Background and Aim

- Diabetes, a prevalent chronic condition in adults, increases the risk of pneumonia.[1]
- The incidence of pneumonia hospitalization among adults aged <65 years with diabetes is comparable to that of the healthy adults aged ≥65 years.[1]
- Based on efficacy data,[2], the 13-valent conjugate pneumococcal vaccine (PCV13) was routinely recommended for all adults aged ≥65 years, including those with diabetes;[3] currently the 23-valent polysaccharide vaccine (PPSV23) is the only recommended pneumococcal vaccination for immunocompetent adults ≥65 years of age with diabetes.[4]
- Immunogenicity results from a randomized trial conducted in adults aged ≥65 years in the Netherlands demonstrated comparable response to PCV13 between individuals with and without diabetes.[5]
- Recently published data support efficacy/effectiveness of PCV13 in individuals with comorbid conditions, including diabetes.[6][7][8]

We modeled the potential impact of PCV13 use in addition to PPSV23 in US adults 18-64 years of age with diabetes.

Methods

- Deterministic model estimating the cumulative number of pneumonia hospitalizations and hospital days potentially averted over five years. Model inputs are summarized in Table 1.
- Multiple scenarios were assessed using different vaccine efficacy/effectiveness (VE) values.
- We estimated the number of hospitalizations averted as the product of i) target population, ii) all-cause CAP incidence, iii) proportion of CAP due to PCV13 serotypes, iv) PCV13 efficacy/effectiveness in adults ≥65 years, and v) five-year duration of protection with constant PCV13 VE.
- We modeled varying VE, ie those with the lowest and highest PCV13 VE inputs.
- Utilizing methodology accounting for cumulative preventive efforts over time, number-needed-to-vaccinate (NNV) for each scenario was also assessed.[9]

Results

- Among the 12.5 million adults aged <65 years with diagnosed diabetes in the United States, we estimated 250,000 pneumonia hospitalizations annually.
- Based on published, US estimates of pneumonia incidence and PCV13 etiology, PCV13 vaccination in this population could avert 21,010 to 37,953 hospitalizations and 176,484 to 318,809 hospital days over a 5-year period.
- NNV to avert one hospitalization and one hospital day were 329 - 594 and 39 - 71, respectively (variability due to VE estimate utilized).

Limitations and Conclusions

- Limitations: Burden of pneumonia in diabetics is poorly defined in the literature. Estimated incidence rate of pneumonia hospitalizations in individuals 18-64 with diabetes was from the pre-PCV13 era but appears similar to a more current analysis.[13] Duration of protection of PCV13 is assumed to be 5 years; actual duration is unknown and could be longer; PCV13 VE values are for adults ≥65 years, but VE may be higher in younger adults.
- NNVs are comparable to those for adults aged ≥65 years (i.e., NNV=576)[9], for whom PCV13 is routinely recommended.
- Inclusion of PCV13 in the current pneumococcal vaccination strategy for the diabetic population <65 years of age has the potential to prevent 21,000 to 38,000 pneumonia hospitalizations over 5 years. Future studies will identify to what extent other at-risk groups of younger adults may also benefit from similar vaccination strategy.

References: