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BACKGROUND

Healthcare-associated infections (HAIs) affect approximately one-third of hospitalized patients at any given time, representing a serious concern for patient safety. While daily and terminal room cleaning are essential components of infection prevention, objectively verifying their effectiveness remains a significant challenge. Environmental surfaces serve as key reservoirs for pathogens, contributing substantially to the transmission of infectious agents within healthcare facilities.

Problem: At University Medical Center of Southern Nevada (UMCSN), cleaning validation relies on visual inspection, which can miss 30-50% of contaminated surfaces.

Current Challenges:
- ❖ Subjective cleaning assessment
- ❖ Lack of real-time feedback
- ❖ Inconsistent cleaning protocols

Innovation: Blacklight environmental auditing provides objective, visual validation of cleaning effectiveness using fluorescent marker technology.

PURPOSE

Objectives:
- ❖ Evaluate effectiveness of Blacklight inspection as a quality tool improvement for validating daily and terminal room cleaning
- ❖ Identify frequently missed surfaces and contamination patterns
- ❖ Implement targeted cleaning improvements based on audit findings
- ❖ Measure cleaning effectiveness improvement post-intervention
- ❖ Improve environmental services staff competency

Primary Aim: Achieve ≥ 85% cleaning effectiveness score using objective blacklight validation methodology.

METHODS

Study Design: Continuous quality analysis using retrospective Blacklight audit data.
- ❖ 12-month performance trend analysis (July 2024 to June 2025)
- ❖ Cross-sectional analysis of surface-specific cleaning effectiveness

Blacklight Auditing Process:
- ❖ Patient care units with daily and terminal cleaning protocols
- ❖ Fluorescent marking solution applied to predetermined high-touch surfaces
- ❖ Post-cleaning Blacklight inspection using Morpilot UV flashlight
- ❖ Binary outcome: Mark visible (inadequate cleaning) vs. Mark removed (adequate cleaning)
- ❖ Standardized surface selection across all audit periods
- ❖ Combined EVS and RN cleaning responsibility areas

Data Collection Period:
- ❖ Q3 2024: 666 surface assessments across 31 surface types
- ❖ Q4 2024: 303 surface assessments across 20 surface types
- ❖ Q1 2025: 735 surface assessments across 20 surface types
- ❖ Q2 2025: 893 surface assessments across 20 surface types
- ❖ **Total: 2,597 individual surface cleaning assessments**

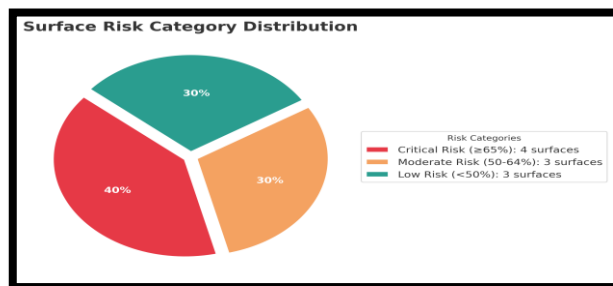*Figure 1.* Quarterly Cleaning Performance Trends

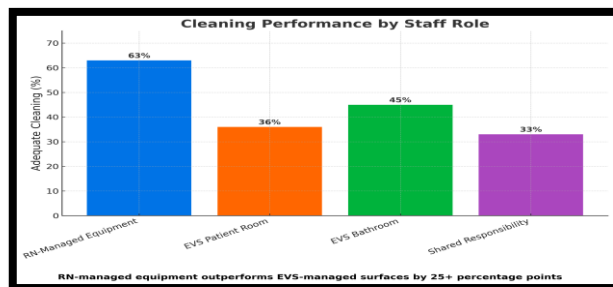*Figure 2.* Surface Risk Category Distribution
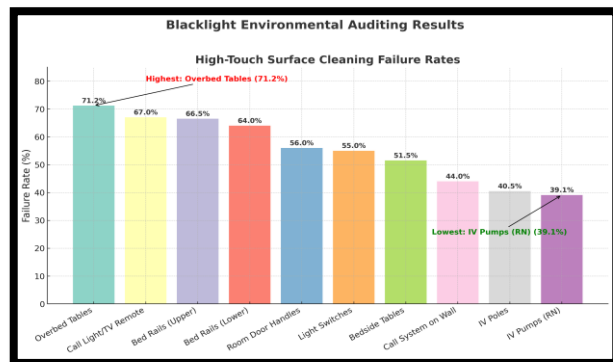

Figure 3. Cleaning Performance by Staff Role

Figure 4. Blacklight Environmental Auditing Results

RESULTS

High-Risk Surfaces (>65% Non-compliance)
- Overbed Tables: *71.2% missed*
- Call Lights/Remotes: *67.4% missed*
- Bed Rails (Upper): *67.5% missed*
- Bed Rails (Lower): *65.0% missed*

Moderate-Risk Surfaces (50-64% Non-compliance)
- Room Door Handles: *56.3% missed*
- Light Switches: *55.6% missed*
- Bedside Tables: *52.0% missed*

Low-Risk Surfaces (<50% Non-compliance)
- IV Pumps: *39.1% missed*
- IV Poles: *41.4% missed*
- Wall Call System: *45.0% missed*

Role-Based Cleaning
- **RN-Managed:** IV Pumps *(60.9% adequate)* Bed Rails *(33–35%)*
- **EVS-Managed:** Wide variability *(28.8–71.2%)* Bathrooms *(30–60%)* Furniture/Equipment *(32.5–58.6%)*

CONCLUSIONS

Priority 1: High-Risk Surfaces: For high risk surfaces a.) Actions: Train staff, create surface-specific protocols; b.)adapt cleaning tools/techniques

Priority 2: Role-Based Optimization: a.) Close EVS training gaps with standardization and coaching; b.) Clarify cleaning ownership for shared surfaces

Priority 3: System-Level Enhancements: a.) Replicate high-performing conditions (Q2 2025 benchmark: 71.67%); b.) Launch real-time feedback systems

RECOMMENDATIONS

Immediate (0–30 Days): a.) Create protocols for key surfaces; b.) Define cleaning responsibilities; c.) Start weekly EVS feedback

Short-Term (1–6 Months): a.) Reach 85% cleaning adequacy; b.) Reduce variability to <10%; c.) Begin peer mentoring

Long-Term (6–12 Months): a.) Sustain 85% cleaning adequacy; b.) Link audit data to infection surveillance with environmental cleaning audits; c.) Analyze predictive trends

Performance & Monitoring: a.) Current cleaning rate: 67.2%; b.)

Target: ≥85% short-term, ≥90% long-term; c.) Audit frequency and feedback linked to improvement; d.) Monthly trend analysis and annual benchmarking recommended.

REFERENCES

References available upon request

PATHWAY DESIGNATED