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Bulletin No. 19 August 11, 2009

Four Cases of Invasive *Haemophilus influenzae* Type b – Southwestern Alaska, 2009

Background

First available in Alaska in 1991, *Haemophilus influenzae* type b (Hib) conjugate vaccine has resulted in one of the greatest public health successes of the last 25 years. Prior to vaccine availability, Hib was the most common cause of meningitis in children, and Alaska Native children aged <5 years experienced rates of Hib disease that were 6-fold higher than similarly aged children in the United States (400–700 vs. 60–100 cases per 100,000 persons, respectively).¹ The highest reported rate of Hib disease occurred in children from the Yukon-Kuskokwim (YK) Delta and Kotzebue, where 2–4% of infants experienced Hib disease in the first year of life.¹

Since routine vaccination was instituted, Hib disease rates in Alaska children have decreased by more than 95%. However, an analysis of Hib incidence from 2000–2006 revealed that Alaska Natives continue to experience substantially higher rates of Hib diseases compared to non-Native Alaskans (6.0 and 0.4 cases per 100,000 persons, respectively; Figure).² Since 2002, 11 of 14 (79%) Hib cases in children aged <10 years occurred in the YK Delta.

Age-appropriate vaccination coverage rates for Alaska Native children aged 3–27 months are reported quarterly through the Alaska Native Tribal Health Consortium Immunization Program, and have ranged from 72% to 88% since 2007. Although age-appropriate vaccine coverage rates for the YK Delta as a whole typically average 69% to 79%, coverage rates for villages where the cases occurred ranged from 28% to 67% since October 2008 (Source: YK Health Corporation Immunization Program).

2009 Hib Cases

The Arctic Investigations Program, Centers for Disease Control and Prevention (AIP-CDC) evaluates the epidemiology and nasal carriage of Hib among pediatric Hib cases, close contacts, and community controls (non-contacts) under the *Haemophilus influenzae* Rapid Response Investigation (HIRRI) protocol. Since May 14, 2009, four cases of Hib disease in children aged <10 years have been reported from the YK Delta region (Table).

Table. Hib Cases in Children Aged <10 Years — Alaska, 2009

Culture Date	Clinical Presentation	Past Medical History
5/14	Cellulitis	Hypogammaglobulinemia
5/25	Pneumonia	Recurrent respiratory infections
7/12	Pneumonia	Acute lymphoblastic leukemia
7/18	Bacteremia	None

All four children were Alaska Native and had uncomplicated infections. Three were hospitalized. Two children were more than 5 years old; both were immunocompromised (one had a history of hypogammaglobulinemia, and the other had

recently finished chemotherapy for acute lymphoblastic leukemia). Three of the children were fully vaccinated; the fourth, a 6-month old, was under-vaccinated, having received a first dose of PRP-T (ACTHib®) outside Alaska at age 3 months. A second dose had not yet been administered.

Discussion

These recent cases are a reminder that Hib bacteria are still circulating in Alaska. Transmission is increased when Hib vaccine coverage levels are low and the protective effect of herd immunity is diminished. Herd immunity is particularly important to protect persons, such as immunocompromised children, who may not respond as well to Hib vaccine.

The under-vaccinated child had received a Hib vaccine (ACTHib®) which does not induce protective antibody levels until the third dose. This case is a reminder of the importance of using PRP-OMP vaccine in Alaska, which has been demonstrated to induce protective antibody levels after the first vaccine dose.³ Fortunately, Alaska has been able to continue to provide PRP-OMP vaccine in spite of a recent national shortage of this vaccine.

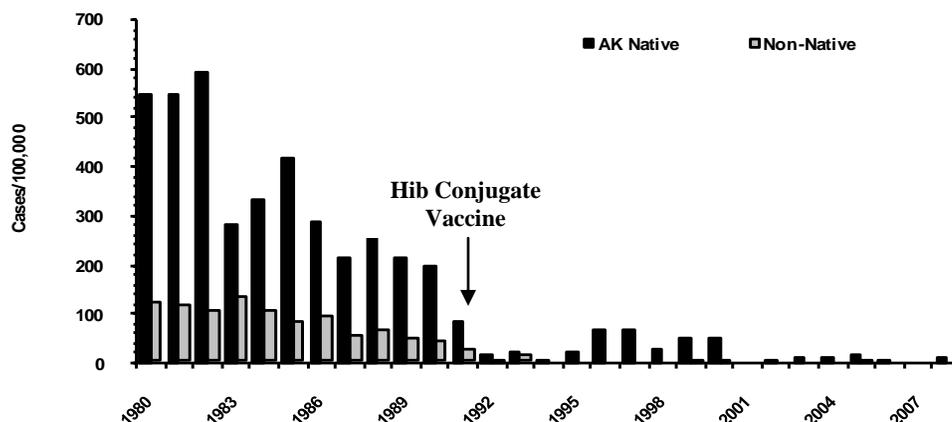
Recommendations

1. Ensure timely vaccination and maintenance of high vaccine coverage rates. In Alaska, three doses of PedvaxHIB® at ages 2, 4 and 12–15 months constitute a complete series. Dose 3 should not be given prior to age 12 months. Children receiving dose 1 at age ≥7 months require fewer doses to complete a series. Hib vaccine is not routinely recommended for children aged ≥5 years. A complete vaccination schedule for children age 0-6 years is available on-line at: http://www.epi.alaska.gov/bulletins/docs/b2009_04.pdf
2. Report cases of invasive *H. influenzae* to the Alaska Section of Epidemiology at 907-269-8000 or 800-478-0084 (after hours). All *H. influenzae* isolates should be sent to AIP-CDC where serotyping is performed. Call 907-729-3400 for shipping details.
3. Prophylaxis of contacts to a Hib case is recommended in certain circumstances and should be coordinated with the Alaska Section of Epidemiology.

References

1. Ward JI, Lum MK, Hall DB, Silimperi DR, Bender TR. Invasive *Haemophilus influenzae* type b disease in Alaska: background epidemiology for a vaccine efficacy trial. *J Infect Dis.* 1986;153:17-26.
2. Singleton R, Hammitt L, Hennessy T, et al. The Alaska *Haemophilus influenzae* type b experience: Lessons in controlling a vaccine-preventable disease. *Pediatrics* 2006;118:421-9.
3. Bulkow LR, Wainwright RB, Letson BW, Chang SJ, Ward JI. Comparative immunogenicity of four *Haemophilus influenzae* type b conjugate vaccines in Alaska Native infants. *Pediatr Infect Dis J.* 1993;120:484-492.

Figure. Invasive Hib Disease in Children Aged <5 Years — Alaska, 1980–2008



(Contributed by Rosalyn Singleton MD, Michael Bruce MD, Tammy Zulz MPH, AIP-CDC; and Joseph Klejka MD, Yukon-Kuskokwim Health Corporation.)