Haemophilus influenzae Type b (and Beyond): from Disease Burden to Disease Prevention

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Disclosures

- **No disclosures or conflicts of interest to report**

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Learning Objectives

- **By the end of this webinar, participants will be able to:**
  - **Describe the burden, transmission, and clinical manifestations of Hib disease**
  - **Describe the appropriate methods for testing and diagnosis of Hib disease**
  - **Identify populations at increased risk for Hib infection and severe disease**
  - **Discuss current Hib vaccination recommendations, schedules, and catch-up guidance**

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In the pre-vaccine era, which of the following organisms resulted in the greatest number of INFECTIONS in the United States?

A. *Corynebacterium diphtheriae* (Diphtheria)
B. Rubeola virus (Measles)
C. *Bordetella pertussis* (Pertussis)
D. *Haemophilus influenzae* type b (invasive disease)
E. *Clostridium tetani* (Tetanus)

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In the pre-vaccine era, which of the following organisms resulted in the greatest number of INFECTIONS in the United States?

A.	*Corynebacterium diphtheriae* (Diphtheria)	[~21,000]
B.	Rubeola virus (Measles)	[~530,000]
C.	*Bordetella pertussis* (Pertussis)	[~200,000]
D.	*Haemophilus influenzae* type b (invasive disease)	[~20,000]
E.	*Clostridium tetani* (Tetanus)	[~580]

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Comparison of 20th Century Annual Morbidity and Current Morbidity: Vaccine-Preventable Diseases

Disease	20th Century Annual Morbidity†	2025 Reported Cases † †	Percent Decrease
Smallpox	29,005	0	100%
Diphtheria	21,053	0	100%
Measles	530,217	1,975	> 99%
Mumps	162,344	336	> 99%
Pertussis	200,752	28,132	86%
Polio (paralytic)	16,316	0	100%
Rubella	47,745	0	100%
Congenital Rubella Syndrome	152	1	99%
Tetanus	580	37	94%
Haemophilus influenzae	20,000	21*	> 99%

† JAMA. 2007;298(18):2155-2163

† † CDC. National Notifiable Diseases Surveillance System, Weekly Tables of Infectious Disease Data. Atlanta, GA. The Office of Public Health Data, Surveillance, and Technology (OPHDST). Available at: Weekly statistics from the National Notifiable Diseases Surveillance System (cdc.gov). Data submitted (U.S. Residents, excluding U.S. Territories) through Dec 27, 2025; accessed on Feb 24, 2026; diphtheria and polio case counts reported by CDC Program.

**Haemophilus influenzae* type b (Hib) < 5 years of age. An additional 7 cases of Hib are estimated to have occurred among the 161 notifications of *Haemophilus influenzae* (< 5 years of age) with unknown serotype.

2/25/2026

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CDC

In the pre-vaccine era, which of the following organisms resulted in the greatest number of DEATHS in the United States?

A. *Corynebacterium diphtheriae* (Diphtheria)
B. Rubeola virus (Measles)
C. *Bordetella pertussis* (Pertussis)
D. *Haemophilus influenzae* type b (invasive disease)
E. *Clostridium tetani* (Tetanus)

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In the pre-vaccine era, which of the following organisms resulted in the greatest number of DEATHS in the United States?

A.	*Corynebacterium diphtheriae* (Diphtheria)	[~1,800; CFR ~8.5%]
B.	Rubeola virus (Measles)	[~440; CFR ~0.08%]
C.	*Bordetella pertussis* (Pertussis)	[~4,000; CFR ~2%]
D.	*Haemophilus influenzae* type b (invasive disease)	[~1,000; CFR ~5%]
E.	*Clostridium tetani* (Tetanus)	[~470; CFR ~81%]

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Haemophilus influenzae: History - 1

- First described by Richard Pfeiffer in 1892
- Initially thought to be cause of clinical syndrome “influenza”
- Given the name Haemophilus in 1920 (Winslow et al.)
- Haima (“blood” from Greek); Philos (“loving” or “friend” from Greek)
- Organism requires blood-containing media for growth in laboratory cultures

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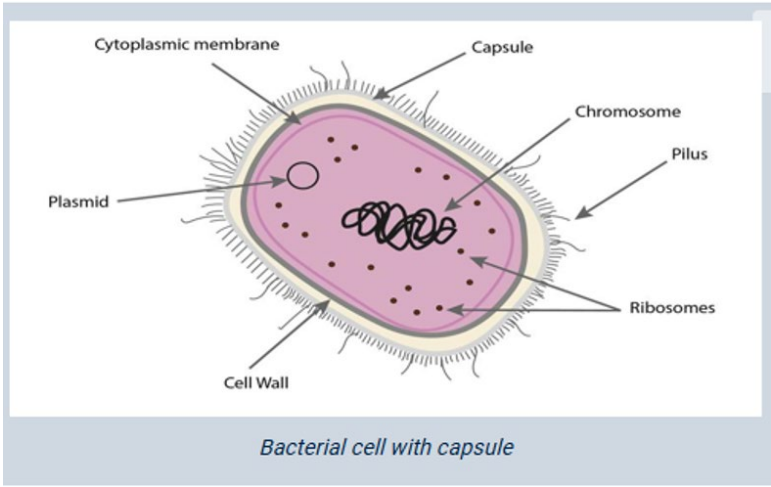
Haemophilus influenzae: History - 2

- In 1933 influenza determined to be caused by a virus and not *H. influenzae*
- Also in the 1930s, Dr. Margaret Pittman showed that the organism occurred in both encapsulated and unencapsulated forms
- She also found that the vast majority of isolates obtained from the cerebrospinal fluid were encapsulated (and specifically, were capsular type b)
- Dr. Margaret Pittman was a bacteriologist who worked for many years at the National Institutes of Health and was the first woman to lead an NIH laboratory

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Haemophilus influenzae (the organism)

- Gram-negative bacterium (coccobacillus)
- An obligate human pathogen; no animal reservoir or environmental niche
- Six encapsulated serotypes (a–f) plus nontypeable (unencapsulated) strains —



Bacterial cell with capsule

Haemophilus Influenzae | maidenlab
(https://maidenlab.zoo.ox.ac.uk/ihaemophilus-influenzaei#!)

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Why is *H. influenzae* a Strictly Human Pathogen?

- Cannot make siderophores (small molecules to find and strip iron from a host)
- Must strip iron directly from host iron-carrier proteins (e.g., transferrin)
- Specific receptors for this task
- Has a specific surface protein to capture heme from human hemopexin
- Secretes specific endopeptidases allowing it to cleave IgA and invade human respiratory epithelial cells
- Surface adhesin targets sialic acid form expressed in humans
- Organism decorates itself with host sialic acid to evade immune system

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Where Does *H. influenzae* live in the human host?

- Organism has adapted for invasion and colonization of respiratory epithelial cells
- Primarily colonizes the nose and throat, especially of young children
- Also found in the urogenital tract of women and less commonly in the male urethra
- A specific biogroup can also colonize the conjunctiva
- Can be found in other body sites and tissues at time of disseminated disease

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What are *H. influenzae*'s Virulence Factors?

