



Polio and *Haemophilus influenzae* type b

Pink Book Webinar Series

JoEllen Wolicki BSN, RN

Nurse Educator

Communications and Education Branch

ACIP Recommendations: Polio and Polio Vaccines

Poliomyelitis Disease

- First outbreak described in the U.S. in 1843
- Polio epidemics were reported each summer and fall
- More than 21,000 paralytic cases reported in the U.S. in 1952

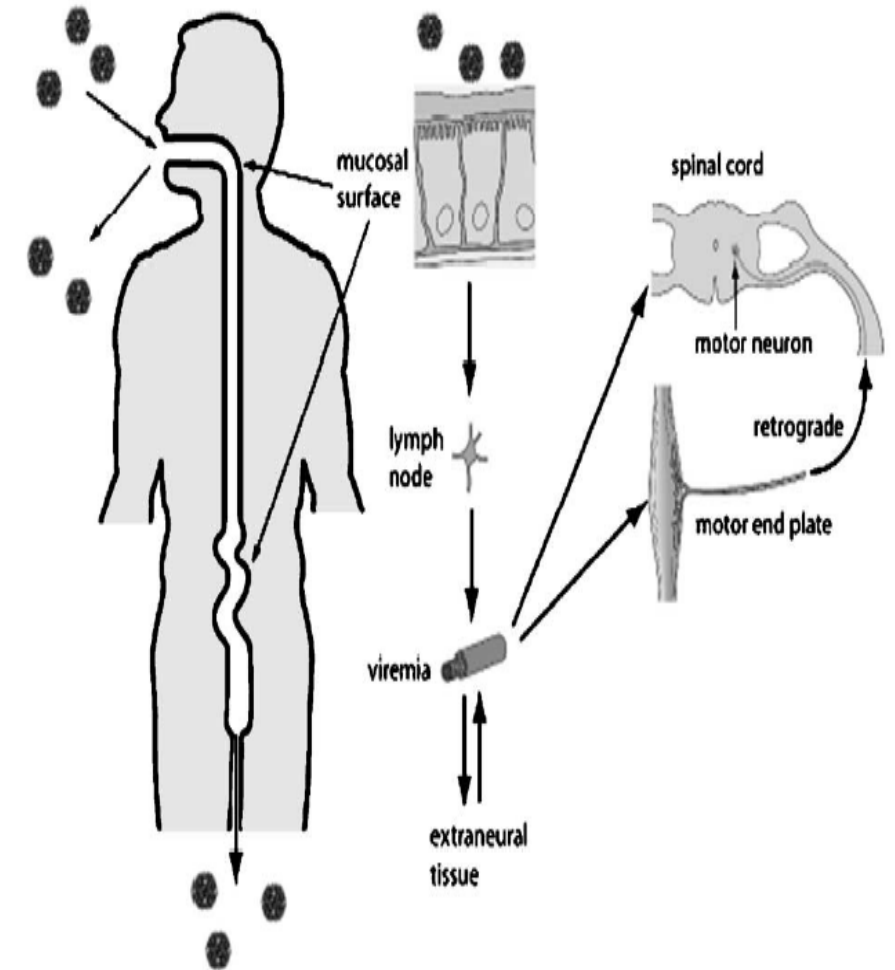


Poliovirus

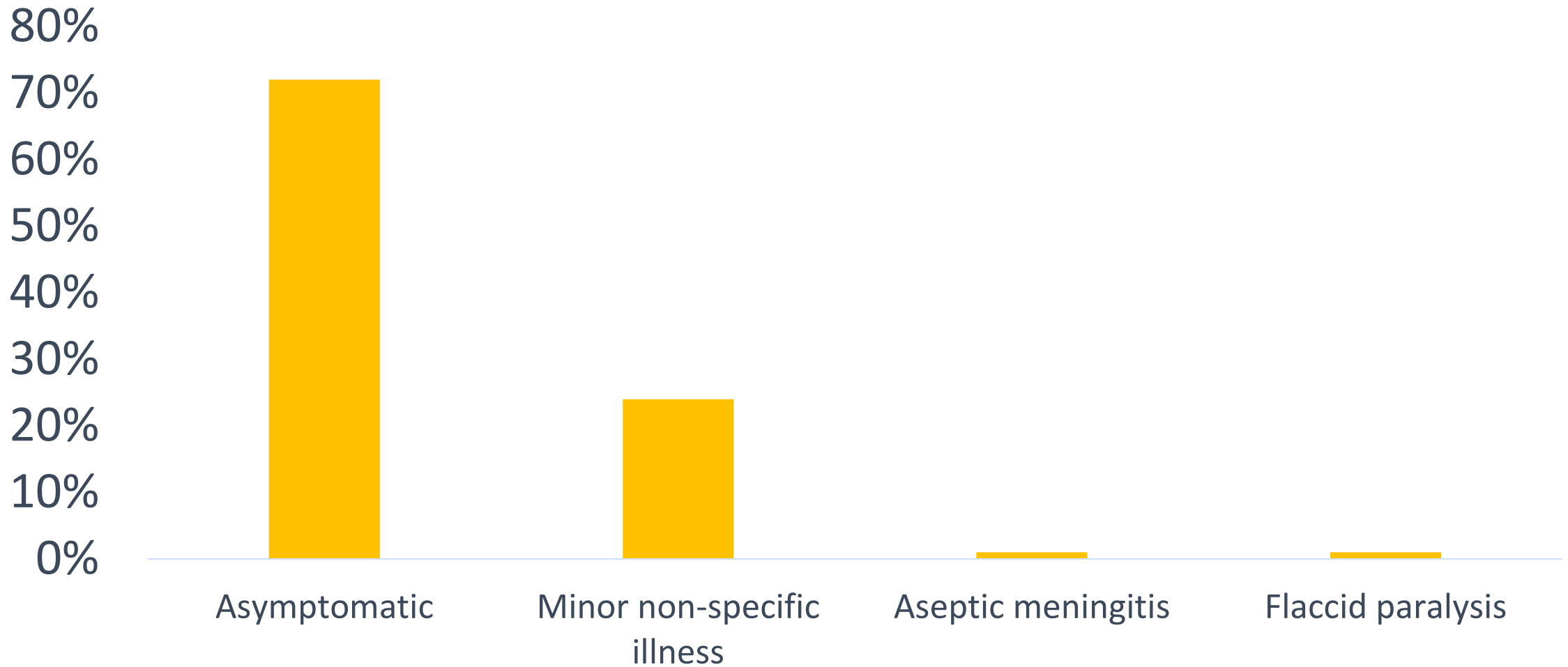
- **Three serotypes of wild poliovirus:**
 - WPV1
 - WPV2
 - WPV3
- **Minimal heterotypic immunity between serotypes**
- **Rapidly inactivated by heat, chlorine, formaldehyde, and ultraviolet light**

Poliomyelitis Pathogenesis

- Enters into mouth
- Replicates in pharynx and GI tract
- Hematologic spread to lymphatics and central nervous system
- Viral spread along nerve fibers
- Destruction of motor neurons



