broader serotype coverage. The aim of this study was to estimate the population-level impact of new PCVs to replace the existing 13-valent vaccine (PCV13) in infants.

**Methods.** An age-structured dynamic transmission model of *Streptococcus pneumoniae* before and after PCVs introduction was developed. The model was fit to longitudinal Active Bacterial Core surveillance (ABCs) data (1997–2015) in the United States on distribution and cases of IPD, as well as population level prevalence and serotype distribution data. It was assumed that total *S. pneumoniae* carriage remains constant over time, with full carriage replacement within four years of introduction of any PCV. Two alternative new PCVs with differing IPD coverage are tested with an introduction date of 2024.

**Results.** When compared with continuing vaccination of infants with PCV13, 10 years after a new PCV is introduced (2,034) cases of IPD are substantially reduced (shown in the table below). Broad serotype coverage leads to greater reductions in IPD. The greatest IPD reduction occurred in infant vaccine groups, but even similar reductions are also observed in the unvaccinated elderly population due to herd protection.

| Additional Vaccine Coverage | Over PCV13 (2016)/2024 | <2 Years | 2–5 Years | 50–64 Years | ≥65 Years | All Ages |
|-----------------------------|------------------------|---------|----------|-----------|----------|---------|
| 11–21% ≤ 25%               | 36                    | 35      | 33       | 31        | 30       | 30      |
| 15–30% ≤ 45%               | 42                    | 42      | 41       | 39        | 40       | 40      |

*Defined as the proportion of IPD cases that are caused by serotypes covered by the new PCV in 2016/2024 (a range of values is given because of differences by age group; values differ between 2016 and 2024 as serotype prevalence has not reached steady state as of 2016).*

**Conclusion.** A new, higher valent PCV given to infants in the United States has the potential to reduce future cases of IPD. Vaccination of infants may also have a substantial indirect benefit on IPD cases in adults and the elderly.

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1428. Modeling Reductions in Antibiotic Prescriptions due to Otitis Media in Canada as a Result of Pneumococcal Conjugate Vaccination

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**Background.** Vaccines are an important factor in combating the growing global health issue of antimicrobial resistance. Pneumococcal conjugate vaccines (PCVs) have substantially reduced the burden of otitis media (OM) caused by *S. pneumoniae*, one of the largest causes of antibiotic prescriptions (Abx) in children under 5. The purpose of this study was to quantify the number of Abx avoided since the introduction of a national PCV program in Canada.

**Methods.** We adapted a previously published forecasting model to estimate the reduction in OM cases in Canada since the introduction of PCVs in all routine programs in 2005 through 2015 (the last year complete data were available). The impact of PCV on OM was modeled and compared with pre-PCV incidence to estimate net impact of the vaccine. We assumed that 90% of OM episodes were treated with an initial Abx given routine practice. All data were sourced from the published literature.

**Results.** Over 10 years, PCVs were estimated to avert 3.7 million cases of OM in Canada. This corresponded to an estimated reduction of 3.3 million Abx, or 0.96 Abx avoided per infant vaccinated with PCV.

**Conclusion.** PCVs have had a significant public health impact on reducing the burden of disease and Abx. While most of the PCV impact on reduction of Abx is due to reduction in OM cases, additional Abx reduction from prevention of other invasive and noninvasive pneumococcal diseases is of importance. Further research is necessary to understand the additional net benefit of reducing antibiotics across the disease spectrum given that reductions in net prescribing could further downstream decrease resistance by other pathogens.

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1430. Evolving Impact of 13-Valent Pneumococcal Conjugate Vaccine on Invasive Pneumococcal Disease

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**Background.** The 13-valent pneumococcal conjugate vaccine (PCV13) replaced PCV7 in the childhood immunization schedule in Massachusetts (MA) beginning in April, 2010. We describe the current epidemiology of invasive pneumococcal disease (IPD) in Massachusetts (MA) children after introduction of PCV13.