- IgA1 protease – cleaves IgA
- Outer membrane protein – involved in adhesion
- Pili and non-pilus adhesins – instrumental in host cell attachment
- Lipooligosaccharide – mediates inflammation and damage to cilia; can vary and mimic host glycolipids to evade immune system recognition
- Biofilm formation – a mechanism of organism persistence

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The Capsule of *Haemophilus influenzae*

- A polysaccharide structure external to the outer membrane
- Six distinct (biochemically and antigenically) capsular polysaccharides (a through f)
- Synthesis and transport of capsule similar to that seen with *E. coli* K1 and *Streptococcus agalactiae* (group B strep)
- Important in limiting phagocytosis by neutrophils and macrophages
- Inhibits deposition of complement, inhibiting complement-mediated killing
- Decreases bloodstream clearance by immune system and facilitates crossing of blood-brain barrier and invasion of the central nervous system

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What is the primary route of transmission of *Haemophilus influenzae* from one person to another?

A. Blood/body fluids
B. Fecal-oral
C. Respiratory droplets
D. Small, airborne particles

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Haemophilus influenzae (transmission and colonization)

- Spread person-to-person via respiratory droplets or direct contact with respiratory secretions
- Neonates may acquire infection intrapartum by aspirating amniotic fluid or contacting genital secretions
- Colonization varies by age and social demographics and varies over time
- 20 to 80% of children will be colonized during the first 5 years of life; 5-20% will be colonized at any given point in time
- Prevalence of colonization is lower in adults than in children
- Women of childbearing age have a colonization prevalence of <1 to 5%
- Pregnant women, however, are at increased risk of infection with the organism and infection has been associated with early pregnancy loss

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What Illnesses are Caused by *H. influenzae*?

- Most commonly, colonization is associated with no symptoms
- Symptomatic illnesses primarily involve the upper respiratory tract (e.g., otitis media, sinusitis)
- Invasive disease includes pneumonia, bacteremia, and meningitis
- Traditionally, type B associated with periorbital cellulitis, facial cellulitis, epiglottitis, and meningitis
- In pregnancy, can result in bacteremia/septicemia, with hematogenous spread to fetus resulting in fetal death or prematurity

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What is so Special about Type B?

- Simply put, the capsule (polyribosylribitol phosphate – PRP)
- Dense polysaccharide coat that sterically hinders complement deposition and phagocyte recognition
- Better limits complement-mediated killing
- Survives longer in the bloodstream, allowing seeding of other tissue including the meninges after crossing the blood-brain barrier
- PRP is a T-cell independent antigen, so does not elicit effective antibody response or immunological memory in young children

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From: **Haemophilus influenzae Infections**

Red Book: 2024–2027 Report of the Committee on Infectious Diseases, 2024



Figure Legend:

A 10-month-old with **periorbital cellulitis** caused by *Haemophilus influenzae* type b. Copyright Martin G. Myers, MD

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Red Book: 2024–2027 Report of the Committee on Infectious Diseases, 2024



Figure Legend:

A 6-month-old with acute **cellulitis of the face** caused by *Haemophilus influenzae* type b. Courtesy of George Nankervis, MD

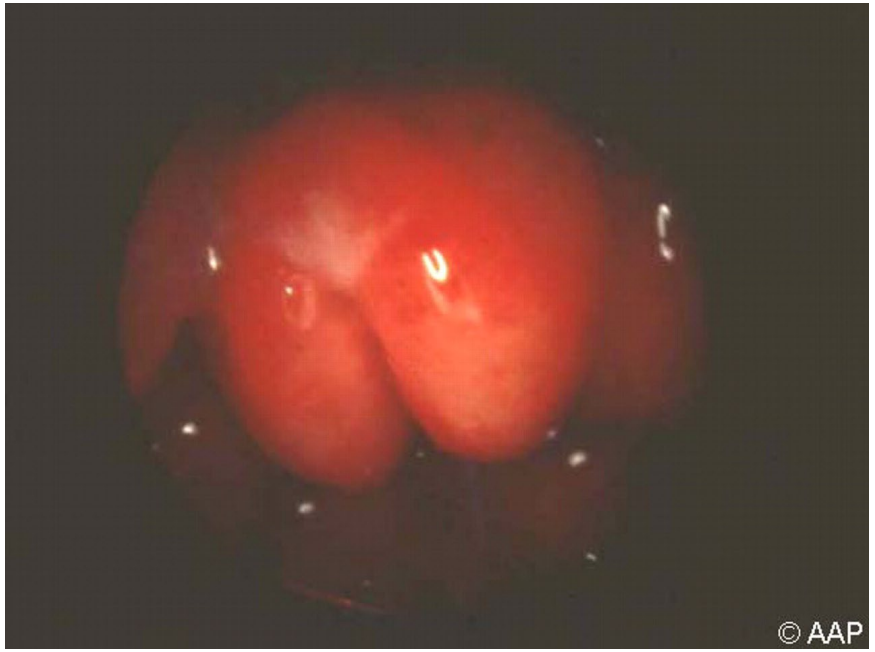
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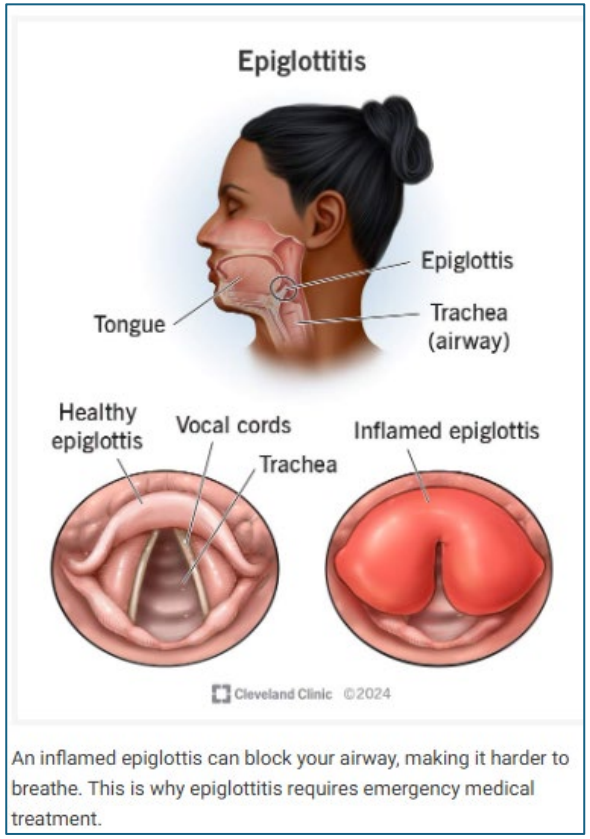
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Epiglottitis: Symptoms, Causes & Treatment
(https://my.clevelandclinic.org/health/diseases/17844-epiglottitis)

Figure Legend:

Acute Haemophilus influenzae type b epiglottitis with striking erythema and swelling of the epiglottis. Courtesy of Edgar O. Ledbetter, MD, FAAP

