


Centers for Disease Control and Prevention  
National Center for Immunization and Respiratory Diseases



## ***Haemophilus influenzae* Type b and Hib Vaccine**

September 2018

Chapter 8

National Center for Immunization & Respiratory Diseases  
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### ***Haemophilus influenzae***

- Severe bacterial infection, particularly among infants
- Aerobic gram-negative bacteria
- Polysaccharide capsule
- 6 different serotypes (a-f) of polysaccharide capsule
- 95% of invasive disease caused by type b (prevaccine era)

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### **Impact of *Haemophilus influenzae* Type b Disease**

- Formerly the leading cause of bacterial meningitis among children younger than 5 years of age
- Approximately 1 in 200 children developed invasive Hib disease
- Almost all infections among children younger than 5 years

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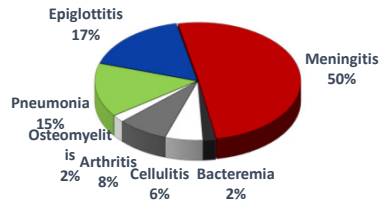
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**Haemophilus influenzae Type b Clinical Manifestations\***



\*Prevaccine era

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Hib facial cellulitis

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**Haemophilus influenzae Type b Epidemiology**

<b>Reservoir</b>	Human asymptomatic carriers
<b>Transmission</b>	Respiratory droplets presumed
<b>Temporal pattern</b>	Peaks in September-December and March-May
<b>Communicability</b>	Generally limited but higher in some circumstances (e.g., household, child care)

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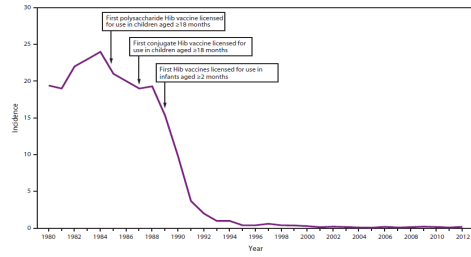
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**Estimated Annual Incidence (per 100,000) of Invasive *Haemophilus influenzae* Type b (Hib) Disease in Children Aged <5 Years — United States, 1980–2012**



MMWR 2014;63(8):11-14.

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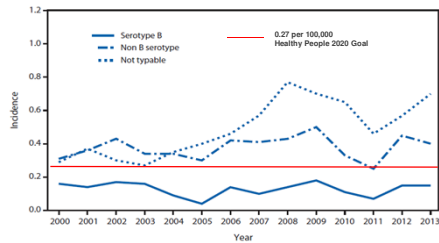
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***Haemophilus influenzae*, Invasive Disease**  
Incidence of Reported Cases (per 100,000), by Serotype Among Children Aged <5 Years — United States, 2000–2013



MMWR 2015;62(53):1-119.

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***Haemophilus influenzae* Type b Polysaccharide Vaccine**

- Available 1985-1988
- Not effective in children younger than 18 months of age
- Efficacy in older children varied
- Age-dependent immune response
- Not consistently immunogenic in children 2 years of age and younger
- No booster response

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### Haemophilus influenzae Type b Conjugate Vaccines

- Conjugation improves immunogenicity
  - Immune response with booster doses
- Same polysaccharide capsule linked to different carrier proteins
- 3 monovalent conjugate vaccines
- 1 combination vaccine available that contains Hib vaccine

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### Conjugate Hib Vaccines

- PRP-T
  - ActHIB
  - Hiberix
  - Pentacel
- PRP-OMP
  - PedvaxHIB

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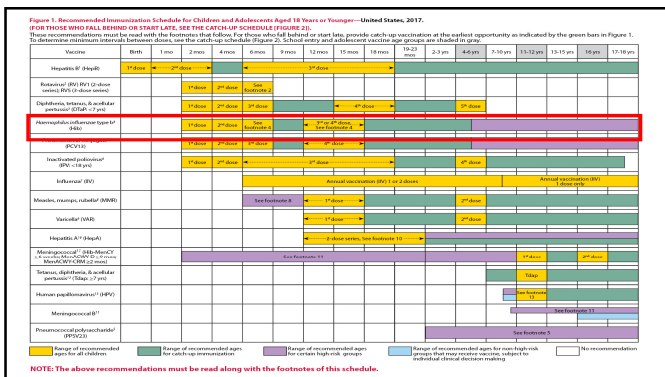
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### Hib Vaccine

