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BACKGROUND

- While MSSA infections are more common in the NICU, infection prevention and control (IP&C) strategies generally focus on MRSA.
- An increased understanding of MSSA molecular epidemiology could enhance IP&C strategies targeting MSSA.

OBJECTIVES

To use *spa* typing to characterize the molecular epidemiology of MSSA isolates during a 1-year NICU *S. aureus* screening and decolonization program.

METHODS

Setting and Study Population

- 58-bed academically-affiliated tertiary care NICU
- Infants hospitalized in the NICU in 2017 (1032 admissions)

Surveillance strategies:

- All infants screened bi-weekly for *S. aureus* colonization
- Transferred infants ≥ 7 days old screened on admission
- Surveillance cultures of anterior nares and 3 skin sites: axilla, umbilical stump, groin.
- Specimens processed by clinical microbiology lab to differentiate MSSA vs. MRSA.
- Culture-positive infants decolonized with mupirocin and/or chlorhexidine.¹

Molecular Typing

- MSSA isolates from surveillance or routine care of suspected infection, were genetically characterized by *spa* typing and surveillance isolates were tested for mupirocin resistance.

Analysis

- Relative frequency** of each *spa* type, including > 1 isolate from same infant, was determined
- Incidence**, defined as initial detection of unique *spa* type(s) in an individual infant, was determined.

RESULTS

- During 2017, 187 infants were colonized and/or infected with MSSA
 - Initial MSSA detection: 145 (78%) by bi-weekly surveillance, 24 (13%) by clinical cultures, and 18 (9.6%) by admission surveillance
- 268 MSSA isolates from 166 infants available for *spa* typing
- 60 *spa* types identified**; 31 (50%) only detected in one infant.
- Figure 1** shows frequency of 9 most common *spa* types, those detected in one infant, and those detected in 1-2.5% of infants.
 - 12/14 (86%) multiple gestations shared same *spa* type as their sibling(s).
 - 13/166 (7.1%) infants had new *spa* types detected over time (e.g., t1451 -> t279); 6/13 (46%) changed to t279
- Figure 2** shows incidence of 9 most common *spa* types
 - Epidemiology of *spa* types varied, e.g., t279 detected in 10 months and t13985 detected in 3 months
- 91% of t279 surveillance isolates tested were resistant to mupirocin.
- T1451 and t571 are part of ST398, a community-associated MSSA clone in Northern Manhattan, New York²

Figure 1: Relative Frequencies of MSSA *spa* Types (n=268 isolates)

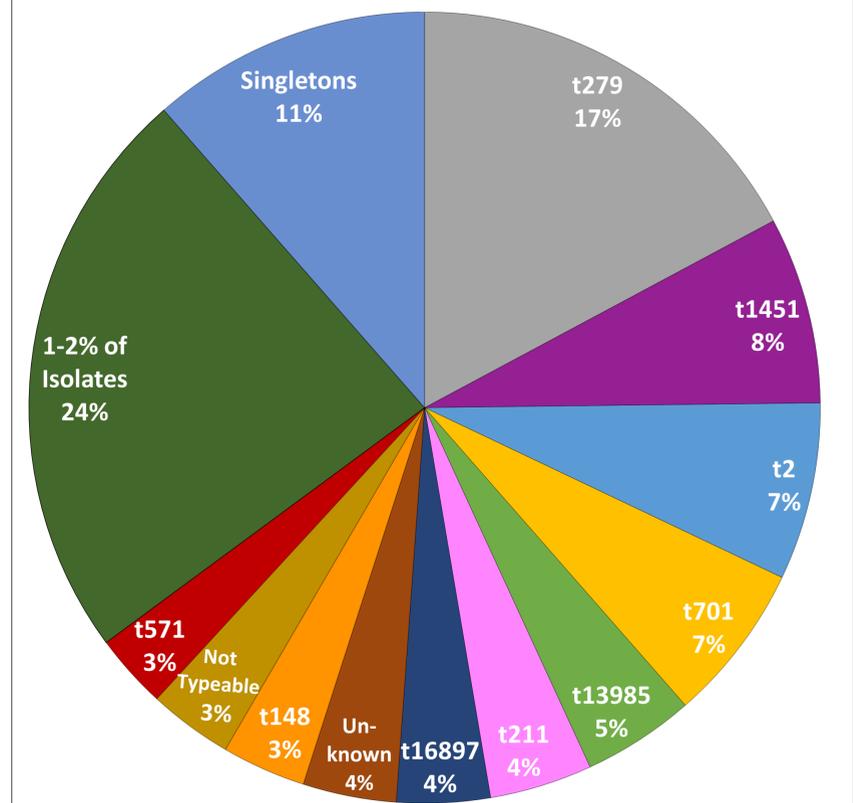
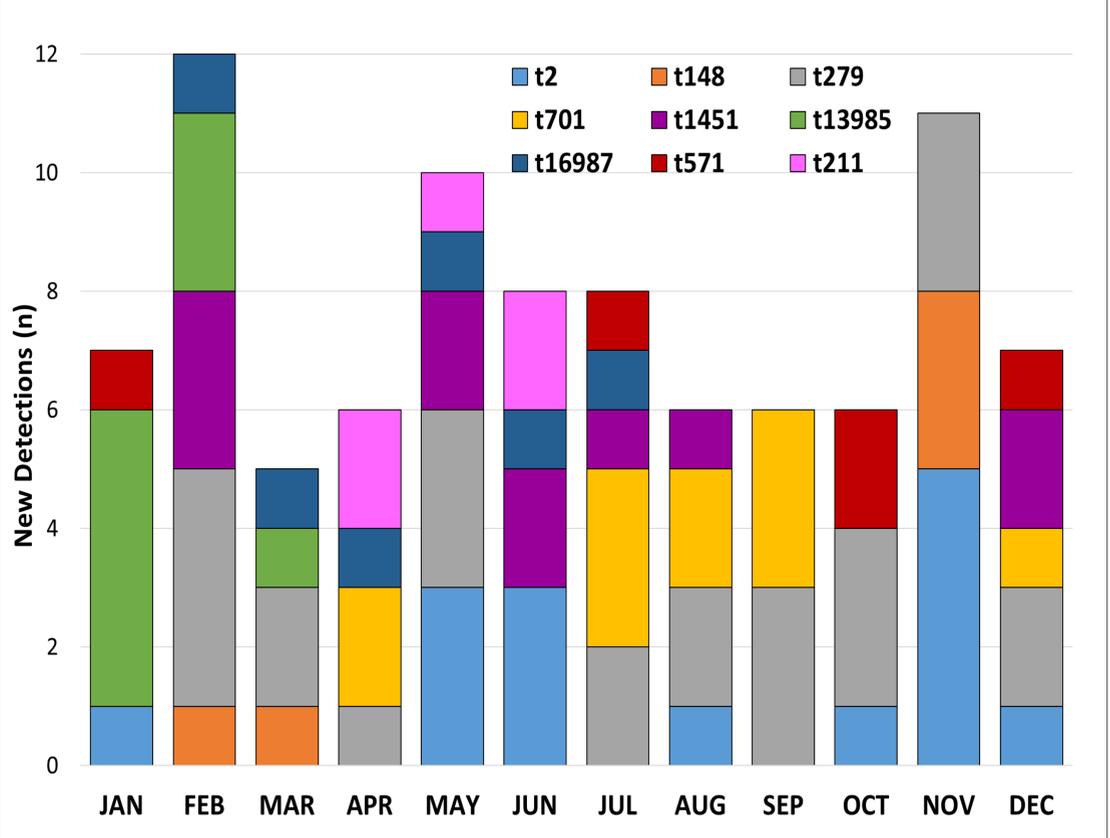


Figure 2: Incidence of the Most Common MSSA *spa* Types 2017



SUMMARY AND CONCLUSIONS

- Overall, MSSA isolates in our NICU were genetically heterogeneous.
- However, several *spa* types had frequencies of 3-17%.
- These data suggest potential transmission and multiple introductions of MSSA into the NICU, including the community and family members, as suggested by detection of t1451 and t571.
- Spa* typing can identify:
 - community- vs. healthcare-adapted MSSA clones
 - transmissible clone
 - These data can inform targeted IP&C strategies
- Our decolonization program may have led to selective pressure resulting in *spa* type t279, detected in 25 infants during 10 months.
- Future studies should utilize sequencing and geospatial technology to study transmission patterns and identify potential "hot spots" (e.g., specific rooms).

REFERENCES

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