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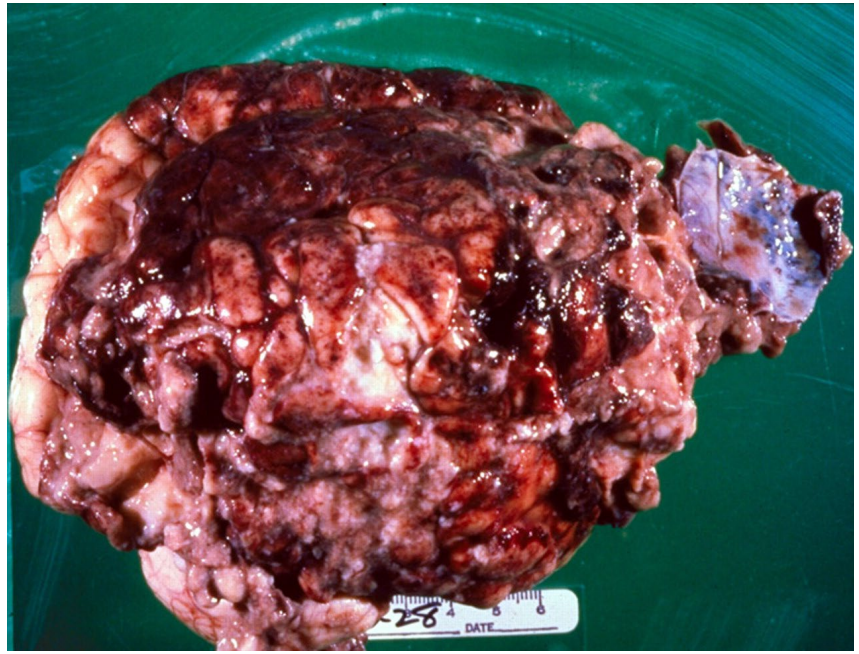


Figure Legend:

Haemophilus influenzae **meningitis** in a 4-month-old, who was evaluated in the morning for a well-child visit with normal clinical findings. By afternoon, the infant had necrosis of the hands and feet, and the infant died 12 hours later. This is the brain of the infant 24 hours after the well-child visit. No immunologic deficit was diagnosed. Copyright Jerri Ann Jenista, MD

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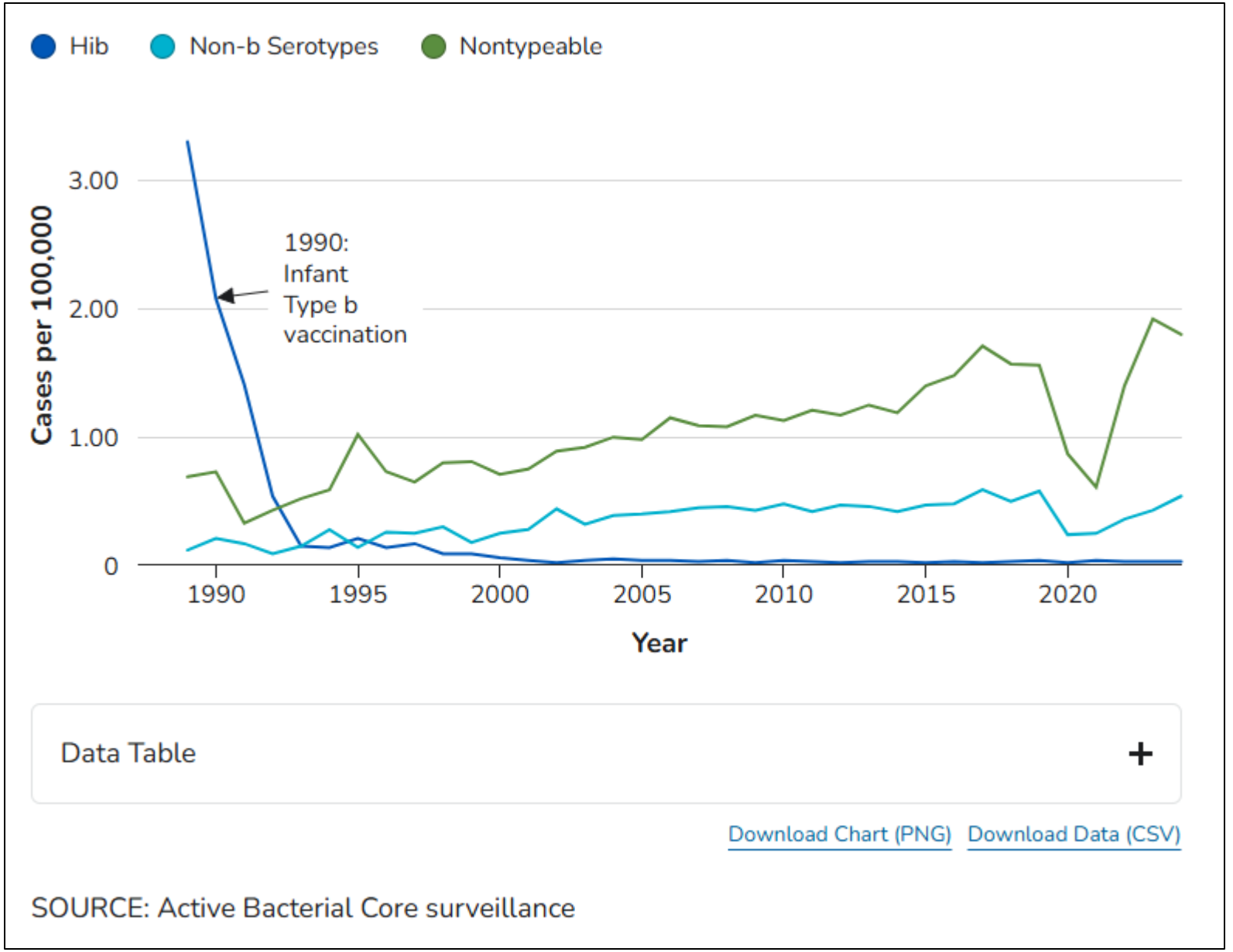
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Haemophilus influenzae type B

- Prior to introduction of vaccines, *Haemophilus influenzae* type B (Hib) was the primary cause of invasive bacterial infections in the United States among children less than 5 years of age
- Annually, around 20,000 cases of invasive Hib infection occurred, with approximately 60% being meningitis cases
- Case fatality rate with invasive Hib disease was 3-6% (i.e., 600-1200 deaths per year)
- 15-30% of meningitis survivors had hearing impairment or neurologic sequelae

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Recent Data from CDC Active Bacterial Core Surveillance

