State of Alaska Epidemiology **Bulletin**

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Updated Guidelines for *Haemophilus influenzae* Type b Vaccination of American Indian and Alaska Native Children

Background

Haemophilus influenzae type b (Hib) colonizes the upper respiratory tract and is transmitted from person-to-person through respiratory droplets.[1] Invasive Hib disease occurs when the bacteria infect a normally sterile site, such as blood or cerebrospinal fluid.

Until the early 1990s, Hib was a leading cause of bacterial sepsis, meningitis, and epiglottitis among U.S. children. From 1980–1985, the annual incidence of invasive Hib disease was 20–25 cases per 100,000 children aged <5 years in the United States.[1] American Indian/Alaska Native (AI/AN) children had higher rates of disease, which tended to occur at a younger age compared to non-Native children.[2] In Alaska, AI/AN children aged <5 years had rates of invasive Hib disease that were 3.6 times higher than non-Native children.[2]

Following the introduction of Hib polysaccharide conjugate vaccines in 1987, the incidence of invasive Hib disease declined dramatically among all U.S. children.[1] However, rates remained higher among AI/AN children. This *Bulletin* summarizes the epidemiology of invasive Hib disease in Alaska among children aged <5 years during 2004–2023 and provides updated Advisory Committee on Immunization Practices (ACIP) recommendations for Hib vaccination in AI/AN children.

Epidemiology of Invasive Hib Disease in Alaska

We obtained data from statewide laboratory-based surveillance. A case of invasive Hib disease was defined as an Alaska resident with the bacteria isolated from or DNA detected in a normally sterile site. For cases among children aged <5 years, we calculated and compared incidence per 100,000 population, and described clinical outcomes and vaccination history.

During 2004–2023, there were 46 cases of invasive Hib disease in Alaska, including 25 (54%) among children aged <5 years, 6 (13%) among children aged 5–17 years, and 15 (33%) among adults aged ≥18 years. Among children aged <5 years, the annual incidence was 2.4 cases per 100,000 population (95% CI: 1.7–3.6). Incidence was 14-fold higher among AI/AN children aged <5 years (7.2 cases per 100,000 population) than non-Native children (0.5 cases per 100,000 population). Overall, 20 (80%) children aged <5 years with invasive Hib disease were hospitalized and 3 (12%) died. Among cases aged <5 years, 12 (48%) had not received Hib vaccine, 3 (12%) received 1 dose, 3 (12%) received 2 doses, and 7 (28%) received ≥3 doses.

Hib Vaccine Recommendations

ACIP recommends routine administration of a 2- or 3-dose primary series of Hib conjugate vaccine beginning at 2 months of age.[1] A booster dose is administered at age 12–15 months.

Five Hib vaccines are licensed and available in the United States.[1] Each contains Hib polyribosylribitol phosphate (PRP) polysaccharide capsule conjugated to a carrier protein, either the outer membrane protein of *Neisseria meningitidis* serogroup B (PRP-OMP) or tetanus toxoid (PRP-T). Three are monovalent Hib vaccines and two combine the Hib polysaccharide-conjugate with other antigens.

PRP-OMP (PedvaxHIB, Merck) is a monovalent Hib vaccine that is administered in a 2-dose primary series at 2 and 4 months of age. Monovalent PRP-OMP has been preferentially recommended for use in the primary series for AI/AN infants because it provides a protective antibody response after the first dose. Protection after the first dose is important in AI/AN infants because Hib disease in this group historically peaked at a younger age (4–6 months) compared to non-Native infants (6–7 months).[1]

Hib-containing Hexavalent Combination Vaccine

In 2018, the U.S. Food and Drug Administration licensed a hexavalent vaccine that combines diphtheria and tetanus toxoids and acellular pertussis (DTaP), inactivated poliovirus (IPV), Hib PRP-OMP, and hepatitis B (HepB) vaccines.[3] DTaP-IPV-Hib-HepB (Vaxelis, MSP Vaccine Company) is administered as a 3-dose series at ages 2, 4, and 6 months. Vaxelis contains PRP-OMP, but at a lower concentration than PedvaxHIB.[4] DTaP-IPV-Hib-HepB is not approved for the booster dose at age 12–15 months.

At that time, DTaP-IPV-Hib-HepB was not preferentially recommended for use in AI/AN infants because there were no data on the antibody response after the first dose.[3] However, a recently completed study in 333 Navajo Nation and Alaska Native infants found that antibody levels against PRP following the first dose of DTaP-IPV-Hib-HepB were non-inferior to that of monovalent PRP-OMP.[4]

Updated Hib Vaccine Recommendations for AI/AN Infants

In June 2024, ACIP recommended that a Hib vaccine primary series consisting of monovalent PRP-OMP (2 doses at ages 2 and 4 months) or DTaP-IPV-Hib-HepB (3 doses at ages 2, 4, and 6 months) is preferred for AI/AN infants.[5] For the Hib booster dose, there is no preferred vaccine formulation for AI/AN children; any Hib vaccine besides DTaP-IPV-Hib-HepB should be used.

Alaska Recommendations and Rationale

During the last 2 decades, the incidence of invasive Hib disease among AI/AN children in Alaska has remained well below its historic peak. However, the rates are still above those of non-Native Alaska children and the general U.S. population. Continued use of PRP-OMP-containing Hib vaccines is needed to achieve further reduction in invasive Hib disease among AI/AN children.

All children should receive Hib vaccine according to ACIP recommendations. Alaska healthcare providers may now use Vaxelis or PedvaxHIB for the Hib vaccine primary series for AI/AN children. Both vaccines are covered through private insurance, the Federal Vaccines for Children (VFC) program, and the Alaska Vaccine Assessment Program (AVAP). Clinicians may contact the Alaska Immunization Program at 907-269-8088 for more information.

References

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