Impact of a Routine Infant PCV Program on the Serotype Distribution of Episodes of Invasive Pneumococcal Disease (IPD) and Non-bacteremic Pneumococcal Pneumonia in Adults

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Background

Herd immunity from pediatric pneumococcal conjugate vaccine (PCV) programs has resulted in substantial reductions in IPD due to PCV serotypes (ST). We assessed whether similar changes in ST distribution occur in non-bacteremic pneumococcal pneumonia (NBPP).

Methods

Population-based surveillance for IPD (illness associated with isolation of *S. pneumoniae* from a sterile site) has been performed in metropolitan Toronto and the Regional Municipality of Peel In Ontario, Canada since 1995 (population 4.4 million in 2018).

Since 2002, respiratory isolates of *S. pneumoniae* have also been collected from hospital laboratories. Patient data are collected by chart review and patient/physician interview. Episodes of illness associated with respiratory pneumococcal isolates are classified as non-bacteremic pneumococcal pneumonia, possible acute respiratory infection, or colonization using a modification of the Musher criteria (Shigayeva A et al., Vaccine 2016;34:846).

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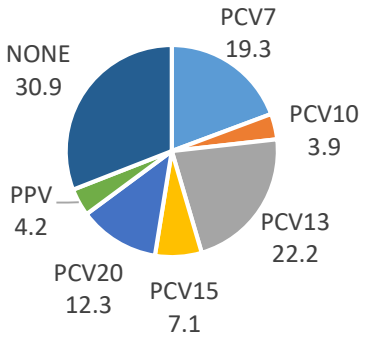
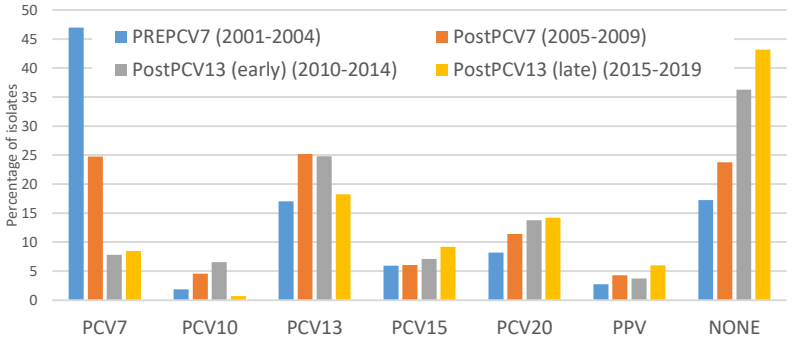
Results

Overall, from 2002 to 2019, there were 13,769 episodes of disease for which an isolate could be serotyped. The overall serotype distribution into groups covered by different vaccines is shown in the adjacent pie chart.



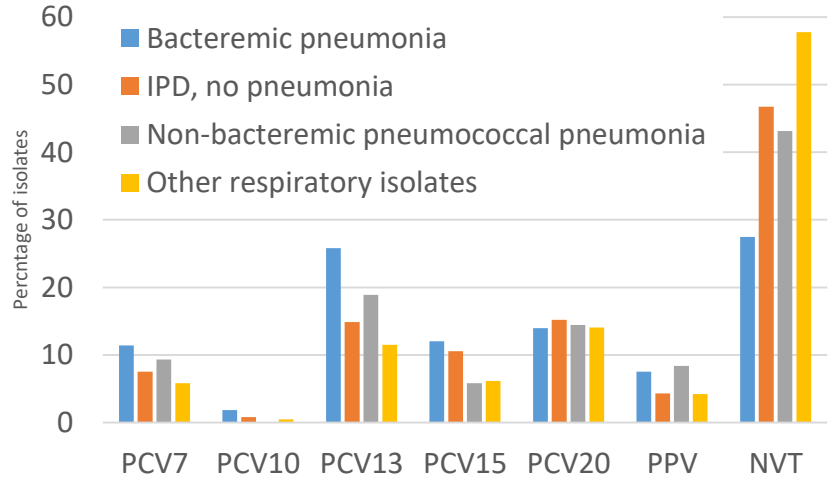
The vaccine category serotype distribution of strains over time is shown in the bar graph below. The proportion of disease due to strains included in PCV7 and PCV10 declined, that due to PCV13 remained stable, and that due to other serotype groups increased.



In children, there are few respiratory isolates. Between 2015 and 2019, 45% of IPD associated with pneumonia (30/67) was due to serotypes included in PCV13, compared to 13% of other cases of IPD (20/160) (P=<0.0001).

Results (cont'd)

In adults, the ST distribution of strains varies between bacteremic pneumonia, IPD without pneumonia, non-bacteremic pneumococcal pneumonia and isolates associated with possible infection or colonization. The figure below shows this distribution for the years 2015-2019.



Conclusions

Nine years post routine infant PCV13 implementation, PCV13 type IPD and NBPP persists in adults. The distribution of vaccine-type strains is similar in IPD and NBPP; although non-vaccine-type strains are more common in NBPP