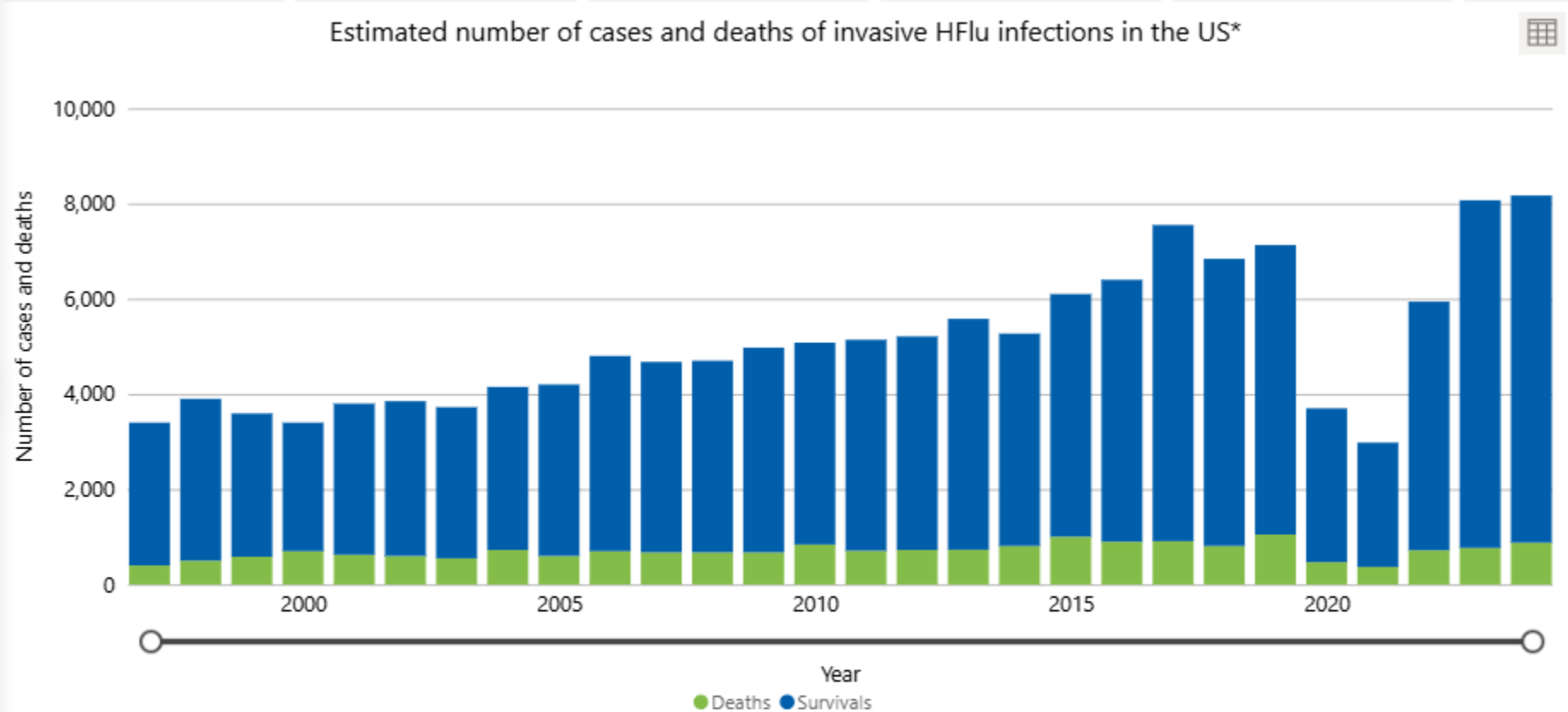
- Invasive Hib disease is now rare in the US: 27 cases reported in children <5 years in 2024
- However, rates of invasive disease, all ages, all serotypes, higher in 2023 and 2024 than in any year since 2000

INVASIVE *H. influenzae* DISEASE, ALL AGES, ALL SEROTYPES			
YEAR	CASES	DEATHS	CASE FATALITY RATE
2023	8070	770	9.5%
2024	8170	880	10.8%

H. Influenzae SYNDROMES, 2023 and 2024		
SYNDROME	2023	2024
Bacteremia with pneumonia	54.1%	56.2%
Bacteremia without focus	19.8%	17.2%
Meningitis	8.9%	8.8%
Other	14.8%	15.7%
Unknown	3.3%	3.3%

ABCs Bact Facts Interactive Data Dashboard | ABCs | CDC (https://www.cdc.gov/abcs/bact-facts/data-dashboard.html

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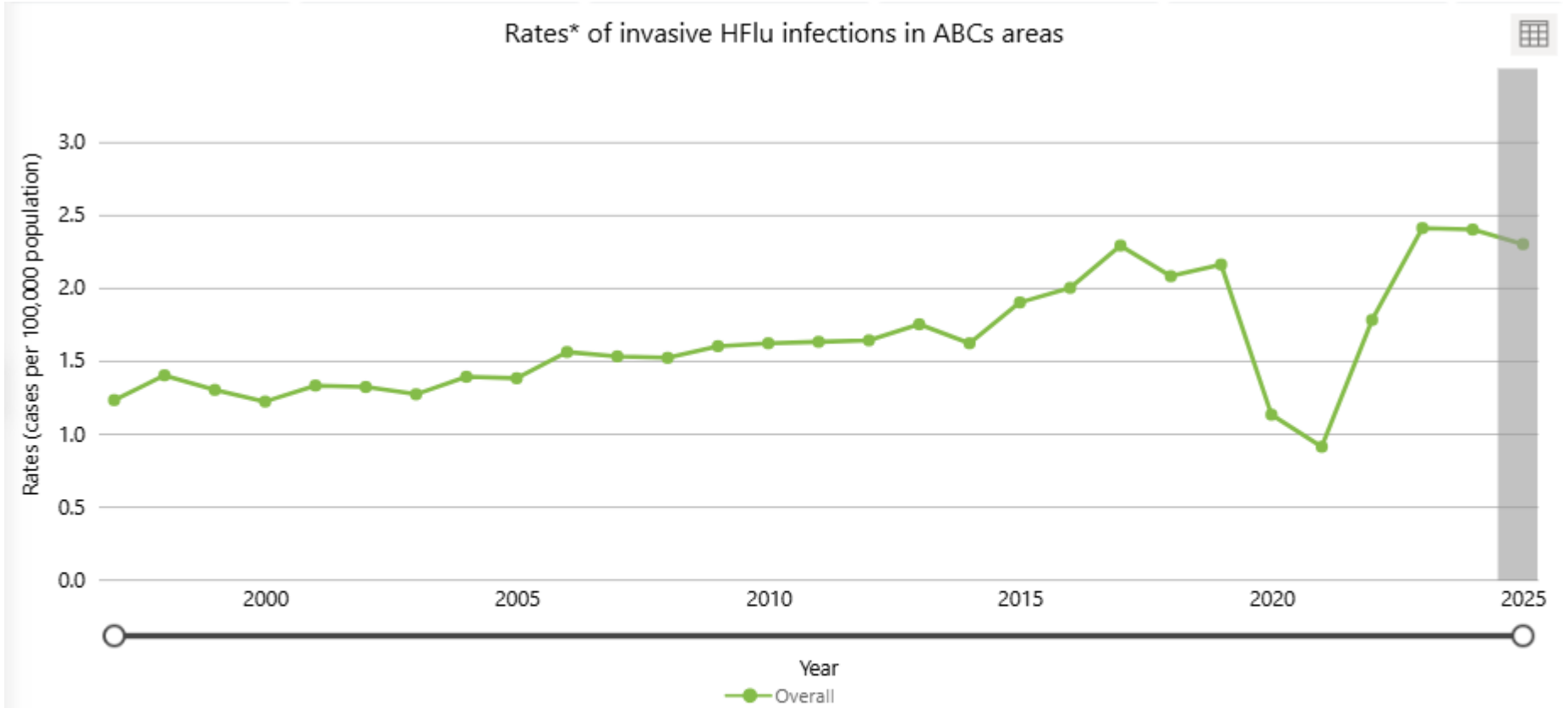


*Race and age-specific rates of disease and deaths were applied from the aggregate surveillance area to the age and racial distribution of the United States population for a given year.

Note

- Methods, such as the way missing data are taken into account, have changed over time. ABCs reports describe the specific methodology used for each year by bacterium.
- Surveillance areas have changed over time.

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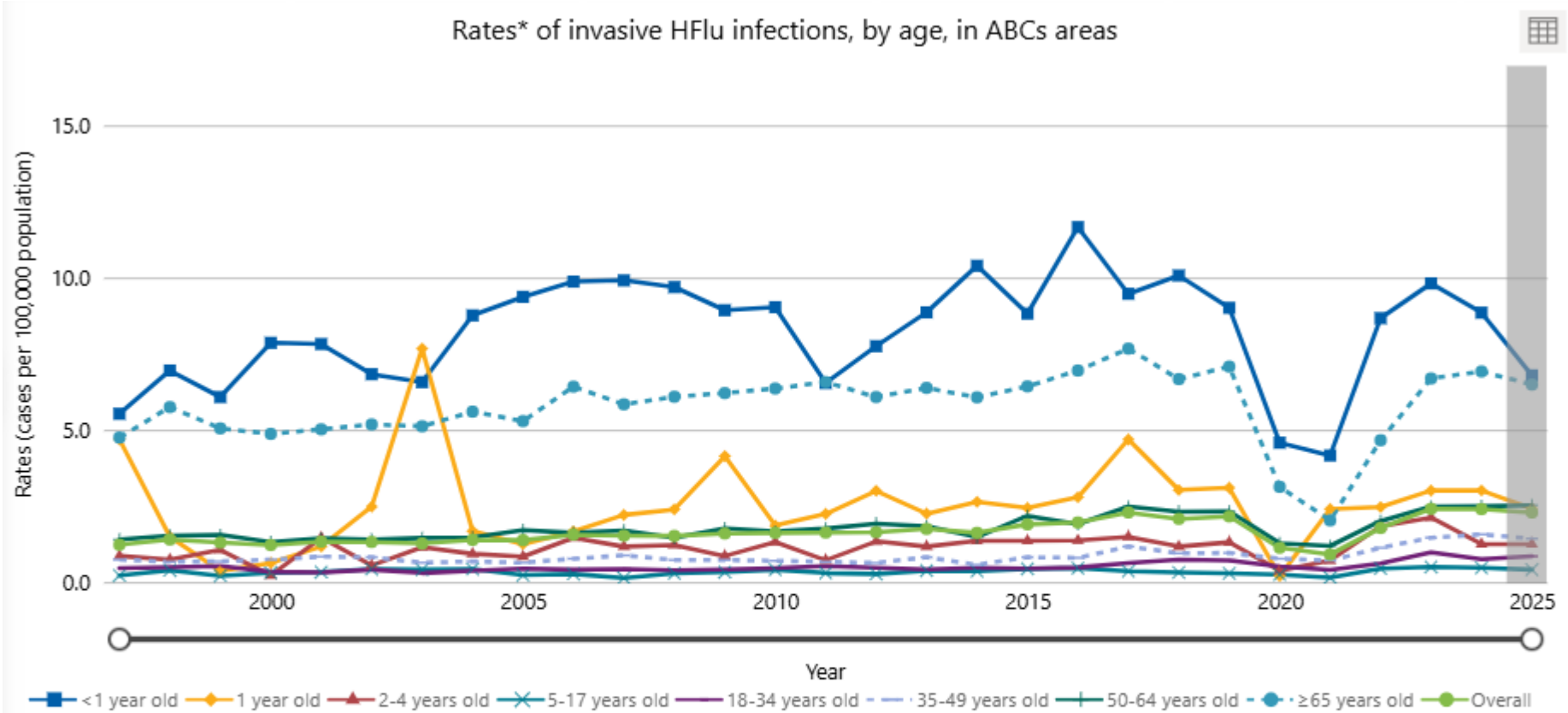
*Rates are calculated as cases per 100,000 population.

**Prior to 2021, bridged race categories were used to report rates by race. Beginning in 2021, rates are reported using unbridged race categories. Read more about race bridging.

Note

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Note

- Methods, such as the way missing data are taken into account, have changed over time. ABCs reports describe the specific methodology used for each year by bacterium.
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Which of the following age groups has the greatest risk of mortality with invasive *Haemophilus influenzae* disease?

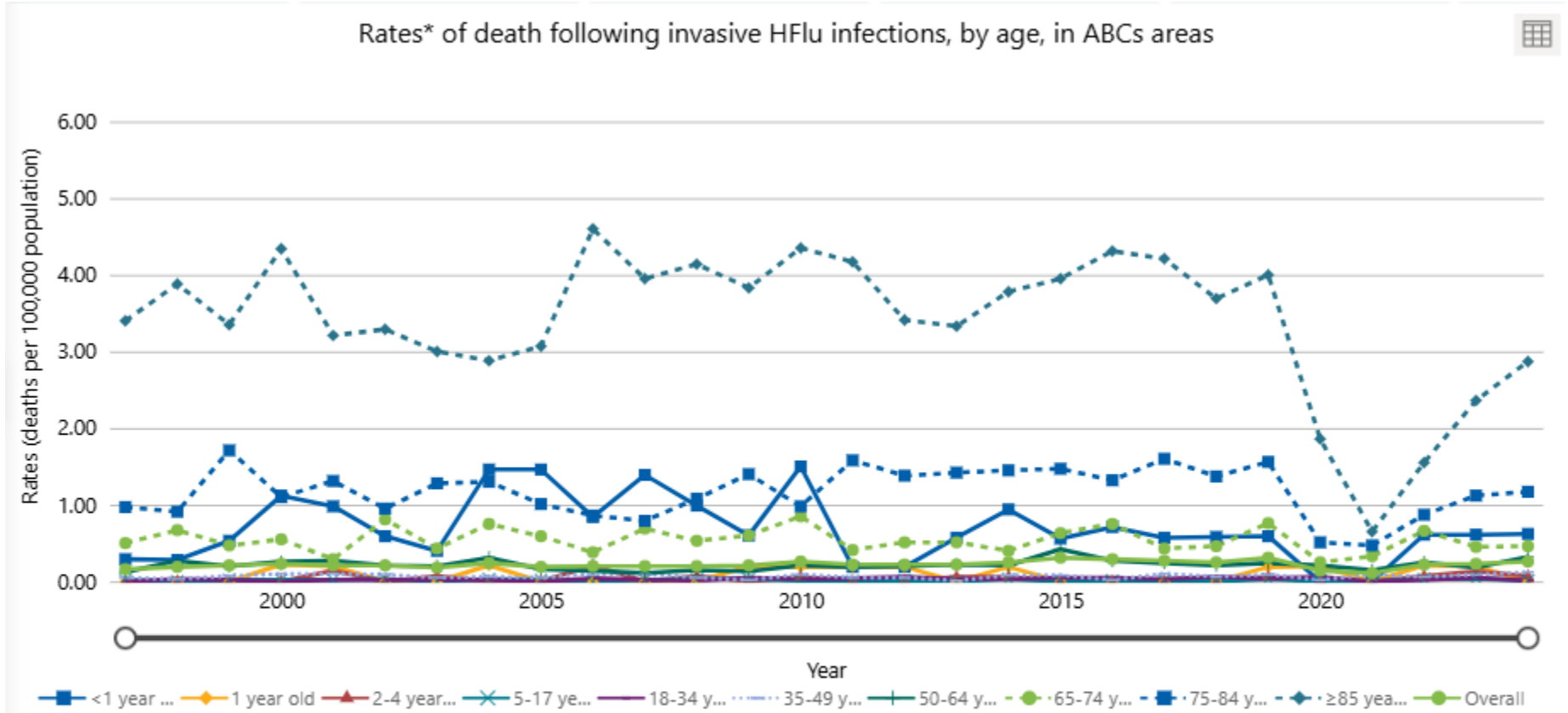
A. < 1 year
B. 12-23 months
C. 65-74 years
D. ≥75 years

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D. ≥75 years

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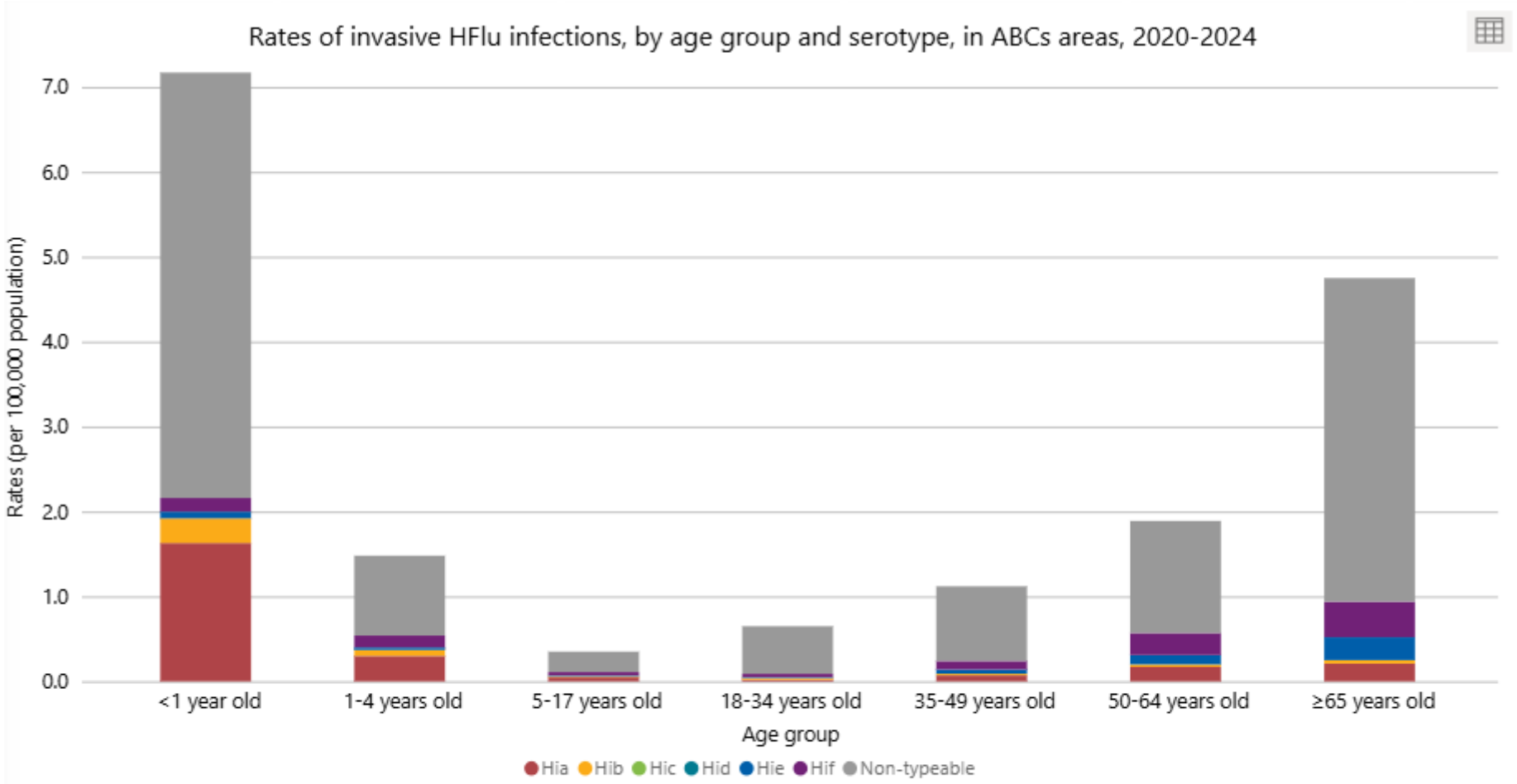


*Rates of death are calculated as deaths per 100,000 population.

Note

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- Surveillance areas have changed over time.

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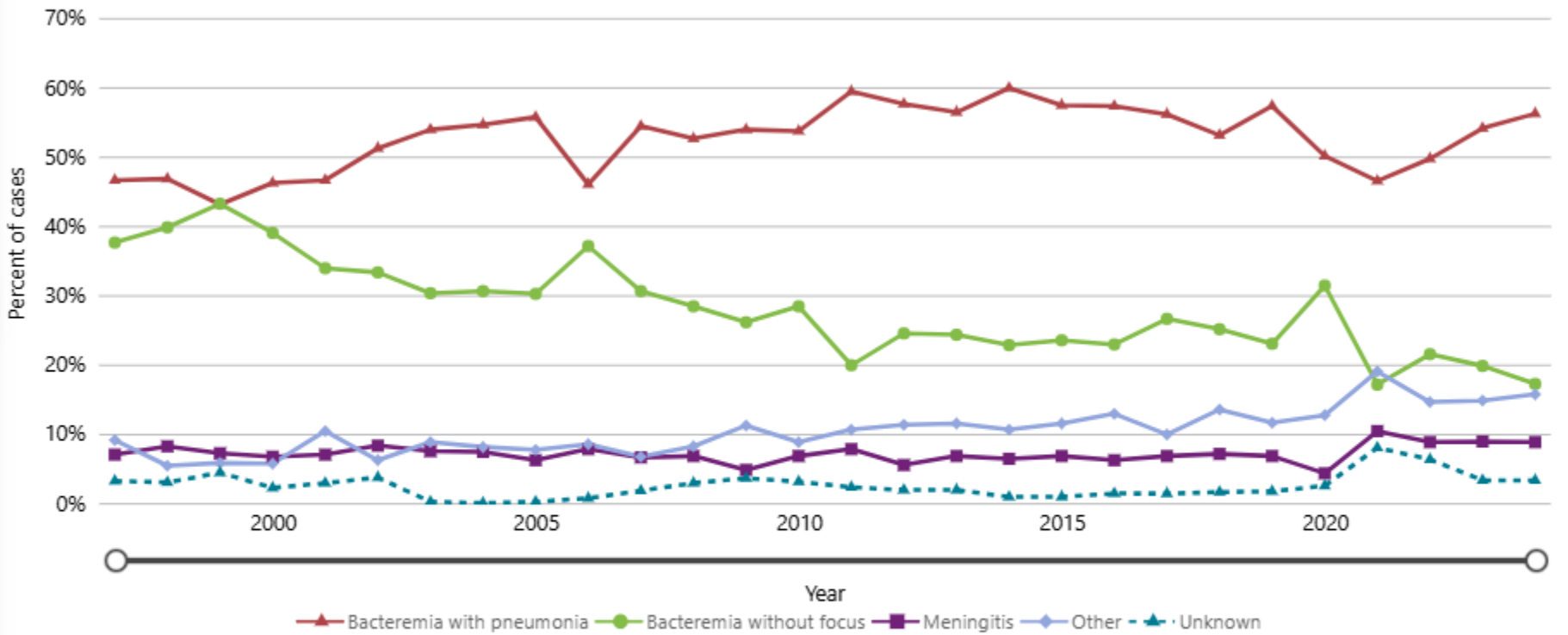
Note

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ABCs Bact Facts Interactive Data Dashboard | ABCs | CDC (https://www.cdc.gov/abcs/bact-facts/data-dashboard.html)

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Percent of invasive HFlu infections with select syndromes in ABCs areas



Note

- Cases might have more than one syndrome (e.g., a case with both pneumonia and meningitis in the same individual) and are included in calculations for each syndrome. Information on how syndromes are defined can be found under the Methodology section.
- Bacteremia without focus cases are those in persons who had a positive blood culture but no other clinical syndrome identified (e.g., pneumonia, meningitis).
- Methods, such as the way missing data are taken into account, have changed over time. ABCs reports describe the specific methodology used for each year by bacterium.
- Surveillance areas have changed over time.

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Risk Factors for Invasive Disease with *H. influenzae*

- Age
  - Age <5 years, and especially those 6-23 months of age, at highest risk of Hib disease
  - Age <1 year and ≥65 years at highest risk for any *H. influenzae* invasive disease (including all serotypes and nontypeable strains)
- Vaccination status
  - Unvaccinated children at highest risk of invasive disease
- Medical conditions
  - Sickle cell disease
  - Asplenia
  - Immunocompromise (e.g., HIV, receiving chemotherapy)

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Haemophilus influenzae (treatment)

- For treatment of otitis media, given higher binding affinity for the penicillin-binding-protein 3 of the organism, high-dose amoxicillin is generally effective
- For meningitis, a 3rd generation cephalosporin is recommended given recognized potential for ampicillin resistance
- For post-exposure prophylaxis, rifampin is recommended for clearance given the high tissue concentrations of the drug achieved in the nasopharynx (20 mg/kg/dose daily x 4 days)

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For which of the following is chemoprophylaxis (for prevention of disease) recommended after exposure to invasive disease with *Haemophilus influenzae* type b?

A. 10-month-old child who has completed the primary Hib vaccine series
B. 23-month-old child who has completed the primary Hib vaccine series but has not had a booster dose
C. 2-year-old child in daycare facility where a case of invasive Hib disease is identified
D. Healthcare worker who obtains vitals on a 4-year-old masked child with a cough and subsequent diagnosis of invasive Hib

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Haemophilus influenzae
(chemoprophylaxis in context of invasive Hib disease)

- **Chemoprophylaxis recommended**
- **For all household contacts in the following circumstances:**
  - **Household with at least 1 child younger than 4 years who is unimmunized or incompletely immunized**
  - **Household with a child younger than 12 months who has not completed the primary H influenzae type b (Hib) vaccine series**
  - **Household with an immunocompromised child, regardless of that child's Hib immunization status or age**
- **For preschool and child care center contacts when 2 or more cases of H influenzae type b invasive disease have occurred within 60 days and unimmunized or incompletely immunized children attend the child care facility or preschool**
- **For index patient, if younger than 2 years or member of a household with a susceptible contact and treated with a regimen other than cefotaxime or ceftriaxone, chemoprophylaxis at the end of therapy for invasive infection**

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Haemophilus influenzae
(chemoprophylaxis in context of invasive Hib disease)

- **Chemoprophylaxis NOT recommended**
- **For occupants of households with no children younger than 4 years other than the index patient**
- **For occupants of households when all household contacts are immunocompetent, all household contacts 12 through 48 months of age have completed their Hib immunization series, and when household contacts younger than 12 months have completed their primary series of Hib immunizations**
- **For preschool and child care contacts of 1 index case**
- **For index patients over age 2 years or treated with a full course of cefotaxime or ceftriaxone for H influenzae type b invasive disease**
- **For pregnant people**

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Haemophilus influenzae vaccine history

- First vaccine licensed in the United States in April, 1985; a polysaccharide vaccine of PRP (the ribitol, ribose, phosphate heteropolymer making up the type B capsule)
- Not particularly effective due to weak immune response, lack of immune memory in younger children with a polysaccharide antigen that is T-cell independent
- First conjugate vaccine was licensed by the FDA on 12/22/1987; found to be much more effective due to the protein component (diphtheria toxoid in this case) that elicits a T-cell dependent immune response and produces immunologic memory in younger children
- Different companies worked on the polysaccharide-protein conjugation and ended with different component vaccines

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Current *Haemophilus influenzae* type B Vaccines

Vaccine name*	Antigen	Adjuvant	Stabilizers	Preservatives	Residual byproducts
ActHIB	Polysaccharide coating (called PRP) linked to tetanus toxoid	None	Sucrose, Sodium chloride	None	Formaldehyde
Hiberix	Polysaccharide coating (called PRP) linked to tetanus toxoid	None	Lactose, Sodium chloride	None	Formaldehyde
PedvaxHIB	Polysaccharide coating (called PRP) linked to outer membrane protein from meningococcus B	Amorphous aluminum hydroxyphosphate sulfate	Sodium chloride	None	None

*Information from package insert dated: 3/2022 (ActHIB); 12/2023 (Hiberix); no date (PedvaxHIB)

Reviewed by Paul A. Offit, MD, on October 7, 2024

Ingredients in Haemophilus Influenzae Type b (Hib) Vaccines | Children's Hospital of Philadelphia
https://www.chop.edu/vaccine-education-center/vaccine-safety/vaccine-ingredients/ingredients-by-vaccine/haemophilus-influenzae-type-b-hib

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Combination Vaccines - Pentacel

These vaccines protect against four bacteria (diphtheria, tetanus, pertussis and *Haemophilus influenzae* type b) and one virus (polio). Find out more about these diseases and the vaccines that protect against them (diphtheria, tetanus, and pertussis; polio; and *Haemophilus influenzae* type b (Hib)).

Vaccine name	Antigen	Adjuvant	Stabilizers	Preservatives	Residual byproducts
Pentacel	Tetanus toxoid, Diphtheria toxoid, Inactivated pertussis toxin (PT), Filamentous hemagglutinin (FHA), Pertactin (PRN), Fimbriae types 2 & 3 (FIM), Killed poliovirus (types 1, 2, and 3), Polysaccharide coating (called PRP) linked to tetanus toxoid	Aluminum phosphate	Polysorbate 80, Sucrose, 2-phenoxyethanol (in doses with polio viruses grown in Vero cells)	None	Formaldehyde, Glutaraldehyde, Bovine serum albumin, 2-phenoxyethanol, Neomycin, Polymyxin B Some doses (those in which polio virus was grown in Vero cells) may contain residual quantities of streptomycin.

*Information from package insert dated: xx/202x (MRC-5 cells), 03/2022 (Vero cells)

Reviewed by Paul A. Offit, MD, on December 16, 2024

Ingredients in DTaP-IPV/Hib Vaccine | Children's Hospital of Philadelphia
https://www.chop.edu/vaccine-education-center/vaccine-safety/vaccine-ingredients/ingredients-by-vaccine/dtap-ipvhib-vaccine-ingredients

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Combination Vaccines - Vaxelis

These vaccines protect against four bacteria (diphtheria, tetanus, pertussis and *Haemophilus influenzae* type b) and two viruses (polio and hepatitis B). Find out more about these diseases and the vaccines that protect against them (diphtheria, tetanus and pertussis; polio; *Haemophilus influenzae* type b (Hib); and hepatitis B).

Vaccine name	Antigen	Adjuvant	Stabilizers	Preservatives	Residual byproducts
Vaxelis	Tetanus toxoid, Diphtheria toxoid, Inactivated pertussis toxin (PT), Filamentous hemagglutinin (FHA), Pertactin (PRN), Fimbriae types 2 & 3 (FIM), Killed poliovirus (types 1, 2, and 3), Polysaccharide coating (called PRP) linked to outer membrane protein complex (OMPC) of *N. meningitidis* serogroup B, Surface protein from hepatitis B virus	Aluminum salts	Polysorbate 80	None	Formaldehyde, Glutaraldehyde, Bovine serum albumin, Neomycin, Streptomycin, Polymyxin B, Ammonium thiocyanate, Proteins from cells used to grow virus (yeast cells)

*Information from package insert dated: xx/202x

Reviewed by Paul A. Offit, MD, on December 16, 2024

Ingredients in DTaP-IPV-Hib-Hep B Vaccine | Children's Hospital of Philadelphia
https://www.chop.edu/vaccine-education-center/vaccine-safety/vaccine-ingredients/ingredients-by-vaccine/dtap-ipv-hib-hepb-vaccine-ingredients

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Vaccine Recommendations for Hib

- All infants should receive a primary series of Hib conjugate vaccine starting at 2 months of age
- Primary series with Hib (PRP-T) requires 3 doses
- Primary series with Hib (OMP) requires 2 doses (if given as PedvaxHIB)
- A booster is required at 12-15 months of age
- DTaP-IPV-Hib-HepB (Vaxelis) should not be used for the booster dose
- American Indians/Alaska Natives
  - Administer PRP-OMP as preferred vaccine

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Haemophilus influenzae type b (Hib) Routine Vaccination Schedule

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

Haemophilus influenzae type b (Hib) Routine Vaccination Schedule

*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.