Vaccine	Birth	1mo	2mos	4mos	6mos	9mos	12mos	15mos	18mos	19-23 mos	2-3 yrs	4-6 yrs	7-10 yrs	11-12 yrs	13-15 yrs	16-18 yrs
<b>Hemophilus influenzae type b (Hib)</b>			1 dose	2 <sup>nd</sup> dose	3 <sup>rd</sup> dose	4 <sup>th</sup> dose	5 <sup>th</sup> dose	6 <sup>th</sup> dose	7 <sup>th</sup> dose	8 <sup>th</sup> dose	9 <sup>th</sup> dose	10 <sup>th</sup> dose	11 <sup>th</sup> dose	12 <sup>th</sup> dose	13 <sup>th</sup> dose	14 <sup>th</sup> dose

- Recommended interval 8 weeks for primary series
- Minimum interval 4 weeks for primary series
- Minimum age 6 weeks
- Booster dose at 12-15 months

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### Hib Vaccine Routine Schedule

Vaccine	2 months	4 months	6 months	12-18 months
PRP-T	X	X	X	X
PRP-OMP	X	X	NA	X

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### Unvaccinated Children 7 months of Age and Older

- Children starting late may not need entire 3- or 4-dose series
- Number of doses child requires depends on current age
- See detailed schedule p. 128 of Pink Book and 2018 catch-up schedule

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### Hib Vaccine Use in Older Children and Adolescents

- Generally not recommended for persons older than 59 months of age
- High-risk older children and adolescents may be vaccinated if not vaccinated in childhood
  - Asplenia
  - Elective splenectomy
  - Immunodeficiency
  - HIV infection
  - Receipt of chemotherapy or radiation therapy
- Special populations

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### Special Populations

- Children aged <24 months with invasive Hib disease
  - Administer complete series as recommended for child's age
  - Vaccinate during the convalescent phase of the illness
- American Indian/Alaska Natives
  - PRP-OMP vaccines specifically recommended for primary series doses
  - Hib disease peaks earlier in infancy
  - PRP-OMP vaccines produce protective antibody after first dose/early protection

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### Monovalent Hib Vaccines

- ActHIB (PRP-T)
- Hiberix (PRP-T)
- PedvaxHIB (PRP-OMP)

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**ActHIB (PRP-T)**

- Approved for all doses of primary schedule and booster dose
- Can be used for previously unvaccinated children per the catch-up schedule
- Must be reconstituted only with 0.4% sodium chloride (NaCl) ActHIB diluent

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**Hiberix (PRP-T)**

- Approved for all doses of primary schedule and booster dose
- Can be used for previously unvaccinated children per the catch-up schedule

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**PedvaxHIB (PRP-OMP)**

- Approved for all doses of primary schedule and booster dose
  - Remember - primary series for PRP-OMP vaccines is 2 doses
- Can be used for previously unvaccinated children per the catch-up schedule

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### Hib-Containing Combination Vaccines

- DTaP-IPV/Hib (Pentacel)

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### Pentacel

- Contains DTaP, Hib (PRP-T), and IPV
- Approved for doses 1 through 4 among children 6 weeks through 4 years of age
- Do NOT use for children 5 years or older
- Package contains lyophilized Hib (ActHIB) that is reconstituted with a liquid DTaP-IPV solution

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### Hib Vaccine Interchangeability