Outcomes of Poliovirus Infection





Asymmetric paralysis

Poliovirus Epidemiology

Reservoir

Human

Transmission

Fecal-oral

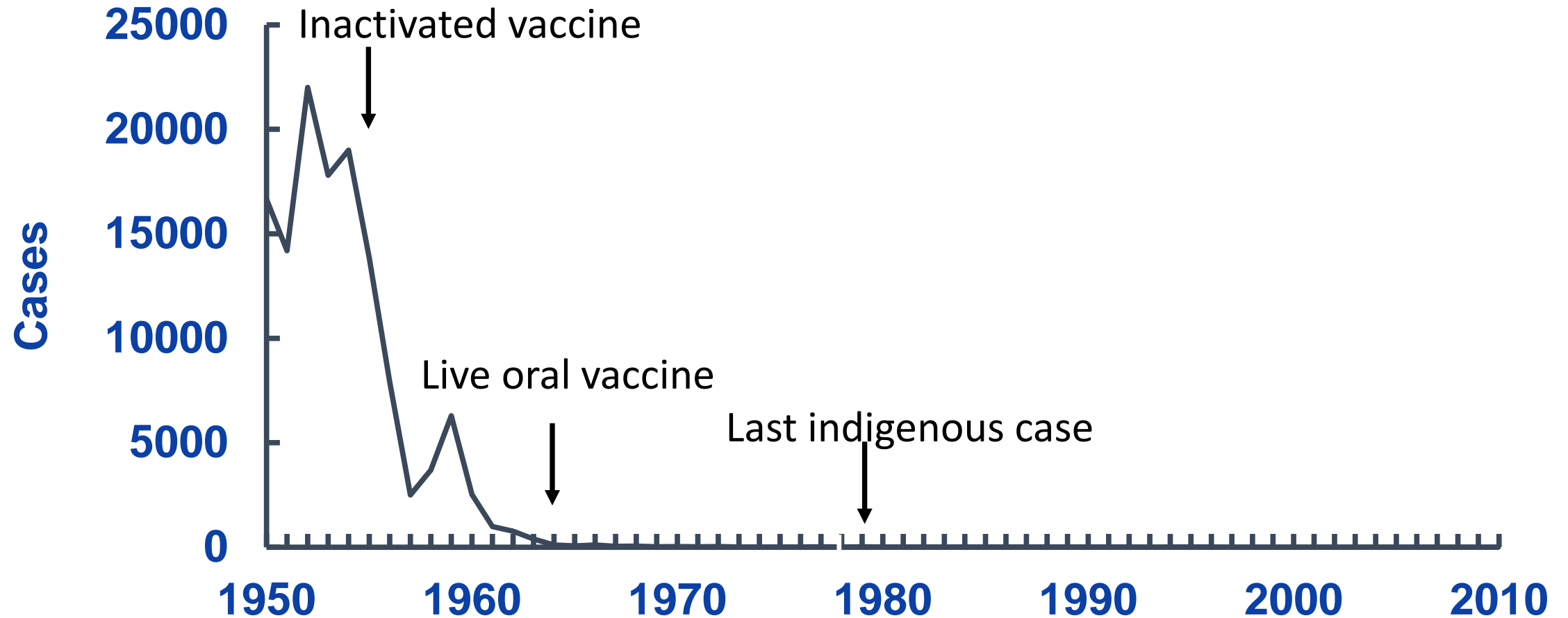
Oral-oral possible

Communicability

Most infectious: 7–10 days before onset

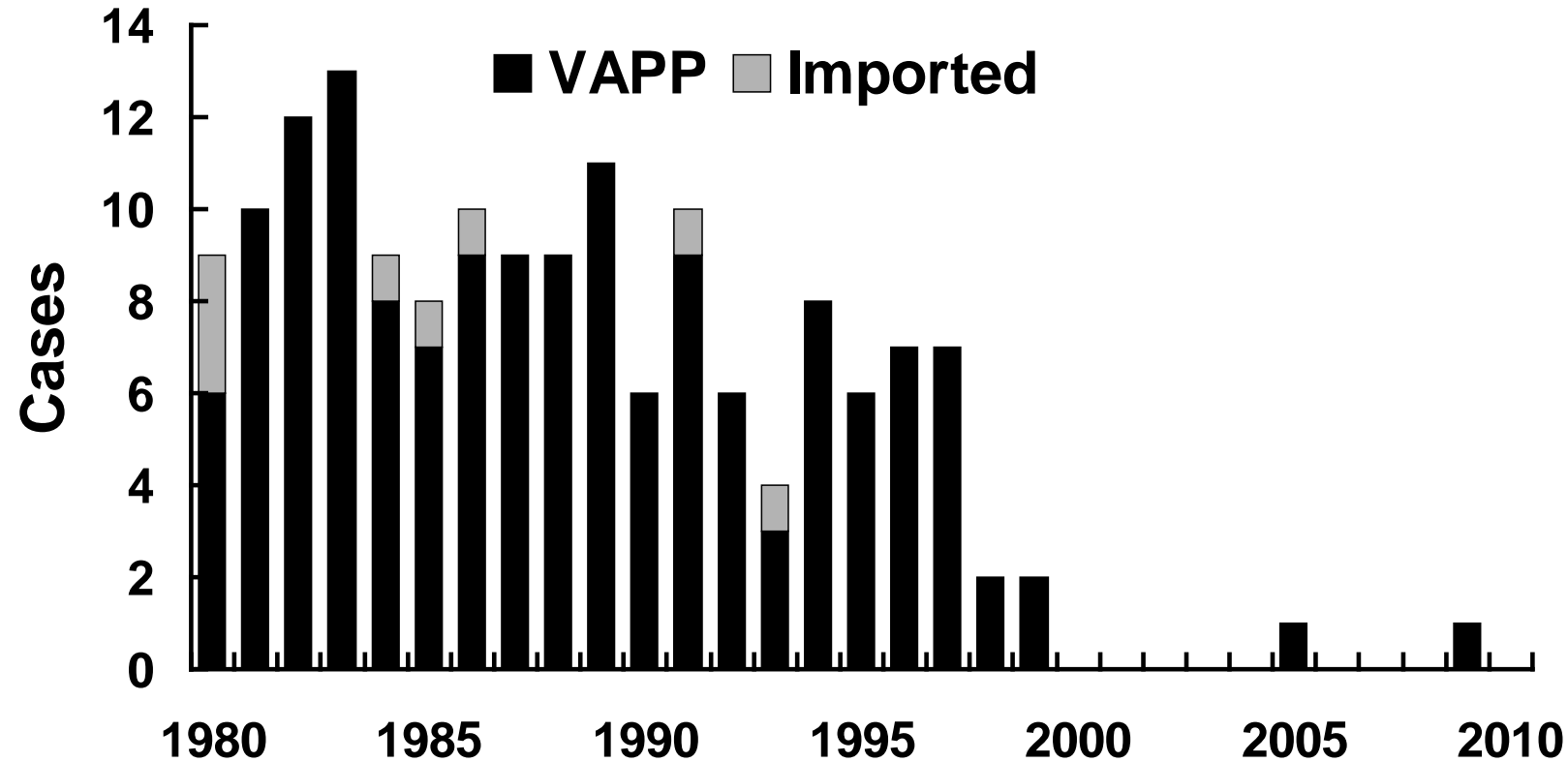
Virus present in stool 3–6 weeks

Poliomyelitis—United States, 1950–2011



Poliomyelitis—United States, 1980–2010

Vaccine-associated paralytic polio = VAPP



Poliovirus Vaccines

- 1955–Inactivated vaccine
- 1963–Live, attenuated vaccine (OPV)
- 1987–Enhanced-potency, inactivated vaccine (IPV)



Enhanced Inactivated Polio Vaccine

- **Highly effective in producing immunity to poliovirus**
 - $\geq 90\%$ of recipients immune after 2 doses
 - $\geq 99\%$ of recipients immune after 3 doses
- **Duration of immunity not known with certainty**

