WELCOME TO
AK LIVER DISEASE ECHO

ALASKA NATIVE TRIBAL HEALTH CONSORTIUM

NPAIHB
Indian Leadership for Indian Health

This project is supported by a grant from the Northwest Portland Area Indian Health Board and funding is provided from the HHS Secretary's Minority HIV/AIDS Fund.

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Where you are located
What brings you to the LD ECHO today

WHAT WE DO

- Didactic Presentations pertaining to ECHO topics
- We're accepting **case presentations and questions pertaining to:**
  - Elevated Liver Function Tests
  - Cirrhosis
  - Managing Complications of Decompensated Cirrhosis – Ascites, encephalopathy, esophageal varices
  - Alcohol-related liver disease, including Alcohol Hepatitis
  - Autoimmune liver disease – Autoimmune Hepatitis, Primary Biliary Cholangitis, Overlap
  - Nonalcoholic fatty liver disease/Nonalcoholic steatohepatitis
  - Hepatocellular carcinoma
- Provide Expert Panelists

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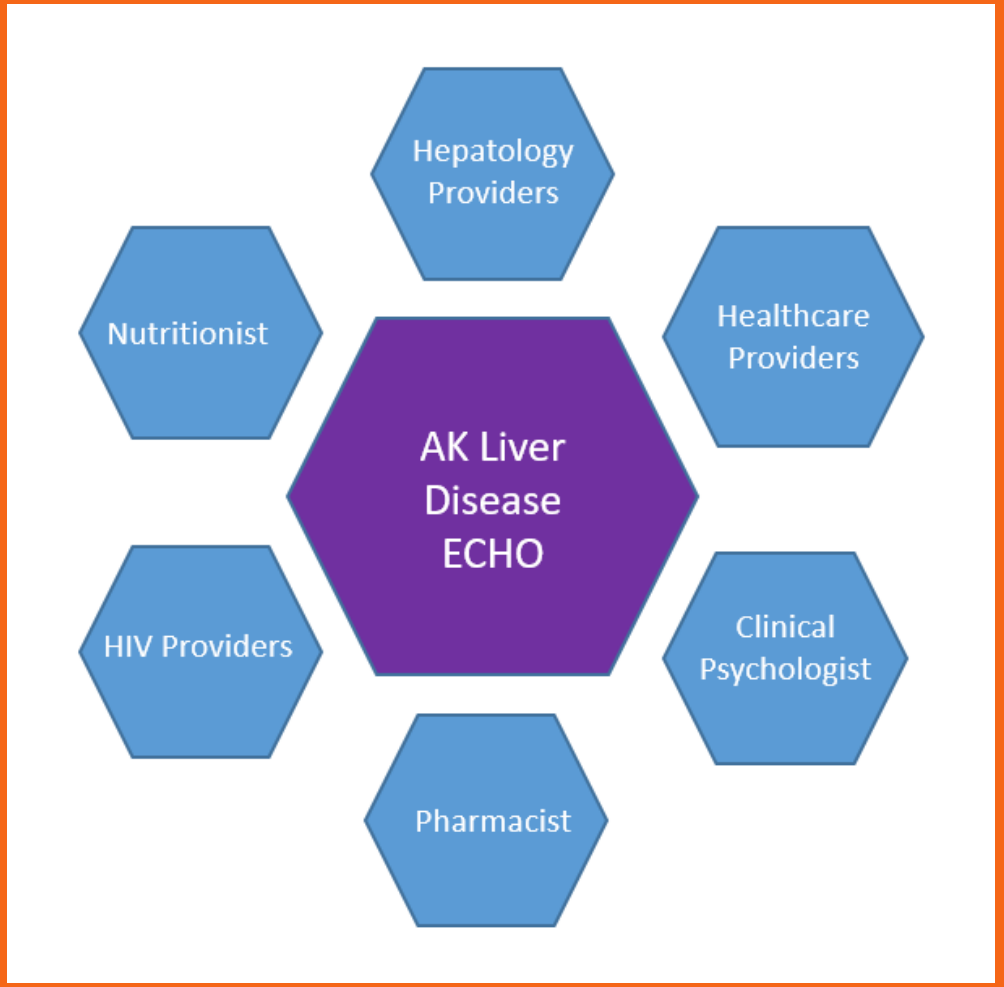

Welcome to Alaska Liver Disease ECHO

Approved Provider Statements:

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INTERPROFESSIONAL CONTINUING EDUCATION

In support of improving patient care, Alaska Native Medical Center (ANMC) is jointly accredited by the Accreditation Council for Continuing Medical Education (ACCME), the Accreditation Council for Pharmacy Education (ACPE), and the American Nurses Credentialing Center (ANCC), to provide continuing education for the healthcare team.

Contact Hours:

ANMC designates this activity for a maximum of 12 contact hours, including 3 total pharmacotherapeutics contact hours, commensurate with participation.

Financial Disclosures:

Youssef Barbour, MD & Lisa Townshend-Bulson, APRN / faculty for this educational event, are primary investigators in an ANTHC sponsored hepatitis C study funded in part by Gilead Sciences. All of the relevant financial relationships listed have been mitigated.

Requirements for Successful Completion:

To receive CE credit please make sure you have actively engaged in the entire activity, your attendance is recorded by the facilitator, and complete the course evaluation form found here: https://forms.gle/R8vibUZgMbRcoScw9.

