Northern Nevada Public Health | Epidemiology & Public Health Preparedness

May 20, 2024, Vol. 44, No. 14 (Page 1 of 2)

EPI-NEWS

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IN THIS ISSUE: INVASIVE *HAEMOPHILUS INFLUENZAE*

Invasive *Haemophilus influenzae*: Epidemiology, Clinical Features, and Vaccines

Introduction

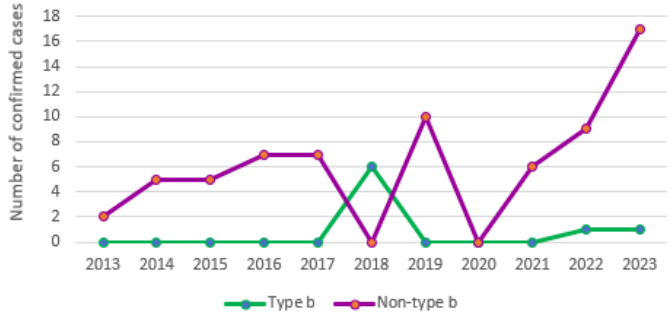
Haemophilus influenzae (*H. flu*) is a gram-negative coccobacillus that can cause illness ranging from mild otitis media to serious, life-threatening infections.[1] Serious infections arise when the bacteria invade a sterile site of the body, such as the blood or meninges.[2] Of the six serotypes of *H. flu* that have been identified (designated a-f), type b (Hib) was documented as the leading cause of bacterial meningitis and other invasive bacterial diseases in children under 5 in the pre-vaccine era.[3] The introduction of the Hib vaccine in 1987 for children and in 1990 for infants has had a significant impact on reducing the incidence of invasive Hib infection among children under 5 years of age in the United States.[2]

Epidemiology

Nationally, the incidence of Hib infection has decreased by 99% since the vaccine was introduced, making it a rare occurrence.[3] However, despite this decrease, cases of Hib infections still occur, from 2009 – 2018, 36 cases of Hib in patients <5 years old were reported.[3] Secondary cases of Hib are rare but do occur and are defined as illness occurring 1-60 days after contact with a case.[3] Attack rates are higher among household contacts under 4 years old (2.1%) and even higher among those under 12 month old (3%).[3] Individuals aged 65 and older have a higher case fatality ratio with *H. flu*, non-type b, and up to 20% of those who survive meningitis caused by *H. flu* may experience permanent hearing loss or other long-term neurological issues.[2] It underscores the importance of vaccination and continued vigilance in preventing and managing such infections.

Over the past decade (2013-2023), Northern Nevada Public Health (NNPH) has received an increase in reports of invasive *H. flu*. Since 2013, 75 cases of invasive *H. flu*, including both type b and non-type b, have been reported in Washoe County [Fig. 1]. Among these, eight cases have been confirmed as Hib. The number of non-type b *H. flu* cases has been historically higher over the past ten years than the number of invasive Hib cases, with the exception of 2018, the inverse was observed. An upward trend in non-type b cases has been observed since 2021, with an average of 10.7 cases per year since.

Figure 1: Incidence of invasive *H. influenzae* disease, Washoe County 2013-2023, type b and non-type b



Source: Northern Nevada Public Health

In situations such as intimate contact with a case in a home, an institution, or a daycare facility, communicability can be greater and result in secondary transmission or outbreaks. [3]

Treatment and Diagnosis

Secondary conditions that can be caused by Hib are meningitis, pneumonia, arthritis, bacteremia, and cellulitis, which may require hospitalizaiton.[3] The course of treatment for invasive disease is typically 10 days. Chemoprophylaxis is recommended for close contacts of Hib cases as the risk increases among unimmunized household contacts.[4]

The American Academy of Pediatrics recommends chemoprophylaxis for household contacts under the following circumstances:[4]

- Household with at least 1 child under 4 years old who is unvaccinated or under vaccinated.
- Household with a child under 12 months old who has not completed primary series.

- Households with immunocompromised child regardless of vaccination status.

Chemoprophylaxis is NOT recommended for the following:[4]

- Households with no children under 4 years of age.
- Households with all immunocompetent members and all have completed their series.
- Pregnant women.
- Preschool and childcare contacts of 1 index case.

Most common testing methods require serum or spinal fluid. All isolates of *H. flu* should be serotyped. Serotype-specific tests are conducted by Nevada State Public Health Laboratory (NSPHL) to determine type.

Vaccine

The Hib vaccine is one of the childhood vaccine recommendations. All infants should receive the primary series of Hib, either combination or monovalent.[3] The minimum age for administration is six weeks of age for routine Hib vaccination. There are three conjugate vaccines and two combination vaccines available [Figure 2].[3]

Figure 2: *Haemophilus influenzae* type b (Hib) Routine Vaccination Schedule[3]

Vaccine Type	Vaccine trade name	2 months	4 months	6 months	12 through 15 months
PRP-T	ActHIB	Dose 1	Dose 2	Dose 3	Booster
	Pentacel	Dose 1	Dose 2	Dose 3	Booster*
	Hiberix	Dose 1	Dose 2	Dose 3	Booster†
PRP-OMP	PedvaxHIB	Dose 1	Dose 2	—	Booster
	Vaxelis	Dose 1	Dose 2	Dose 3§	Not Indicated

*The recommended age for dose 4 of DTaP-IPV/Hib (Pentacel) is age 15 through 18 months, but it can be administered as early as 12 months, provided at least 6 months have elapsed since dose 3.
†The recommended age for dose 4 of Hib (PRP-T) (Hiberix) is age 15 months, but to facilitate timely booster vaccination, it may be administered as early as age 12 months.
§The recommended minimum age for dose 3 of DTaP-IPV-Hib-HepB (Vaxelis) is 24 weeks, the minimum age for completion of the hepatitis B vaccine series.

The number of doses for primary series depends on vaccine type.[3] The interval recommended between doses in the primary series is 8 weeks, with a minimum of 4 weeks and should be given at the same visit as other recommended vaccinations.[3]

Detailed information on number of doses, vaccine types, catch-up schedule, medical indications, and special circumstances can be found on the most recent vaccine schedule from the U.S. Department of Health and Human Services, updated in 2024. https://www.cdc.gov/vaccines/schedules/downloads/child/0-18yrs-child-combined-schedule.pdf

Reporting

All cases of invasive *H. influenzae* are reportable. The list of reportable communicable diseases and reporting forms can be found at: **http://tinyurl.com/WashoeDiseaseReporting**

Report communicable diseases to the Washoe County Health District. To report a communicable disease, please call 775-328-2447 or fax your report to the WCHD at 775-328-3764.

Acknowledgement

Thank you to all health care providers, infection control practitioners, laboratory staff, as well as schools and daycares for their reporting and collaboration to make this work possible.

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