Polio-Containing Vaccine Products

Product ACIP Abbreviation	Age Indications	IPV Series
IPOL IPV	6 weeks and older	Any dose in the series
Pediarix DTaP-IPV-HepB	6 weeks through 6 years	Doses 1 through 3
Pentacel DTaP-IPV/Hib	6 weeks through 4 years	Doses 1 through 4
Kinrix DTaP-IPV	4 through 6 years	Dose 4
Quadracel DTaP-IPV	4 through 6 years	Dose 4 or 5

ACIP Polio Immunization Recommendations

Routine Schedule

IPV Dose	Routinely Recommended Age
1	2 months
2	4 months
3	6–18 months
4	4–6 years

ACIP Polio Immunization Recommendations

Catch-Up Schedule

- Infants 6 months of age and younger, follow the recommended schedule intervals
- If accelerated protection is needed (e.g., travel to polio-endemic area), minimum age and intervals may be followed

Dose	Minimum Age	Minimum Interval to the Next Dose
Dose 1	6 weeks	4 weeks
Dose 2	10 weeks	4 weeks
Dose 3	14 weeks	6 months
Dose 4	4 years	-----

ACIP Polio Immunization Recommendations

4th Dose and the Catch-Up Schedule

- **A 4th dose is not necessary if the 3rd dose was administered:**
 - At age 4 years or older AND
 - At least 6 months after the previous dose
- **Children who have received 4 doses (or more) before 4 years of age need an additional dose**
 - There should be at least 6 months between last and next-to-last dose

Schedules that Include Both IPV and OPV

- **Mixed-product series containing both OPV and IPV is acceptable**
 - Only trivalent OPV (tOPV) counts toward completing the series
- **Children with an incomplete series:**
 - Administer IPV to complete a series that includes doses of OPV
 - Ensure doses met minimum ages and intervals
- **Administer 1 dose of IPV to children who received 4 doses of OPV (or more) before 4 years of age**
 - There should be at least 6 months between the last dose of OPV and the IPV dose

OPV Administered Outside the U.S.

- Use the date of administration to make a presumptive determination of what type of OPV was received
- Trivalent OPV was used throughout the world prior to April 2016
- Persons 18 years of age and younger with doses of OPV that do not count towards the U.S. vaccination requirements should receive IPV

ACIP Polio Immunization Recommendations

Adolescents and Adults

- Routine vaccination of U.S. residents 18 years of age or older is not necessary or recommended
- May consider vaccination of travelers to polio-endemic countries and selected lab workers

ACIP Polio Immunization Recommendations

Unvaccinated Adults

- **Use routine IPV schedule if possible**
 - 0, 1–2 months, 6–12 months intervals
- **If accelerated protection is needed (e.g., travel to polio-endemic area), use the minimum intervals**

Minimum Intervals to the Next Dose

Dose 1	4 weeks
Dose 2	6 months
Dose 3	-----

ACIP Polio Immunization Recommendations

Previously Vaccinated Adults

- **Previously completed series**
 - Administer 1 dose of IPV to those at risk
- **Incomplete series**
 - Administer remaining doses in series based on immunization history
 - No need to restart a valid, documented series
 - Valid = minimum intervals met

Contraindications and Precautions

- **Severe allergic reaction to a vaccine component or following a prior dose of vaccine**
- **Moderate to severe acute illness**

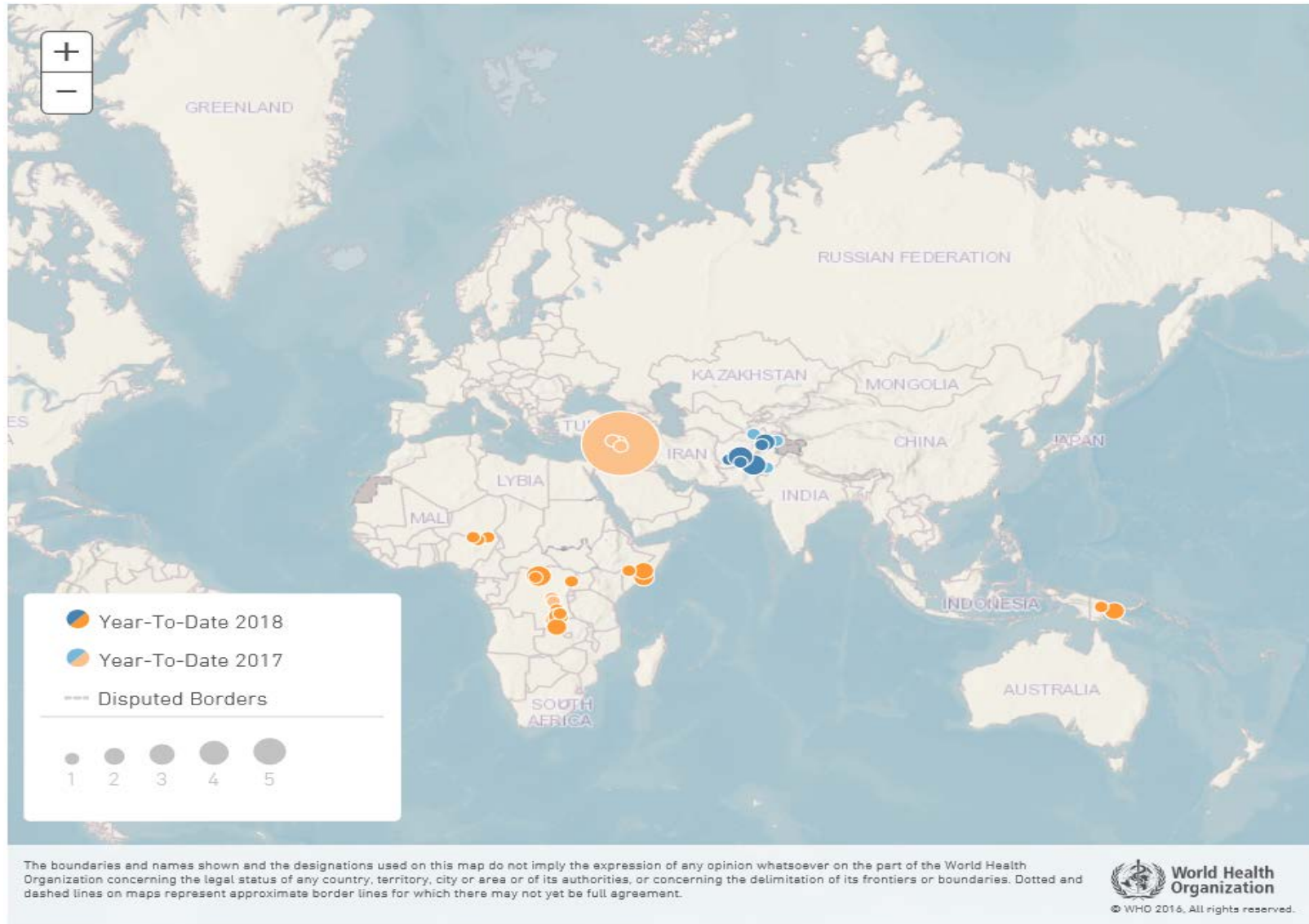
IPV Adverse Reactions

- **Local reactions** **2.8% (pain, redness, swelling)**
- **Severe reactions** **rare**

Polio Eradication

- Last case in the United States in 1979
- Western Hemisphere certified polio-free in 1994
- Last isolate of WPV2 was in India in October 1999
- Global eradication goal

