Decrease in PCV13 serotypes in adults hospitalized with pneumococcal pneumonia over time: evidence of herd immunity effects from childhood vaccination?

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Introduction

- Pneumococcal community-acquired pneumonia (CAP) and invasive pneumococcal disease (IPD) cause significant morbidity and mortality worldwide.
- Although childhood immunization programs have reduced the overall burden of pneumococcal disease in both children and adults (through herd immunity), there is insufficient data in Canada to inform immunization policy in immunocompetent adults.
- Given the routine use of 13-valent pneumococcal vaccine (PCV13) in childhood immunization programs in Canada since 2010, this study aimed to assess the impact of herd immunity on adults by determining the proportion of pneumococcal disease in hospitalized Canadian adults caused by PCV13 serotypes from 2010 to 2015.

Methods

- Active surveillance for CAP-Spn and IPD in hospitalized adults was performed in hospitals across five Canadian provinces from December 2010 to 2015.
- For serotyping, S. pneumoniae isolates recovered from sputum or blood culture were characterized by Quellung reaction, or CAP-Spn were serotyped using a PCV13-specific urine antigen detection (UAD-PCV13) assay.
- Only the PCV13-specific UAD data is presented.

Results

PCV13 serotype distribution over time in hospitalized adults with pneumococcal CAP

- From 2010 to 2015, 7.8% (349/4485) of adults hospitalized with CAP overall had a positive UAD-PCV13.
- When assessed individually by year, the proportion of PCV13 serotypes declined over this study period: 13.6% (44/332) in 2011, 11.9% (75/633) in 2012, 8.3% (99/1192) in 2013, 5.3% (50/944) in 2014, and 8.7% (58/666) in 2015.
- While the proportion of some PCV13 serotypes remained unchanged (i.e. serotype 3), others showed significant decreases over time (i.e. serotype 7F).
- Comparison of UAD-PCV13 data to S. pneumoniae isolates characterized by Quelling reactions is underway.

Conclusions

- In the 5 years following infant PCV13 immunization program implementation in Canada, S. pneumoniae serotypes contained in PCV13 remain an important cause of adults hospitalized with CAP.
- However, the proportion of PCV13 serotypes seems to be decreasing over time, particularly for serotype 7F, but not for serotype 3.
- Similar trends have recently been reported in adults with IPD.
- In order to inform recommendations on the use of PCV13 in adults, it will be important to maintain active surveillance for pneumococcal CAP and IPD to characterize the proportion of adult disease caused by PCV13 serotypes as the impact of herd protection conferred by childhood immunization programs is fully realized.

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