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Hib Catch-up Immunization

Table 2
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Recommended Catch-up Immunization Schedule for Children and Adolescents Who Start Late or Who Are More than 1 Month Behind, United States, 2026

American Academy of Pediatrics
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The table below provides catch-up schedules and minimum intervals between doses for children whose vaccinations have been delayed. A vaccine series does not need to be restarted, regardless of the time that has elapsed between doses. Use the section appropriate for the child's age. **Always use this table in conjunction with Table 1 and the Notes that follow.**

Children age 4 months through 6 years

Vaccine	Minimum Age for Dose 1	Minimum Interval Between Doses			
		Dose 1 to Dose 2	Dose 2 to Dose 3	Dose 3 to Dose 4	Dose 4 to Dose 5
Hepatitis B	Birth	**4 weeks**	**8 weeks *and* at least 16 weeks after first dose:** minimum age for the final dose is 24 weeks		
Rotavirus	6 weeks: Maximum age for first dose is 14 weeks, 6 days.	**4 weeks**	**4 weeks:** maximum age for final dose is 8 months, 0 days		
Diphtheria, tetanus, and acellular pertussis	6 weeks	**4 weeks**	**4 weeks**	**6 months**	**6 months:** A fifth dose is not necessary if the fourth dose was administered at age 4 years or older ***and*** at least 6 months after dose 3
Haemophilus influenzae type b	6 weeks	**No further doses needed** if first dose was administered at age 15 months or older **4 weeks** if first dose was administered before the 1st birthday **8 weeks (as final dose)** if first dose was administered at age 12 through 14 months	**No further doses needed** if previous dose was administered at age 15 months or older **4 weeks** if current age is younger than 12 months and first dose was administered at younger than age 7 months ***and*** at least 1 previous dose was PRP-T (ActHib, Pentacel, Hiberix), Vaxelis, or unknown **8 weeks and age 12 through 59 months (as final dose)** if current age is younger than 12 months ***and*** first dose was administered at age 7 through 11 months; **OR** if current age is 12 through 59 months ***and*** first dose was administered before the 1st birthday ***and*** second dose was administered at younger than 15 months; **OR** if both doses were PedvaxHIB and were administered before the 1st birthday	**8 weeks (as final dose):** This dose only necessary for children age 12 through 59 months who received 3 doses before the 1st birthday	

AAP-Immunization-Schedule.pdf

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Hib Vaccine – Special Situations

Special situations

- **Chemotherapy or radiation treatment:**

  Age 12–59 months

  - Unvaccinated or only 1 dose before age 12 months: 2 doses, 8 weeks apart
  - 2 or more doses before age 12 months: 1 dose at least 8 weeks after previous dose

Doses administered within 14 days of starting therapy or during therapy should be repeated at least 3 months after therapy completion.

- **Hematopoietic cell transplant (HCT):**
  - 3-dose series 4 weeks apart starting 6 to 12 months after successful transplant, regardless of Hib vaccination history

- **Anatomic or functional asplenia (including sickle cell disease):**

  Age 12–59 months

  - **Unvaccinated or only 1 dose before age 12 months:** 2 doses, 8 weeks apart
  - **2 or more doses before age 12 months:** 1 dose at least 8 weeks after previous dose

  Unvaccinated persons age 5 years or older*

  - 1 dose

- **Elective splenectomy:**

  Unvaccinated persons age 15 months or older*

  - 1 dose (preferably at least 14 days before procedure)

- **HIV infection:**

  Age 12–59 months

  - Unvaccinated or only 1 dose before age 12 months: 2 doses, 8 weeks apart
  - 2 or more doses before age 12 months: 1 dose at least 8 weeks after previous dose

  Unvaccinated persons age 5–18 years*

  - 1 dose

- **Immunoglobulin deficiency, early component complement deficiency, or early component complement inhibitor use:**

  Age 12–59 months

  - Unvaccinated or only 1 dose before age 12 months: 2 doses, 8 weeks apart
  - 2 or more doses before age 12 months: 1 dose at least 8 weeks after previous dose

Unvaccinated* = Less than routine series (through age 14 months) **or no doses (age 15 months or older)

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Hib Vaccine Contraindications and Precautions

- **Contraindication**
  - **Severe allergic reaction to a vaccine component or following a prior dose of vaccine**
  - **Children younger than age 6 weeks**
- **Precaution**
  - **Moderate or severe acute illness**

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Hib Vaccination – Adverse Events

- Moderate to severe adverse events with Hib vaccination are uncommon
- Reactions are similar to those noted with other childhood vaccines
- Swelling, redness, and pain at the injection site are the most commonly reported reactions (5-30%, generally resolving within 12-24 hours)
- Vaccine Adverse Event Reporting System (VAERS) events also similar to other childhood vaccines
    - Fever, crying, injection site erythema, irritability, rash

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A child is hospitalized with Hib meningitis and has completed three days of appropriate antibiotic therapy. What PPE should be worn by a provider who enters the patient's room?

A. Gown and gloves
B. Surgical/procedure mask
C. N95 respirator
D. Gown, gloves, and mask
E. No PPE necessary

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Infection Prevention and Control

- **Standard Precautions plus Droplet Precautions for invasive Hib disease, continued until patient has received 24 hours of effective antimicrobial therapy**

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Standard Precautions: The Foundation

Used for every patient, every encounter — regardless of diagnosis or infectious status



Hand Hygiene

Before/after all patient contact; soap & water for visibly soiled hands or *C difficile*/norovirus exposure



Gloves

Clean, nonsterile, single-use for blood/body fluids; change between tasks; hand hygiene before donning & after removal



Masks & Eye Protection

Protect mucous membranes when exposure to fluids/secretion/ excretions is expected



Gowns

Fluid-resistant, nonsterile; protect skin & clothing during care with expected fluid exposure



Respiratory Hygiene

Cough etiquette, tissues, no-touch disposal, masking if tolerated, physical distancing



Safe Injection Practices

Never reuse syringes/needles between patients; avoid needlestick injury; use safety devices



Equipment Cleaning

Disinfect shared equipment (stethoscopes) per manufacturer instructions between patients



Textile & Sharps Handling

Treat used linens as contaminated; puncture-resistant sharps containers near point of use

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Questions? Comments?

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A few summary points

1. *Haemophilus influenzae* remains an important cause of common upper respiratory infections and invasive disease among all ages.
2. Vaccination against *Haemophilus influenzae* type b is highly effective as preventing invasive Hib disease.
3. Most invasive disease with *Haemophilus influenzae* currently is associated with nontypeable *H. flu*
4. People at the extremes of age (both young and old) are at increased risk of invasive disease and mortality associated with *H. flu*
5. There are limited indications for chemoprophylaxis after exposure to invasive disease with *Haemophilus influenzae* type b

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