Global Polio Eradication Efforts



YEAR-TO-DATE 2018

Jan 1 - Aug 21, 2018

13_{WPV} **24**_{cVDPV}

2017 TOTAL

Jan 1 - Dec 31, 2017

22_{WPV} **96**_{cVDPV}

Clinical Considerations for IPV-Containing Vaccines

- **Storage:** Refrigerate between 2°C and 8°C (36°F and 46°F)
- **Preparation:** Prepare the vaccine just prior to administration
 - Pentacel requires reconstitution
 - Reconstitute the lyophilized vaccine with the DTaP-IPV liquid diluent supplied by the manufacturer. Do NOT use Kinrix or Quadracel
- **Route:** IM injection*
- **Site:**
 - 11 months and younger: Anterolateral thigh muscle
 - 12 months and older: Anterolateral thigh muscle or deltoid muscle of arm
- **Needle:**
 - Children: 22–25 gauge, 1-inch needle
 - Adults: 22–25 gauge, length varies by weight

*iPV may be administered by subcutaneous injection using a 5/8-inch needle given in the fatty tissue over the upper, outer triceps or anterolateral thigh

Polio: Vaccine Administration Errors

- **Schedule errors: Dose 4 administered too soon**
 - Doses administered 5 or more days before the minimum age and/or interval do not count and should be repeated when age-appropriate
 - Wait the minimum interval from the invalid dose before giving the repeat dose
 - Minimum age/interval: At/after age 4 AND 6 months after dose 3
- **Age/dose errors: Kinrix or Quadracel for doses 1 through 3**
 - If the minimum age and interval from the last dose of polio vaccine has been met, the dose can count and does not need to be repeated
- **Preparation errors: Wrong diluent to reconstitute DTaP-IPV/Hib (Pentacel)**
 - Do not use Kinrix or Quadracel to reconstitute Pentacel

ACIP Recommendations: *Haemophilus influenzae* type b and Hib Vaccine

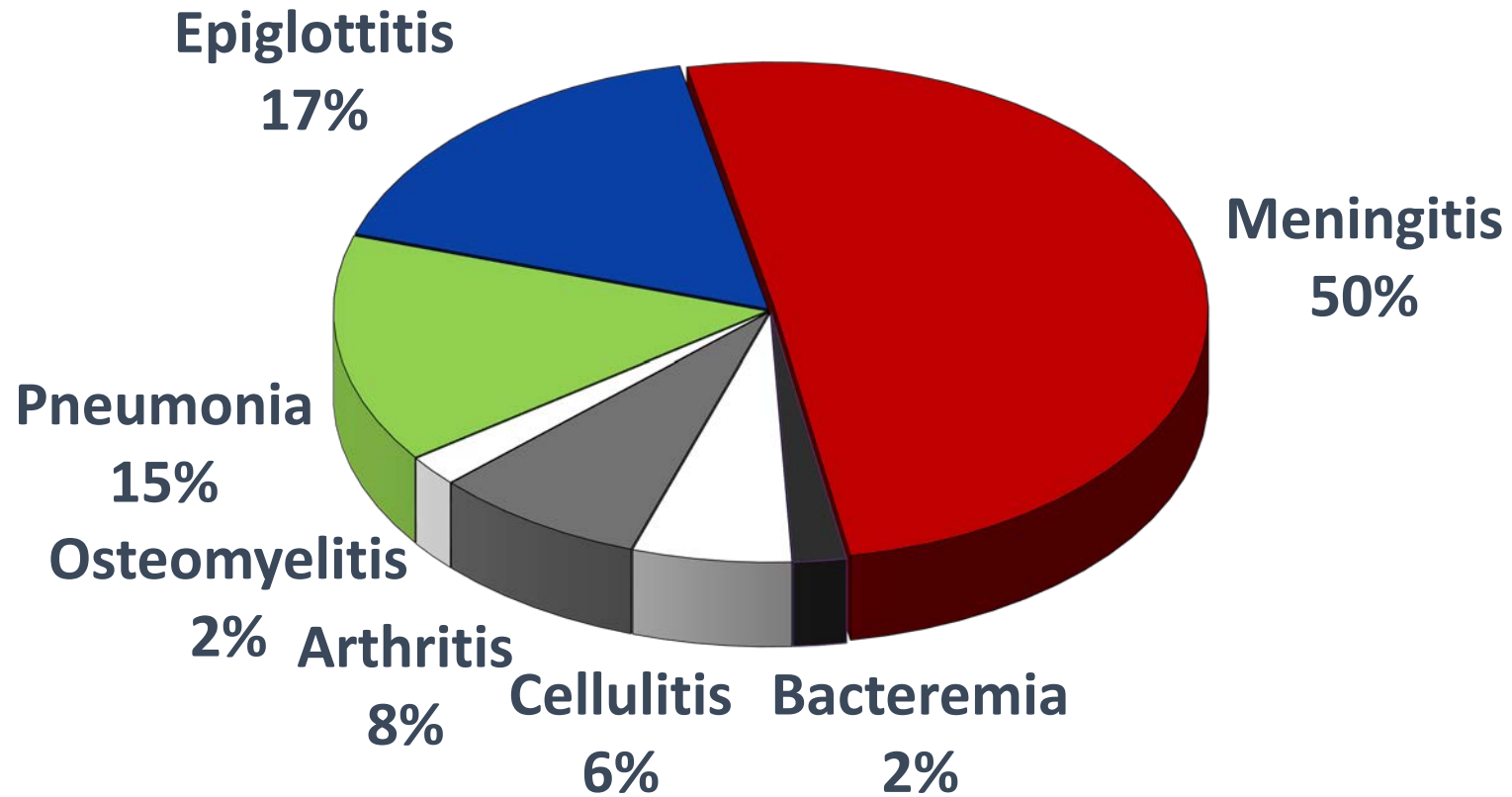
Haemophilus influenzae type b

- 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)

