



KEY POINT SUMMARY

OBJECTIVES

This investigation aimed to identify the items and design features within NICU pods that were contaminated with Staphylococcal.

Investigations of Staphylococcal contamination on environmental surfaces of a neonatal intensive care unit of a children's hospital

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Key Concepts/Context

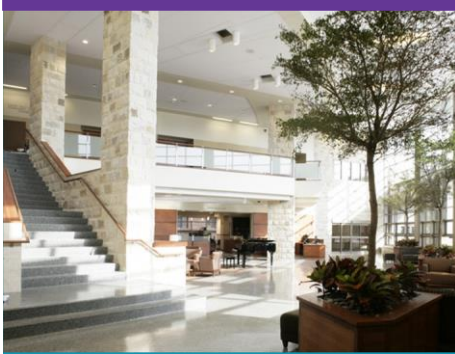
Staphylococcal, particularly methicillin-resistant *S. aureus* (MRSA), infections are pervasive in intensive care units (ICUs). However, little research focuses on areas of contamination within neonatal intensive care units (NICUs), even though Staphylococci can cause severe infection in infants. This study identified different types of Staphylococcal contamination and areas of contamination within multiple NICU sites. This investigation found various kinds of Staphylococci present throughout the NICU, with the most contamination on return air ducts and the floors near sinks.

Methods

Forty-six NICU locations at the same facility were sampled on three different dates. The researchers selected high-touch surfaces and categorized them into three groups:

- Baby isolette station,
- Communal equipment, and
- Physical plant.

Samples were collected using sterile transport swabs. Each swab was used to introduce two types of bacterial growth on plates that were incubated at 37 degrees Celsius for 48 hours. The researchers detected mannitol-negative (*S. epidermidis*) and mannitol-positive (*S. aureus*) Staphylococci using Mannitol Salt Agar (MSA) plates and MRSA with Hardy-CHROM MRSA Agar (CHROM-MRSA) plates.



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The researchers conducted statistical analysis using a Walk X-Square test of independence to help understand the link between categories of sample sites listed above.

Findings

Viable Staphylococci were found on over half (54% or 25 out of 46) of the NICU locations sampled. Of these positive sites, 56% had low contamination. Positive locations included:

- **Baby isolette station:** Stethoscopes, occupied baby bed tubing port (44% contaminated), handle, & door, bath basins, equipment drawers, computer keyboard and mouse, telephones, and lamp switch.
- **Communal equipment:** Diaper scale controls, breast milk refrigerator (handles), physical computer (keyboard and mouse), charts, medication Pyxis (touch screen), flip bins, protocol book pages, kangaroo recliner, nurse cell phones, towel dispenser, labor and delivery bag handles and bottoms, and clean beds door gasket and tubing ports
- **Physical plant:** Return air duct (67% contaminated), the floor near sink (67% contaminated), pneumatic tubes bin.

The 10 locations with the most Staphylococcal contamination were: stethoscopes, bed handles, bath basins, equipment drawers, computer keyboard and mouse, medication Pyxis touch screens, flip bins, nurse cell phones, return air ducts, and floors near sinks.

Viable Staphylococci were not found at 45% (19 out of 46) locations sampled. Negative locations included:

- **Baby isolette station:** Pump controls, chairs, mamaRoo fabric and controls, ventilator control, transcutaneous monitoring units, cardiac monitor screen.
- **Communal equipment:** Bed scales keyboard and handles, supply Pyxis keyboard and door handle, breast milk freezer handle, blood glucose keyboard and strips, and medication Pyxis keyboard
- **Physical plant:** Input air duct, sink basin, sink faucet, and pneumatic tubes carrier

Category rankings of Staphylococcal contamination:

1. Physical plant (68% contaminated)
2. Baby isolette station (46% contaminated)
3. Community equipment (25% contaminated)

S. aureus and MRSA were also detected on some of the sites (22% and 11%, respectively). The floors near the sinks and dust in the air ducts were found to have



the most variety of contamination, with all three types of Staphylococcal types showing positive.

Limitations

The paper does not include a discussion of limitations. It is worth noting that the researchers did not look deeper into what might have caused the differences in Staphylococci present at each site, such as different cleaning regimens.

Design Implications

Return air ducts, the floor near the sink, and other areas at high risk for Staphylococci contamination should be designed to facilitate easy and efficient cleaning and disinfection.

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