**Methods.** Cases of invasive pneumococcal disease (IPD) in children <18 years of age were identified through enhanced surveillance system in MA since 2001. All cases in children and Streptococcus pneumoniae (SP) isolates, when available, are submitted to Department of Public Health (MDPH) and parents/physicians are interviewed for confirmation of demographic and clinical data. All available isolates are confirmed as SP, serotyped by Quellung reaction.

**Results.** There were 351 IPD cases in MA children from April 1, 2010 to September 31, 2017, and 36 (10.3%) were in infants <6 months; 42 (12.0%) in children between 6 and 12 months; 63 (18.0%) in toddlers 12–24 months; 102 (29.1%) in children aged 2–5 years, and 108 (30.8%) were in children aged ≥5 years. Incidence of IPD declined to 6.81/100,000 children (95% CI 2.6–11.1) in 2015/2016 period which represents a 72.1% decline compared with 2010/2011 (24.4/10, 95% CI 16.3–32.5) (figure). However, in 2016/2017, IPD incidence increased to 10.4/100,000 children (95% CI 5.2–15.7). The most common clinical presentation was bacteremia (62.9%), followed by pneumonia (30.5%) and CNS disease (6.6%). Among, 103 (32.6%) children with ≥1 comorbidity, asthma (13.2%), hematologic malignant (12.1%), prematurity (9.9%) and sickle cell disease (9.9%) were the most common comorbidities. He over all mortality rate was 5.1%. Isolates from 308 (89.3%) were available for serotyping: vaccine serotypes (VST) were identified in 123 (46.2%), 7F (19.9%), 3 (17.9%), 19F (10.4%), 6A (2.8%), 14, 18C, 5 (9.0% each). Serotypes 15B (13.7%), 22F (12.6%) and 33F (11.8%) were the most common nonvaccine serotypes (NVST).

**Conclusion.** Invasive pneumococcal disease identified in the post-PCV13-era is primarily caused by NVSTS, specifically serotypes 15B, 33F and 22F; and disproportionately observed in children with comorbid conditions. Continued surveillance is necessary to determine the impact of PCV13, as well as track potential changes in disease incidence and character due to NVST.
Disclosures. All authors: No reported disclosures.

1431. Dynamics of Antibiotic Prescription Rate Following Pneumococcal Conjugate Vaccine (PCV) Implementation in Children <2 Years Old: Comparison Between High and Low Prescribing Clinics in Two Different Ethnic Groups Dana Danino, MD1,2; Noga Givon-Lavi, PhD1; Shalom Ben-Shimol, MD2;3; David Greenberg, MD2,4 and Ron Dagan, MD3;4; Pediatric Infectious Disease Unit, Soroka University Medical Center, Beer-Sheva, Israel, Faculty of Health Sciences, Ben-Gurion University of the Negev, Beer-Sheva, Israel

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Background. Antibiotic overuse is common among pediatricians. Since PCV reduces respiratory infections, a resultant reduction in antibiotic consumption was expected. We speculated that the decline in dispensed antibiotic prescription (DAP) rates will be greater among high antibiotic user clinics (HUC) than low user clinics (LUC).

Methods. Southern Israel is inhabited by two ethnic groups: Bedouins and Jews. Pre-PCV, DAP rates were higher in Bedouin children. In 2005–2009, yearly average of 10,002 Bedouin and 8,977 Jewish children <2 years were insured by Clalit Health Maintenance Organization, where all prescriptions are computerized. Active clinics during both pre- and post-PCV periods with ≥25 insured children <2 years were enrolled. Mixed Bedouin/Jewish clinics (14% of children) were excluded. DAP rates were calculated by age, antibiotic category and ethnicity. Clinics were classified as HUC (above median DAP rates) and LUC (below median rates). During 2009–2016, 137,663 and 59,606 prescriptions were dispensed in HUC and LUC resp. among the Jewish children and 214,524 and 91,236 resp., among Bedouin children. PCV7/PCV13 were implemented in July 2009/November 2010 and rapidly reached ≥90% coverage.