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

Haemophilus influenzae type b Clinical Manifestations*



*Prevaccine era

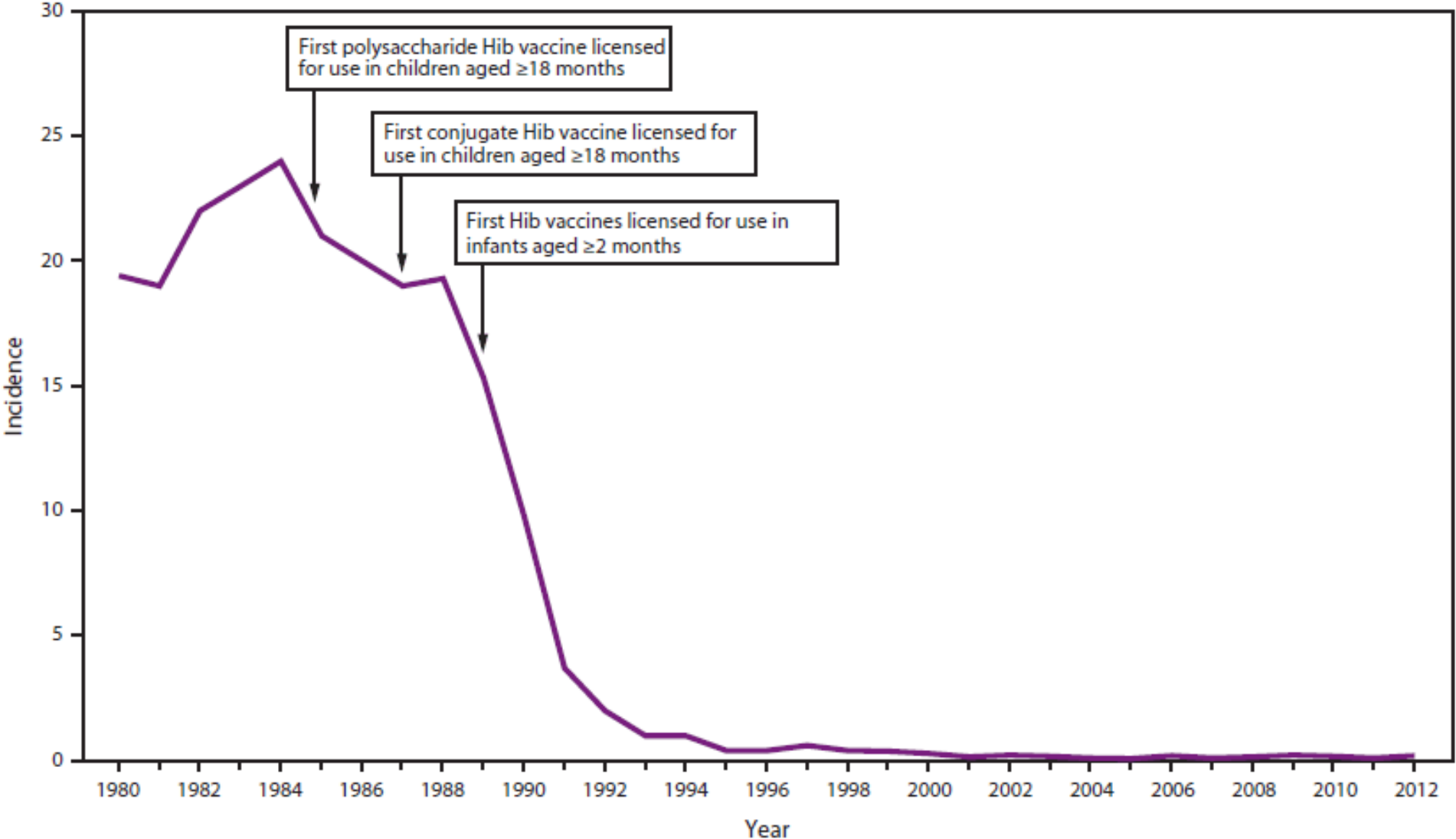


Facial cellulitis or infection of the soft tissues of the face, caused by Hib

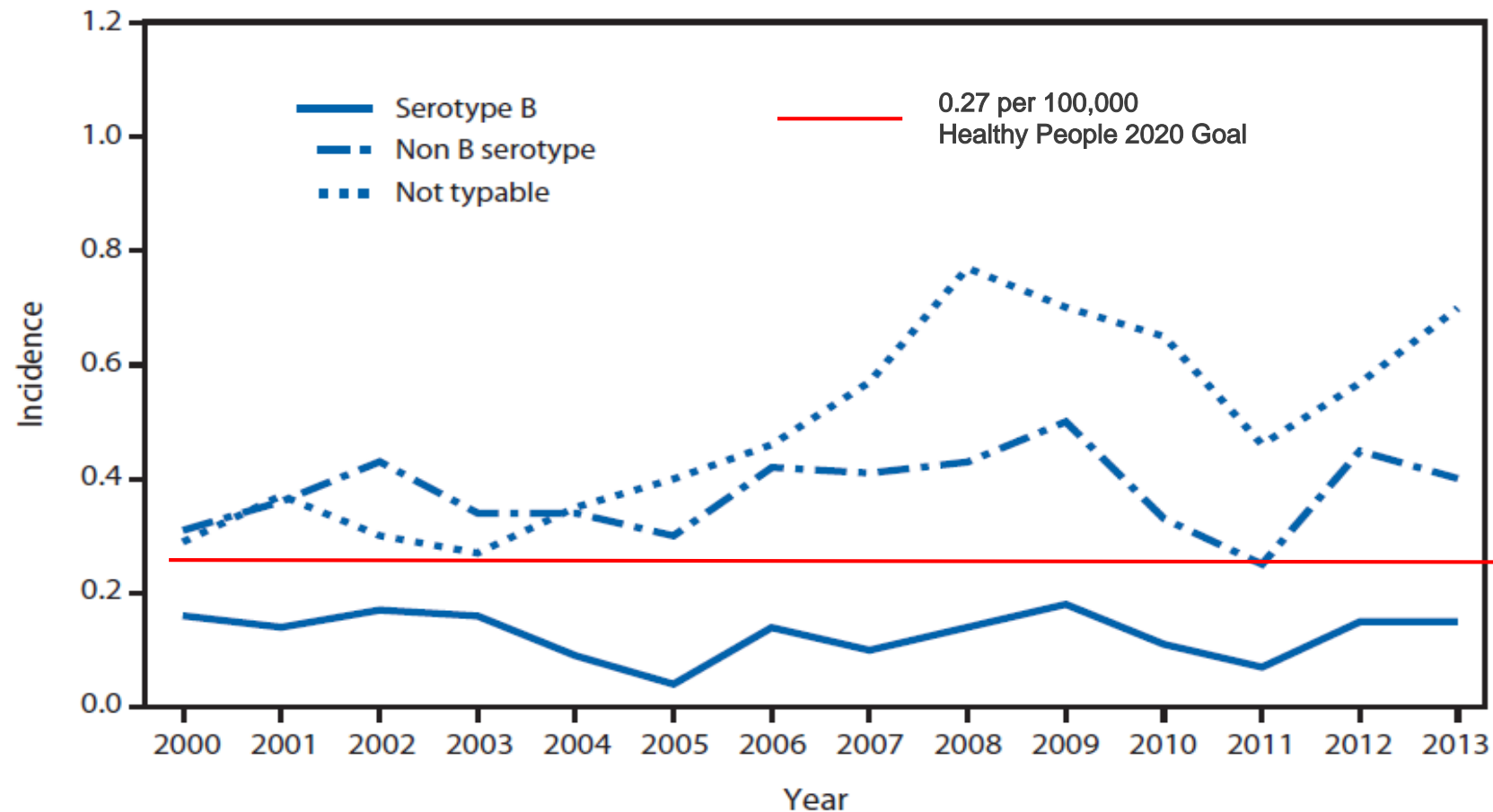
Haemophilus influenzae type b Epidemiology

Reservoir	Human asymptomatic carriers
Transmission	Respiratory droplets presumed
Temporal pattern	Peaks in Sept–Dec and March–May
Communicability	Generally limited but higher in some circumstances (e.g., household, child care)

Estimated Annual Incidence (per 100,000) of Invasive *Haemophilus influenzae* type b (Hib) Disease in Children Aged <5 Years—U.S., 1980–2012



Haemophilus influenzae, Invasive Disease Incidence of Reported Cases (per 100,000), by serotype Among Children aged <5 years—U.S., 2000–2013



***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

Haemophilus influenzae Type b Conjugate Vaccines

- **Conjugation improves immunogenicity**
 - Immune response with booster doses
- **Same polysaccharide capsule linked to different carrier proteins**
- **3 single-component conjugate Hib vaccine products**
- **1 combination vaccine products available that contain Hib conjugate vaccine**

Hib-Containing Vaccine Products

Product ACIP Abbreviation	Age Indications	Approved for
ActHIB Hib	6 weeks and older	Primary series (3 doses) Booster dose (1)
Hiberix Hib	6 weeks and older	Primary series (3 doses) Booster dose (1)
PedvaxHIB Hib	6 weeks and older	Primary series (2 doses) Booster dose (1)
Pentacel DTaP-IPV/Hib	6 weeks through 4 years	Primary series (3 doses) Booster dose (1)

