Molecular Epidemiology of Methicillin-Resistant \textit{Staphylococcus aureus} in Manitoba, Canada

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\textbf{ABSTRACT}

Objective: Epidemiological study of methicillin-resistant \textit{Staphylococcus aureus} (MRSA) has lagged behind the identification of different MRSA strains, largely due to a lack of readily available tools to provide a current representative picture of MRSA in Manitoba. We have conducted a molecular epidemiology study on a series of MRSA isolates recently collected and available at Cadham Provincial Laboratory (CPL), Winnipeg, Manitoba.

Methods: Three hundred and fifty isolates were available for analysis with collection dates ranging from September 2007 to August 2008. Given the client-base of CPL, the majority of these isolates would be represented by these isolates, with the exception of clients living in the community, in personal care homes, or patients admitted to larger hospitals. Most regions of Manitoba would be represented by these isolates, with the exception of southeastern and southwestern Manitoba. DNA was extracted from each isolate using our established method. spa typing was performed and all spa results were analyzed using BioNumerics 6.1 (Genetic ID) and v四是六2.0: Software for the spatial and space-time scan of Crime Incident Locations (v 3.1). Ned Levine & Associates, Houston, TX.

RESULTS

Spa Typing

- From 350 isolates, 31 spa types were identified.
- The three most common spa types were 002 (21.7%), 008 (20.6%), and 128 (20.5%).

Distribution of MRSA Strain Types

- Three Canadian epidemic strain types, CMRSA2, CMRSA7, and CMRSA10, accounted for 86% of all tested isolates.

Age and Gender Distribution of CMRSA2, 7, and 10

- Overall, cases of CMRSA2 were higher in males (35.8% vs. children (31.6%) and CMRSA7 (30.4% vs. females)
- Median age for cases of CMRSA10 was younger (occurring in the age group from 20-29 yrs), as well as for CMRSA2 (18-29 yrs) and CMRSA10 (20-29 yrs).

Spatial Distribution - Midpoint and Extent

- CMRSA7 has a widespread distribution throughout the province, whereas cases of CMRSA2 are less likely to occur in individuals residing within the city of Winnipeg and surrounding areas.

Spatial Clustering - Relative Risk by Strain Type

- The mean center and a standard deviation ellipse for cases of CMRSA2, CMRSA7, and CMRSA10.

REFERENCES

11. Hawe J, Quine B, Stockdale D et al. Sixth International Conference on Emerging Infectious Diseases, Mar 16-19, 2003, Atlanta, Georgia.

CONCLUSIONS

Three strains of MRSA, which included CMRSA2 (USA100/900), ST57, and CMRSA10 (USA400), were associated with patients of younger age.

Spatial mapping revealed CMRSA groupings that were centered in unique areas of the province and had very different (but overlapping) spatial extents.

The differences in the ages of the individuals colonized or infected with these MRSA types, and their respective geographic distributions, suggest clear differences in the epidemiology of these strains in Manitoba.

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