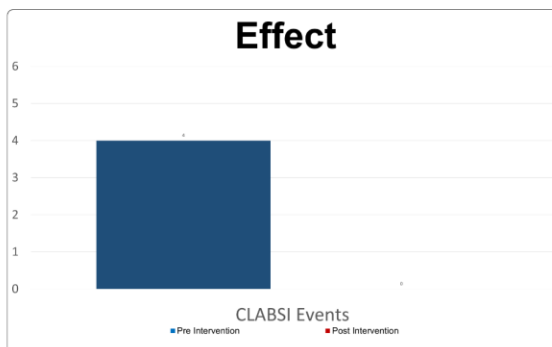
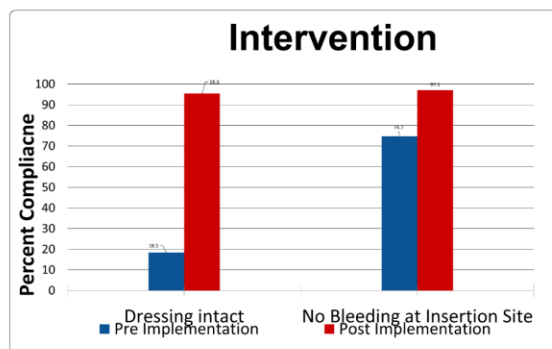
Aim 1: Improve Dressing Disruptions By Implementing a Topical Hemostatic Powder and Gum Mastic Adhesive

- Topical hemostatic powder and gum mastic adhesive sourced by facility supply chain and placed in supply rooms on 3 inpatient units identified for trial and interventional radiology for patients identified as high risk
- Hands-on and supplemental education provided by a multi-disciplinary team of infection prevention, quality, nursing, and vascular access personnel
- To assess progress toward dressing integrity goal of 90%, all central line dressings on the 3 trial units were audited daily
- House-wide implementation at the end of 2023

Aim 2: Effect of topical hemostatic powder and gum mastic adhesive on outcomes

- Reduction in CLABSI in high-risk patient populations utilizing NHSN surveillance criteria
- Rapid Cycle Plan-Do-Study-Act methodology implemented for continuous feedback of intervention

Results



Bleeding at the central line insertion site was improved to (74.7% to 97.1% equals 23.6%) with use of a hemostatic powder and central line dressing integrity was improved from (18.5% to 95.5% equals 77.0%) with use of a liquid gum mastic adhesive. Additionally, CLABSIs were reduced from n=4 (2023Q1-Q2) to n=0 CLABSIs (2023Q3-2024Q1 YTD), and zero medical adhesive-related skin injuries were reported on the 3 trial units since the implementation of the bundle 2023Q1 to 2023Q3.

Lessons Learned

- Consistent reinforcement of education is required due to staff turnover, contract staff, and other challenges
- Buy-in is critical in all departments involved to support initiatives and sustain improvement
- Continue CLABSI prevention bundle rounding to ensure consistent practice
- Peer-to-peer accountability in handoff is key to maintaining a clean, dry, and intact dressing

Conclusion

Topical hemostatic powder, as well as the liquid gum mastic adhesive paired with the adhesive remover for safe removal, was shown to be effective in improving cleanliness and integrity in central line dressings for the prevention of CLABSIs. In Q42023, the dressing integrity bundle has been standardized in all units within the facility

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