ACIP Hib Immunization Recommendations

Routine Schedule

- **Routinely recommended for all infants beginning at 2 months of age***
- **Schedule varies based on the product used**
 - ActHib, Pentacel, Hiberix: Follow the 4-dose schedule at 2, 4, 6, and 12–15 months of age
 - PedvaxHIB: Follow the 3-dose schedule at 2, 4, and 12–15 months of age
- **If any dose in the series is ActHIB, Pentacel, Hiberix or the product is not known, follow the 4-dose schedule**

*Minimum age for the 1st dose is 6 weeks

Unvaccinated Healthy 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
- Resources:
 - 2018 catch-up schedule
 - Catch-up guidance for healthy children
 - Detailed schedule p. 128 of Pink Book

Catch-Up Guidance for Healthy¹ Children
4 Months through 4 Years of Age
Haemophilus influenzae type b-Containing Vaccine
Products: ActHIB, Pentacel, Hiberix, or Unknown

Catch-Up Guidance for Healthy¹ Children
4 Months through 4 Years of Age
Haemophilus influenzae type b-Containing Vaccine
Products: ActHIB, Pentacel, Hiberix, or Unknown

Catch-Up Guidance for Healthy¹ Children
4 Months through 4 Years of Age
Haemophilus influenzae type b-Containing Vaccine
Products: ActHIB, Pentacel, Hiberix, or Unknown

The table below provides guidance for children whose vaccinations have been delayed. Start with the child's age and information on previous doses (previous doses must be documented and must meet minimum age requirements and minimum intervals between doses). Use this table in conjunction with figure 2 of the Recommended Immunization Schedule for Children and Adolescents Aged 18 Years or Younger, found at www.cdc.gov/vaccines/schedules/hcp/child-adolescent.html.

IF current age is	AND # of previous doses is	AND	THEN	Next dose due	
4 through 6 months	Unknown or 0	→	Give Dose 1 today	Give Dose 2 at least 4 weeks after Dose 1	
	1	It has been at least 4 weeks since Dose 1	Give Dose 2 today	Give Dose 3 at least 4 weeks after Dose 2	
7 through 11 months	1	It has not been 4 weeks since Dose 1	No dose today	Give Dose 2 at least 4 weeks after Dose 1	
	2	It has been at least 4 weeks since Dose 2	Give Dose 3 today	Give Dose 4 (Final Dose) at 12 months of age or older.	
15 through 59 Months	2	It has not been 4 weeks since Dose 2	No dose today	Give Dose 3 at least 4 weeks after Dose 2	
		It has been at least 4 weeks since Dose 2	Give Dose 3 today	Give Dose 4 (Final Dose) at 12 months of age or older.	
	3	All doses were given before 12 months of age	→	Give Dose 1 today	Give Dose 2 at least 4 weeks after Dose 1
		At least one dose was given at 12 months of age or older	→	Give Dose 2 today	IF Dose 1 was given before 7 months of age, give Dose 3 at least 4 weeks after Dose 2 IF Dose 1 was given at 7 months of age or older, give Dose 3 (Final Dose) at least 8 weeks after Dose 2 and no earlier than 12 months of age or older.

1 Refer to footnote 4 of the 2018 Recommended Immunization Schedule for Persons Aged 18 Years or Younger for immunization guidance for children at increased risk for *Haemophilus influenzae* type b disease.
Reference: Recommended Immunization Schedule for Persons Aged 18 Years or Younger—United States, 2018. www.cdc.gov/vaccines/schedules/downloads/child/0-18yr-child-combined-schedule.pdf


Revised January 2018

Revised January 2018

Revised January 2018

1

CS240275-M



U.S. Department of Health and Human Services
Centers for Disease Control and Prevention

ACIP Hib Immunization Recommendations

Older Children and Adults

- **Generally not recommended for healthy persons older than 59 months of age**
- **Vaccinate high-risk older children and adolescents if incompletely or previously unvaccinated**
 - Asplenia
 - Immunodeficiency
 - HIV infection
 - Receipt of chemotherapy or radiation therapy

ACIP Hib Immunization Recommendations

High-Risk Children and Adults

High-Risk Children and Adults

Hib Vaccine Guidance

Elective splenectomy	If unvaccinated: 1 dose prior to procedure
Asplenic patient	If unvaccinated: 1 dose
HIV-infected children	If unvaccinated: 1 dose
Hematopoietic cell transplant	3 doses (at least 4 weeks apart) beginning 6–12 months after transplant
HIV-infected adults	Hib vaccination is not recommended

Special Populations

- **Children less than 24 months of age 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**
 - Hib disease peaks earlier in infancy
 - PedVaxHIB vaccine produces protective antibody after first dose/early protection
 - PedVaxHIB vaccine is specifically recommended for primary series doses

Hib Vaccine Interchangeability

- All single-component 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

Contraindications and Precautions

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

Hib Vaccine Adverse Reactions

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

Clinical Considerations for Hib-Containing Vaccine

- **Storage: Refrigerate between 2°C and 8°C (36°F and 46°F)**
- **Preparation: Prepare vaccine just prior to administration**
 - ActHIB, Pentacel, and Hiberix require reconstitution
 - Reconstitute the lyophilized vaccine with the diluent supplied by the manufacturer
- **Route: IM injection**
- **Site:**
 - 11 months and younger: Anterolateral thigh muscle
 - 12 months and older: Anterolateral thigh muscle or deltoid muscle of arm
- **Needle: 22–25 gauge, 1-inch needle**

Vaccines with Diluents: How to Use Them

Be sure to reconstitute the following vaccines correctly before administering them! Reconstitution means that the lyophilized (freeze-dried) vaccine powder or wafer in one vial must be reconstituted (mixed) with the diluent (liquid) in another.

- Only use the diluent provided by the manufacturer for that vaccine as indicated on the chart.
- ALWAYS check the expiration date on the diluent and vaccine. NEVER use expired diluent or vaccine.

Vaccine product name	Manufacturer	Lyophilized vaccine (powder)	Liquid diluent (may contain vaccine)	Time allowed between reconstitution and use, as stated in package insert*	Diluent storage environment
ActHIB (Hib)	Sanofi Pasteur	Hib	0.4% sodium chloride	24 hrs	Refrigerator
Hiberix (Hib)	GlaxoSmithKline	Hib	0.9% sodium chloride	24 hrs	Refrigerator or room temp
Imovax (RAB _{HDcv})	Sanofi Pasteur	Rabies virus	Sterile water	Immediately†	Refrigerator
M-M-R II (MMR)	Merck	MMR	Sterile water	8 hrs	Refrigerator or room temp
Menveo (MenACWY)	GlaxoSmithKline	MenA	MenCWY	8 hrs	Refrigerator
Pentacel (DTaP-IPV/Hib)	Sanofi Pasteur	Hib	DTaP-IPV	Immediately†	Refrigerator
ProQuad (MMRV)	Merck	MMRV	Sterile water	30 min	Refrigerator or room temp
RabAvert (RAB _{PROV})	GlaxoSmithKline	Rabies virus	Sterile water	Immediately†	Refrigerator
Rotarix (RV1)‡	GlaxoSmithKline	RV1	Sterile water, calcium carbonate, and xanthan	24 hrs	Refrigerator or room temp
Shingrix (RZV)	GlaxoSmithKline	RZV	AS01§ adjuvant suspension	6 hrs	Refrigerator
Varivax (VAR)	Merck	VAR	Sterile water	30 min	Refrigerator or room temp
YF-VAX (YF)	Sanofi Pasteur	YF	0.9% sodium chloride	60 min	Refrigerator or room temp
Zostavax (ZVL)	Merck	LZV	Sterile water	30 min	Refrigerator or room temp

Always refer to package inserts for detailed instructions on reconstituting specific vaccines. In general, follow the steps below.

