Invasive pneumococcal disease (IPD) is an important cause of morbidity and mortality among young children and elderly adults in Indiana. The emergence of drug-resistant Streptococcus pneumoniae (DRSP) infections has created renewed urgency to adapt treatment options and improve vaccination rates among these populations. CDC's Antibiotic Resistance Threats Report listed DRSP as a serious threat in 2013 (Figure 1). Though vaccines against particularly virulent and prevalent strains and antimicrobial therapies are available, the Indiana State Department of Health (ISDH) still identifies several hundred cases annually among all ages.

### Results

**Table 1.** Characteristics of cases of invasive pneumococcal disease (n=3040) in Indiana.

<table>
<thead>
<tr>
<th>Age Group</th>
<th>N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1</td>
<td>1482(48.8)</td>
</tr>
<tr>
<td></td>
<td>1555(51.2)</td>
</tr>
</tbody>
</table>

- Among cases of IPD (n=3040), 5.3% occurred in children <5 years of age and 40.9% occurred in adults 65 and over.

- Among children <5 years of age (n=160), 39.4% had an infection that was resistant to at least one antibiotic. Of these, 40.0% had an infection from a serotype included in the PCV13 pneumococcal vaccine routinely given to children starting in 2010.

- The percentage of organisms resistant to one antibiotic increased from 3.3% in 2010 to 4.3% in 2013. However, the percentage of organisms resistant to 4 or more antibiotics decreased from 1.6% to 0.7%.

**Figure 2.** Trends in antimicrobial susceptibility in Indiana, showing antibiotics with the highest overall resistance rates.

- **Figure 3.** Serotypes responsible for 5 or more cases of IPD in child <5. Other isolated serotypes were 11A, Group 16, 13F, 21, 17F, 12F, 9N, 6, 25F, 10A, 7C, 6A, 29A, 28A, 21F, 20, 15A, and 11C.

**Figure 4.** Annual incidence of IPD. National data was acquired from a representative sample of sites used by the CDC's Active Bacterial Core Surveillance program.

**Figure 5.** Incidence rates of IPD by age group and sex. Incidence is highest in females <1 and males 65 and over.

### Conclusions

Despite high PCV13 vaccination rates in young children, Streptococcus pneumoniae serotypes included in the PCV13 vaccine continue to present a high burden of disease in this age group. Additionally, adults aged 50-64, who are not currently routinely recommended to have PCV23 vaccine doses also face a high disease burden with relatively few preventative protection options.

Though penicillin resistance has decreased, isolates continue to have high rates of resistance to other antibiotics, such as TMP-SMX and erythromycin. Antimicrobial stewardship efforts must continue to target these antibiotics in addition to penicillin.

IPD continues to be a challenge for public health in Indiana. Understanding trends in antimicrobial resistance and epidemiology of IPD is important to informing preventative action, treatment and vaccine research.

### Acknowledgements

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### References