- All monovalent conjugate Hib vaccines are interchangeable for primary series and booster dose
- 3-dose primary series (4 doses total) if more than one brand of vaccine used at 2 or 4 months of age
- Whenever feasible use same combination vaccine for subsequent doses
- If vaccine used for earlier doses is not known or not available, any brand may be used to complete the series

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### Contraindications and Precautions

- Severe allergic reaction to vaccine component or following previous dose
- Moderate to severe acute illness
- Age younger than 6 weeks

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### Vaccine Administration Hib-containing Vaccines

- Preparation:
  - ActHIB and Pentacel must be reconstituted BEFORE administering
  - PedvaxHib: None
- Route: IM injection
  - Needle gauge: 23–25 gauge
  - Needle length\*: 1–1.5 inch depending on the patient’s age and/or weight
- Site\*:
  - 6 weeks through 11 months: Vastus lateralis muscle
  - 1 through 3 years: Vastus lateralis muscle is preferred; deltoid muscle may be used if the muscle mass is adequate
  - 4 years and older: Deltoid muscle is preferred; vastus lateralis muscle may be used
- Vaccine administration error:
  - Preparation error: Wrong diluent used to reconstitute ActHIB or Pentacel

\*Professional judgement should be used to determine the proper needle length and site. Influencing factors include injection technique, local reaction, number of vaccines to be administered, patient age, size, and muscle mass.

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### Hib Vaccine Adverse Reactions

- Swelling, redness, or pain in 5%-30% of recipients
- Systemic reactions infrequent
- Serious adverse reactions rare

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### Vaccine Storage and Handling

- Store Hib-containing vaccines in a refrigerator between 2°C -- 8°C (36°F -- 46°F)
- Store Hib-containing vaccines:
  - In the original packaging with the lids closed
  - In a clearly labeled bin and/or area of the storage unit
- Store Pentacel diluent (DTaP-IPV) in the refrigerator with the ActHIB vaccine
- Do not freeze vaccine or diluent

**Hib (ActHIB)**

Age: 6 weeks through 4 years

Use for: Any dose in the series

Route: Intramuscular (IM) injection

**Reconstitute Hib powder ONLY with manufacturer supplied 0.9% sodium chloride diluent**

Inject (or Use Free and Immediately after reconstitution, store at 2°C to 8°C (36°F to 46°F) and discard if not used within 24 hours. Do not use after expiration. Do not use if the powder is clumpy or if the powder is dark in color.

**Hib (ProvacHIB)**

Age: 6 weeks through 4 years

Use for: Any dose in the series

Route: Intramuscular (IM) injection

Visit supplier website here

**Hib (Hiberix)**

Age: 6 weeks through 4 years

Use for: Any dose in the series

Route: Intramuscular (IM) injection

**Reconstitute Hib powder ONLY with manufacturer supplied 0.9% sodium chloride diluent**

Inject (or Use Free and Immediately after reconstitution, store at 2°C to 8°C (36°F to 46°F) and discard if not used within 24 hours. Do not use after expiration. Do not use if the powder is clumpy or if the powder is dark in color.

**Hib-HepB (Comvax)**

Age: 6 weeks through 4 years

Use for: Hib: Any dose in the series  
HepB: Any dose in the series

**Do NOT use for Hib birth dose**

Route: Intramuscular (IM) injection

Visit supplier website here

Vaccine storage label examples  
Available at [www.cdc.gov/vaccines/hcp/admin/storage/guide/vaccine-storage-labels.pdf](http://www.cdc.gov/vaccines/hcp/admin/storage/guide/vaccine-storage-labels.pdf)

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### What Do You Think?

Callie is a healthy 2-year-old coming for a well-child visit. Her immunization history indicates she has received 2 doses of Hib vaccine—the first at 10 months and a second at 15 months of age. Do you administer Hib vaccine today?

- Yes
- No

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PLEASE PLACE QUESTIONS IN THE BASKET

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