1. For single-dose vaccine products (exception is Rotarix[®]), select a syringe and needle of proper length to be used for both reconstitution and administration of the vaccine. For Rotarix, see the package insert.¹
 - For single-dose vaccine products (exception is Rotarix[®]), select a syringe and needle of proper length to be used for both reconstitution and administration of the vaccine. For Rotarix, see the package insert.¹
2. Before reconstituting, check labels on both the lyophilized vaccine vial and the diluent to verify that
 - they are the correct two products to mix together,
 - the diluent is the correct volume, and
 - neither the vaccine nor the diluent has expired.
3. Reconstitute (i.e., mix) vaccine just prior to use by:
 - removing the protective cap and wiping each stopper with an alcohol swab,
 - inserting needle of syringe into diluent vial and withdrawing entire contents, and
 - injecting diluent into lyophilized vaccine vial and rotating or agitating to thoroughly dissolve the lyophilized powder.
4. Check the appearance of the reconstituted vaccine.
 - Reconstituted vaccine may be used if the color and appearance match the description on the package insert.
 - If there is discoloration, extraneous particulate matter, obvious lack of reuspension, or the vaccine cannot be thoroughly mixed, mark the vial as "DO NOT USE," return it to proper storage conditions, and contact your state or local health department immunization program or the vaccine manufacturer.
5. If reconstituted vaccine is not used immediately or comes in a multidose vial, be sure to
 - clearly mark the vial with the date and time the vaccine was reconstituted,
 - maintain the product at 2°–8°C (36°–46°F); do not freeze, and
 - use only within the time indicated on chart above.

*If the reconstituted vaccine is not used within this time period, it must be discarded.

†For purposes of this guidance, IAC defines "immediately" as within 30 minutes or less.

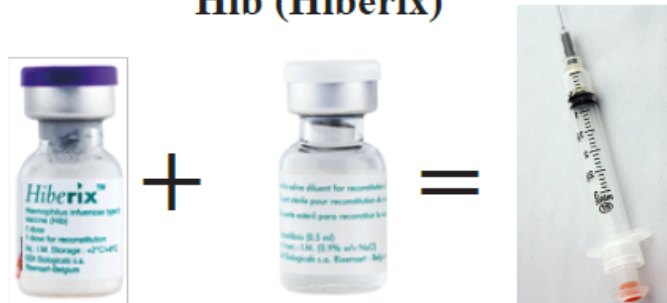
‡Rotarix vaccine is administered by mouth using the applicator that contains the diluent. It is not administered as an injection.

§AS01§ is composed of 3-O-Desacyl-4'-monophosphoryl lipid A (MPL) from *Salmonella minnesota* and QS-21, a saponin purified from plant extract *Quillaja agaveoides* Molina, combined in a liposomal formulation. The liposomes are composed of dioleoyl phosphatidylcholine (DOPC) and cholesterol in phosphate-buffered saline solution containing disodium phosphate anhydrous, potassium dihydrogen phosphate, sodium chloride, and water for injection.

Hib: Vaccine Administration Errors

- Preparation errors: Using the wrong diluent to reconstitute the lyophilized component


Hib (Hiberix)



Lyophilized Hib component + Manufacturer's 0.9% sodium chloride diluent = Hiberix vaccine

Beyond Use Time: If not used immediately after reconstitution, store at 2°C to 8°C (36°F to 46°F) and discard if not used within 24 hours. Should be shaken vigorously before injection.

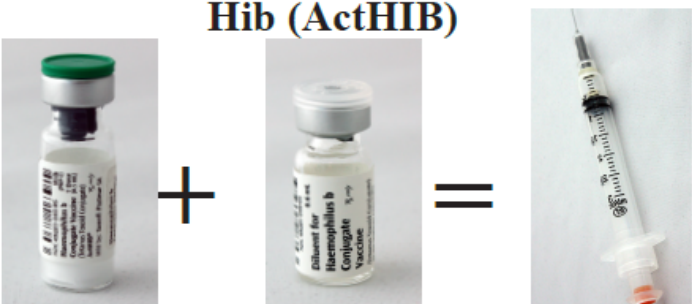
DTaP-IPV/HIB (Pentacel)



Lyophilized Hib component + Manufacturer's DTaP-IPV liquid component = Pentacel vaccine

Should be used immediately after reconstitution

Hib (ActHIB)



Lyophilized Hib component + Manufacturer's 0.4% sodium chloride diluent = ActHIB vaccine

Beyond Use Time: If not used immediately after reconstitution, store at 2°C to 8°C (36°F to 46°F) and discard if not used within 24 hours. Should be shaken vigorously before injection.

Additional Clinical Considerations

- Provide the polio and Hib vaccine information statement (VIS) when a combination vaccine is administered
 - There are no VISs specific for Kinrix, Pediarix, Pentacel, or Quadracel
- Other option: multiple vaccines VIS
 - May be used in place of the individual VISs for DTaP, Hib, hepatitis B, polio, and PCV13 when two or more of these vaccines are administered during the same visit
 - It may be used for infants through children receiving their routine 4- to 6-year vaccines

The image displays three overlapping Vaccine Information Statement (VIS) forms from the CDC. The top form is titled "Your Child's First Vaccines" and includes a checklist for DTaP, Hib, Hepatitis B, and Polio. The middle form is titled "Polio Vaccine" and contains section 1, "Why get vaccinated?". The bottom form is titled "Hib Vaccine" and contains sections 1, "Why get vaccinated?", and 2, "Hib vaccine". The forms are partially overlapping, with the Hib form in the foreground and the Polio form behind it.

VACCINE INFORMATION STATEMENT
Your Child's First Vaccines
What You Need to Know

Many Vaccine Information Statements are available in Spanish and other languages. See www.imzantize.org/via.
Hojas de información sobre vacunas están disponibles en español y en muchos otros idiomas. Visite www.imzantize.org/via.

The vaccines covered on this statement are those most likely to be given during infancy and early childhood. Other vaccines (including mumps, measles, rubella, rotavirus, influenza, and hepatitis A) are also routinely recommended.

Your child will get these vaccines today:

DTaP Hib Hepatitis B Polio

(Provider: Check appropriate boxes.)

1 Why get vaccinated?

Vaccine-preventable diseases that have not gone away. Other diseases still occur even in babies who get 7 childhood diseases vaccines:

1. **Diphtheria (the 'D')**
 - **Signs and symptoms:** Sore throat, fever, and a thick coating in the back of the throat that may lead to breathing problems, paralysis, and heart failure.
 - **Diphtheria can lead to:** paralysis and heart failure.
 - About 15,000 people die from diphtheria each year.
2. **Tetanus (the 'T' in Lockjaw)**
 - **Signs and symptoms:** Stiff muscles, usually in the neck, and difficulty swallowing.
 - **Tetanus can lead to:** death.
 - Tetanus kills about 10% of those who get it.
3. **Pertussis (the 'P' known as Whooping Cough)**
 - **Signs and symptoms:** Coughing spells that can last for weeks and may be worse at night.
 - **Pertussis can lead to:** pneumonia, or death. In infants, it can cause seizures.
 - Most pertussis deaths occur in infants under 6 months of age.

VACCINE INFORMATION STATEMENT
Polio Vaccine
What You Need to Know

Many Vaccine Information Statements are available in Spanish and other languages. See www.imzantize.org/via.
Hojas de información sobre vacunas están disponibles en español y en muchos otros idiomas. Visite www.imzantize.org/via.

