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## Invasive Pneumococcal Disease Among Children Aged <5 years — Alaska, 1991–2020

### Background

Invasive pneumococcal disease (IPD) occurs when *Streptococcus pneumoniae* infects a normally sterile site, such as blood or cerebrospinal fluid. Clinical manifestations of IPD include bacteremia, meningitis, and pneumonia. People at greatest risk for IPD are children aged <5 years, adults aged ≥65 years, and immunocompromised persons.<sup>1</sup> Historically, Alaska Native children have experienced a disproportionate burden of IPD.<sup>2</sup>

In 2001, a 7-valent pneumococcal conjugate vaccine (PCV7) was introduced into the childhood immunization schedule in Alaska.<sup>2</sup> In 2010, PCV7 was replaced by a 13-valent pneumococcal conjugate vaccine (PCV13), which includes the serotypes in PCV7 and six additional serotypes.<sup>2</sup> In June 2022, the Advisory Committee on Immunization Practices recommended either PCV13 or a new 15-valent pneumococcal conjugate vaccine (PCV15) for use in children.<sup>3</sup> A 20-valent pneumococcal conjugate vaccine (PCV20) is being evaluated in clinical trials in infants and children.<sup>4</sup> This *Bulletin* describes the epidemiology of IPD among Alaska children aged <5 years during 1991–2020, before and after the introduction of pneumococcal conjugate vaccines.

### Methods

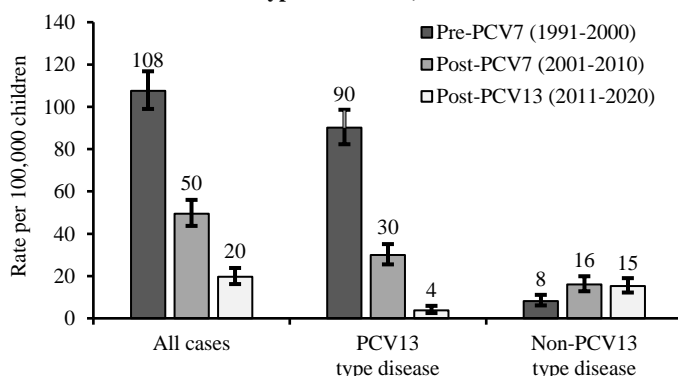
Data were obtained through statewide laboratory-based surveillance. A case of IPD was defined as isolation of *S. pneumoniae* from a normally sterile site in a child aged <5 years in Alaska. We calculated and compared IPD rates per 100,000 children and 95% confidence intervals (CI) for three decades: 1991–2000 (pre-PCV7), 2001–2010 (post-PCV7), and 2011–2020 (post-PCV13). We also calculated the proportion of IPD cases during 2011–2020 that were caused by pneumococcal serotypes contained in PCV13, PCV15, and PCV20.

### Results

During 1991–2020, 912 IPD cases were reported among children aged <5 years in Alaska for an incidence of 59 cases per 100,000 children per year (95% CI: 55–62). Overall, annual IPD incidence declined by 82% from 108 per 100,000 children during the pre-PCV7 period to 20 per 100,000 during the post-PCV13 period (Figure 1). During this same timeframe, the annual incidence of IPD caused by *S. pneumoniae* serotypes contained in PCV13 declined by 96% from 90 per 100,000 children to 4 per 100,000; rates of IPD caused by non-PCV13 serotypes increased by 88% from 8 per 100,000 children to 15 per 100,000.

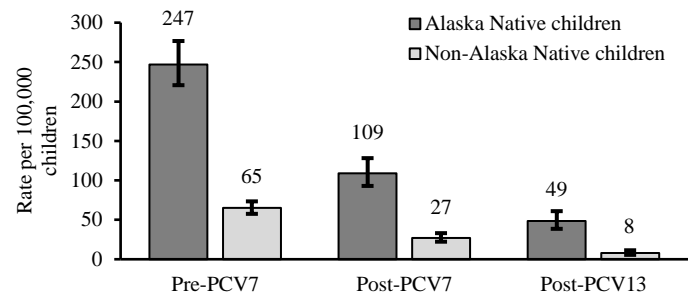
During 2011–2020, of 103 IPD cases among children aged <5 years, 20 (19%) were caused by PCV13 serotypes, 41 (40%) by PCV15 serotypes, and 57 (55%) by PCV20 serotypes.

**Figure 1. IPD Rates per 100,000 Children Aged <5 Years per Year and 95% Confidence Intervals, by Vaccine Period and Disease Caused by PCV13 and non-PCV13 Serotypes — Alaska, 1991–2020**



Among Alaska Native children, annual IPD incidence decreased by 80% from 247 per 100,000 during 1991–2000 to 49 per 100,000 during 2011–2020 (Figure 2). However, rates remained higher among Alaska Native children compared to non-Alaska Native children during all three time periods.

**Figure 2. IPD Rates per 100,000 Children Aged <5 Years per Year and 95% Confidence Intervals, by Race and Vaccine Period — Alaska, 1991–2020**



### Discussion

Pneumococcal conjugate vaccines have led to a significant decrease in IPD incidence among children aged <5 years in Alaska. This finding is consistent with national trends and previous studies in Alaska which showed decreases in IPD incidence in this population following the introduction of PCV7 and PCV13.<sup>2,5</sup> Although IPD incidence decreased for all children, historical disparities between Alaska Native and non-Alaska Native children persist.

During 1991–2020, large reductions occurred in both overall and vaccine-type IPD. Smaller absolute increases in IPD caused by non-PCV13 serotypes were seen prior to PCV13 introduction. The additional serotypes in PCV15 and PCV20 caused a substantial proportion of IPD cases among children aged <5 years during 2011–2020. These vaccines present a further opportunity to decrease IPD incidence among Alaska children and to reduce remaining disparities. Historically, pneumococcal vaccination coverage among children in Alaska has been high but declined in recent years.<sup>2,6,7</sup> In 2020, an estimated 85% (95% CI: 77–91) of Alaska children aged 24 months had received ≥3 doses of PCV13 compared to 93% (95% CI: 93–94) of U.S. children.<sup>7</sup>

Health care providers should continue to vaccinate children according to the current [national recommendations](#) and consider using new pneumococcal vaccines as they become available.<sup>3</sup>

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