Results. Proportion of dispensed antibiotics pre-PCV implementation is shown in Figure 1. Mean (±1,000 child year ±SD) DAP rates during pre-PCV implementation were 3,246 ± 156 and 2,136 ± 11 in Bedouin and Jewish children resp. The respective figures in HUC and LUC were 4,033 ± 163 and 2,172 ± 205 in Bedouin children; and 2,589 ± 33 and 1,417 ± 51 in Jewish children (P <0.001). Pre-PCV, no significant trends in DAP rates were observed, but the rates rapidly declined post PCV in HUC in both ethnic groups. The reduction was greater in HUC than LUC, and no decrease was seen in LUC for Jewish children (Figure 2). Similar trends were found with amoxicillin, the commonest dispensed antibiotic. No decline in azithromycin was seen in HUC, and a significant increase was found in LUC, in both ethnic groups.

Conclusion. PCV7/PCV13 implementation was associated with a significant decline of DAP rates except in LUC among Jewish children, resulting in partial closing of the gap between HUC and LUC. Similar trends were found in both ethnic groups despite significant differences in the pre-PCV DAP rates.

Figure 1: Proportions of dispensed antibiotic prescriptions by antibiotic category, before PCV implementation, July 2005 – June 2009

Figure 2: Overall antibiotic prescription rates in children <2 years old, and by high and low prescribing clinics in southern Israel, July 2005 through June 2016

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1432. County-Wide Pediatric IPD Experience Following Pneumovax 13 Implementation Delma Nieves, MD1; Stephanie Osborne, BS, RN2; Michele Cheung, MD MPH1 and Antonio Arrieta, MD, FIDSA1; Infectious Diseases, CHOC Children's Hospital, Orange, California, Research Institute, CHOC Children's, Orange, California, Epidemiology and Assessment, Orange County Health Care Agency, Santa Ana, California

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Background. Although invasive pneumococcal disease (IPD) has declined following pneumococcal conjugate vaccines, both respiratory (R-IPD; e.g., pneumonias +/- empyema) and nonrespiratory IPD (NR-IPD) remain concerning. We evaluate 13-valent pneumococcal conjugate vaccine (PCV13) impact on county-wide IPD, serotypes involved and patients affected since its 2010 introduction.

Methods. Prospective analysis of culture confirmed pediatric IPD was conducted in Orange County, CA following PCV13 vaccine implementation comparing 2010–2013 (transition; Era 1) to 2014–2017 (full implementation; Era 2). We reviewed age, ethnicity, health status, immunizations, immune work up, site of infection, and serotype distribution.

Results. There were 135 IPD cases (78[58%] male; 65[47%] Hispanic, 38[28%] White, 11[8%] Asian, 9[7%] other and 11[8%] unknown). IPD decreased by 37.3% (Era 1 = 83 cases vs. Era 2 = 52). R-IPD (41.5%) and NR-IPD (58.5%) exhibited a similar decrease. Serotype was known for 116 (86%) cases. Overall PCV13 serotype incidence rate (IR) per 100,000 population decreased by 44.7%; of note non-PCV13 decreased by 14.8%. The largest change was seen in PCV13 serotype NR-IPD (−60%) (Figure 1). As a percentage of PCV13 serotypes, 19A and 3 increased from 32 and 21% to 46% (+44%) and 27% (+29%), respectively. Meanwhile, 7F decreased from 36 to 7% (−81%). R-IPD due to PCV13 serotype in children <5 years old did not decrease during the study (Figure 2). By Era 2 PCV13 immunization was broadly implemented (Figure 3). Despite being fully immunized, 12 patients (5[42%] male; 7[58%] White, 4[33%] Asian, 1[8%] other) developed PCV13 serotype IPD. The majority (10/12) were previously healthy, with R-IPD (83%) and affected by serotypes 19A (58%) or 3 (25%). No immune deficiency was identified among these subjects.

Conclusion. Pediatric IPD continues to decrease post PCV13 implementation, most notably due to a decrease in PCV13 serotype NR-IPD and disappearance of 7F. We did not see an increase in non-PCV13 IPD. Serotypes 19A and 3 remain a significant proportion of a lower number of cases. Children <5 remain at highest risk for IPD, particularly R-IPD. A notable proportion of PCV13 serotype R-IPD occurred in fully immunized and previously healthy children.