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Emergence of Serotype 19A Multi-drug Resistant *S. pneumoniae* (MDR SPN) in Canada

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Abstract:

Background

Canadian Bacterial Surveillance Network (CBSN) is a network of clinical laboratories that submit consecutive SPN to a central laboratory. The 7-valent SPN conjugate vaccine Prevnar (PCV7) was introduced in a series of universal provincial programs from 2002-2005. We reviewed the impact of PCV7 on MDR SPN serotypes in Canada.

Methods

All SPN submitted to CBSN from 1995-2007 were reviewed. MICs were determined following CLSI. MDR SPN were defined as non-susceptible to penicillin and any 2 of: erythromycin, TMP/SMX, tetracycline, ciprofloxacin (MIC>4mg/L). Serotypes were determined using latex pneumococcal antisera (Statens Serum Institut). MDR SPN pre-PCV7 (1995-2001) were compared to SPN post-PCV7 (2006-2007). Typing was completed by MLST.

Results

A mean of 2044 SPN were submitted/yr. The proportion of SPN that were MDR post-PCV7 (313/4022 8%) was not significantly different compared to the yr pre-PCV7 (155/2242 7%). The most common pre-PCV7 MDR SPN serotypes were 19F, 23F, 6B, 14, 9V, 19A, and 6A. Post-PCV7 there was a significant decrease in vaccine serotypes (VS) 23F (21 vs 10% p<0.0001), 6B (20 vs 11% p=0.0009), 14 (13 vs 3% p<0.0001) among MDR SPN. No significant changes were noted in VS 19F, 9V, and 6A. A significant rise was noted in MDR SPN with non-VS 19A (4 vs 14% p<0.0001), 15A (1 vs 5% p<0.0001), and 23A (0 vs 2% p=0.002). MLST of a subset of 19A MDR SPN post-PCV7 (n=21) revealed the predominant type to be ST320 (13/21 62%). ST320 MDR 19A SPN was not detected pre-PCV7.

Conclusions

Post-PCV7 there was a significant decrease in VS 23F, 6B, and 14 among MDR SPN. There was a corresponding striking significant rise in non-VS 19A MDR SPN. Further study is required to determine the role of immunologic versus antibiotic selective pressure in selecting this resistant clone.