1 Why get vaccinated?

Adults
Most adults do not need IPV because they were already vaccinated against polio as children. But some adults are at higher risk and should consider polio vaccination, including:
• people traveling to certain parts of the world, especially laboratory workers who might handle polio virus, and health care workers treating patients who could have polio.
• These higher-risk adults may need 1 to 3 doses of IPV, depending on how many doses they have had in the past. There are no known risks to getting IPV at the same time as other vaccines.

3 Some people should not get this vaccine

All the person who is giving the vaccine:
If the person getting the vaccine has any severe, life-threatening allergies.
If you ever had a life-threatening allergic reaction after a dose of IPV, or have a severe allergy to any part of this vaccine, you may be advised not to get vaccinated. Ask your health care provider if you want information about vaccine components.
If the person getting the vaccine is not feeling well.
If you have a mild illness, such as a cold, you can probably get the vaccine today. If you are moderately or severely ill, you should probably wait until you recover. Your doctor can advise you.

4 Risks of a vaccine reaction

With any medicine, including vaccines, there is a chance of side effects. These are usually mild and go away on their own, but serious reactions are also possible.
Some people who get IPV get a sore spot where the shot is given. IPV has not been known to cause serious problems, and most people do not have any problems with it.

VACCINE INFORMATION STATEMENT
Hib Vaccine
(Haemophilus influenzae Type b)
What You Need to Know

Many Vaccine Information Statements are available in Spanish and other languages. See www.imzantize.org/via.
Hojas de información sobre vacunas están disponibles en español y en muchos otros idiomas. Visite www.imzantize.org/via.

1 Why get vaccinated?

Haemophilus influenzae type b (Hib) disease is a serious disease caused by bacteria. It usually affects children under 5 years old. It can also affect adults with certain medical conditions.

Your child can get Hib disease by being around other children or adults who may have the bacteria and not know it. The germs spread from person to person. If the germs stay in the child's nose and throat, the child probably will not get sick. But sometimes the germs spread into the lungs or the bloodstream, and then Hib can cause serious problems. This is called invasive Hib disease.

Before Hib vaccine, Hib disease was the leading cause of bacterial meningitis among children under 5 years old in the United States. Meningitis is an infection of the lining of the brain and spinal cord. It can lead to brain damage and deafness. Hib disease can also cause:

- pneumonia
- severe swelling in the throat, making it hard to breathe
- infections of the blood, joints, bones, and covering of the heart
- death

Before Hib vaccine, about 20,000 children in the United States under 5 years old got Hib disease each year, and about 3% - 6% of them died.

Hib vaccine can prevent Hib disease. Since use of Hib vaccine began, the number of cases of invasive Hib disease has decreased by more than 99%. Many more children would get Hib disease if we stopped vaccinating.

2 Hib vaccine

Several different brands of Hib vaccine are available. Your child will receive either 3 or 4 doses, depending on which vaccine is used.

Doses of Hib vaccine are usually recommended at these ages:

- First Dose: 2 months of age
- Second Dose: 4 months of age
- Third Dose: 6 months of age (if needed, depending on brand of vaccine)
- Final/Booster Dose: 12-15 months of age

Hib vaccine may be given at the same time as other vaccines.

Hib vaccine may be given as part of a combination vaccine. Combination vaccines are made when two or more types of vaccine are combined together into a single shot, so that one vaccination can protect against more than one disease.

Children over 5 years old and adults usually do not need Hib vaccine. But it may be recommended for older children or adults with asplenia or sickle cell disease, before surgery to remove the spleen, or following a bone marrow transplant. It may also be recommended for people 5 to 18 years old with HIV. Ask your doctor for details.

Your doctor or the person giving you the vaccine can give you more information.

**U.S. Department of Health and Human Services
Centers for Disease Control and Prevention**

Polio and Vaccine Resources and References

- Resources and references are available on the webinar web page

Polio and Haemophilus influenzae type b Vaccines Resources and References

2018 PINK BOOK WEBINAR SERIES

ACIP recommendations

- Current ACIP *Haemophilus influenzae* type b vaccine recommendations www.cdc.gov/vaccines/hcp/acip-recs/vacc-specific/hib.html
- Current ACIP Polio vaccine recommendations www.cdc.gov/vaccines/hcp/acip-recs/vacc-specific/polio.html
- ACIP General Best Practice Guidelines on Immunization www.cdc.gov/vaccines/hcp/acip-recs/general-recs/index.html

Manufacturer's vaccine package inserts (PI)

- ~~DTaP-IPV (Kivrix)~~, GlaxoSmithKline, Biologicals www.fda.gov/downloads/BiologicsBloodVaccines/Vaccines/ApprovedProducts/UCM241453.pdf
- ~~DTaP-IPV (Quadacel)~~, Sanofi Pasteur Limited www.fda.gov/downloads/BiologicsBloodVaccines/Vaccines/ApprovedProducts/ucm439903.pdf
- ~~DTaP-IPV-HepB (Pediarix)~~, GlaxoSmithKline, Biologicals www.fda.gov/downloads/BiologicsBloodVaccines/Vaccines/ApprovedProducts/UCM241874.pdf
- ~~DTaP-IPV/Hib (Pentacel)~~, Sanofi Pasteur Limited www.fda.gov/downloads/BiologicsBloodVaccines/Vaccines/ApprovedProducts/UCM109810.pdf
- ~~ActHib~~, Sanofi Pasteur Limited www.fda.gov/downloads/BiologicsBloodVaccines/Vaccines/ApprovedProducts/UCM109841.pdf
- ~~Hibertix~~, GlaxoSmithKline, Biologicals, www.fda.gov/biologicsbloodvaccines/vaccines/approvedproducts/ucm179527.htm
- ~~PedvaxHib~~, Merck & Co., Inc www.fda.gov/BiologicsBloodVaccines/Vaccines/ApprovedProducts/ucm094051.htm
- IPOL, Sanofi Pasteur Limited www.fda.gov/BiologicsBloodVaccines/Vaccines/ApprovedProducts/ucm200582.htm

Schedule

- 2018 Recommended immunization schedule for persons aged 18 years and younger www.cdc.gov/vaccines/schedules/hcp/child-adolescent.html
- 2018 Recommended immunization schedule for adults 19 years and older www.cdc.gov/vaccines/schedules/hcp/adult.html

Disease

- CDC *Haemophilus influenzae* type b disease webpage www.cdc.gov/hi-disease/clinicians.html
- CDC Polio disease webpage <https://www.cdc.gov/polio/us/hcp.html>
- Hib disease information you need to know www.chop.edu/conditions-diseases/haemophilus-influenzae-infections
- Polio information you need to know
- The Global Polio Eradication Initiative <http://polioeradication.org/>

Information for health care personnel

- *Epidemiology and Prevention of Vaccine-Preventable Diseases: Haemophilus influenzae* type b chapter www.cdc.gov/vaccines/pubs/pinkbook/hib.html
- *Epidemiology and Prevention of Vaccine-Preventable Diseases: Polio* chapter www.cdc.gov/vaccines/pubs/pinkbook/downloads/polio.pdf
- Ask the Experts: Combination vaccine questions www.immunize.org/askexperts/experts_combo.asp
- Ask the Experts: *Haemophilus influenzae* type b questions www.immunize.org/askexperts/experts_hib.asp
- Ask the Experts: Polio questions www.immunize.org/askexperts/experts_pol.asp
- CDC Hib vaccination www.cdc.gov/vaccines/vpd/hib/hcp/index.html