For more information contact
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ALASKA NATIVE TRIBAL HEALTH CONSORTIUM

LIVER DISEASE ECHO SCHEDULE AT A GLANCE

- **May 19th – Hepatitis B and other Vaccine Updates**
- June 16th AIH in AN/AI Population in Alaska
- July 21st – PBC/Overlap
- August 18th – Most Common Liver Toxic Drugs
- September 15th – Trauma Informed Care and Liver Disease
- October 20th – Screening for Alcohol Use Disorder

LAND ACKNOWLEDGEMENT

Out of great respect, we acknowledge the Creator of all living things and the original inhabitants upon whose traditional lands we respectively now gather or reside.

Let us, forever, remember the benefits and bounty of the vast resources that stem from these traditional lands, and thank the original inhabitants for their past and present stewardship of the resources (i.e., waters, plants, animals), and the spiritual practices which they cherish on the lands we now call home.

Hepatitis B and Other Vaccine Updates

Alaska Liver Disease ECHO
May 19, 2022

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- I have no conflicts of interest to disclose

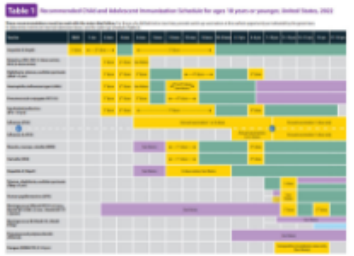
Objectives

- Review background information on hepatitis B
- Review recommendations for hepatitis B vaccination
- Review differences in hepatitis B vaccination schedules
- Review other vaccine updates

Child and Adolescent Schedule

Recommended vaccination schedule for ages 18 years or younger

Birth to 18 Years



Adult Schedule

Recommended vaccination schedule for ages 19 years or older

19 Years or Older

Pre-test

- T/F: The best way to prevent hepatitis B is through vaccination
- The following groups should be vaccinated against hepatitis B:
  a) All infants
  b) Unvaccinated children aged <19 years
  c) Adults aged 19 through 59 years
  d) Adults aged 60 years and older with risk factors for hepatitis B
  e) All of the above
- T/F: Heplisav-B is a 3 dose series
- T/F: Eligible adults may receive either PCV15 in a series with PPSV23 or PCV20 alone

Background

- Vaccine-preventable liver infection caused by the hepatitis B virus (HBV)
- Spread through blood, semen, or other body fluids via sexual contact, sharing needles/syringes/other drug equipment, or from mother to baby at birth
- May or may not cause symptoms
  - Fatigue
  - Poor appetite
  - Stomach pain
  - Nausea
  - Jaundice
- Short-term or chronic
  - Cirrhosis
  - Liver cancer
- Risk for chronic infection is related to age at infection
  - 90% of infants with hepatitis B develop chronic infection
  - 2-6% infected as adults develop chronic infection
- The best way to prevent hepatitis B is to get vaccinated

Reported Hepatitis Cases in Alaska

- Hepatitis C became reportable in January 1996
- Universal Hepatitis A Immunization Program began January 1996
- Hepatitis B Immunization Program expanded April 1997
- Mandatory Hepatitis A and B immunization for children attending Alaska schools and licensed childcare facilities began in Fall 2001

Annual Reported Cases of Hepatitis in Alaska

Number of Annual Reported Cases of Hepatitis in Alaska January 1, 2000 to December 31, 2018

Year	Hepatitis A	Hepatitis B, acute	Hepatitis C**
2018	1	7	1238
2017	0	9	1214
2016	2	7	1193
2015	4	3	1240
2014	1	3	1227
2013	1	1	1037
2012	1	1	987
2011	2	4	1092
2010	5	6	662
2009	2	4	829
2008	5	1	1006
2007	5	8	999
2006	2	9	1039
2005	4	8	982
2004	2	11	932
2003	8	8	821
2002	12	11	746
2001	13	9	741
2000	16	14	722

**Numbers for hepatitis C represent newly reported cases (acute and chronic) for each year.

https://dhss.alaska.gov/dph/Epi/id/Pages/hepatitis/cases.aspx

Background

- 880,000 to 1.89 million people are living with HBV infection in the United States
  - 2/3 may be unaware of their infection
- Chronic hepatitis B disproportionately affects those born outside of the US
  - 14% of the general US population
  - 69% of those not born in the US
- In 2018 a total of 1,649 US death certificates had HBV recorded as an underlying or contributing cause of death
  - This is a conservative estimate

Who should be vaccinated against hepatitis B?

- All infants
- Unvaccinated children aged <19 years
- Adults aged 19 through 59 years
- Adults aged 60 years and older with risk factors for hepatitis B
  - Sexual exposure
  - Percutaneous or mucosal exposure to blood
  - International travelers
  - HIV or HCV infection
  - Chronic liver disease
  - Incarcerated
- In certain healthcare, evaluation, or treatment settings, a high proportion of clients have known risk factors for HBV infection. Adults who receive care in those settings should be vaccinated.
  - Sexually transmitted disease treatment facilities
  - HIV testing/treatment facilities
  - Drug-abuse treatment/prevention programs
  - Healthcare settings targeting service to people who inject drugs
  - Correctional facilities
  - Healthcare settings targeting services to men who have sex with men
  - Chronic hemodialysis facilities/ESRD programs
  - Institutional/non-residential day care facilitates for people with developmental disabilities
- The following groups *may* receive hepatitis B vaccination
  - Adults aged 60 years and older without known risk factors for hepatitis B

New updates

All infants

Persons aged <19 years

Adults aged 19–59 years

Adults aged ≥60 years with risk factors for hepatitis B:

- Persons at risk for infection by sexual exposure
  - Sex partners of persons testing positive for HBsAg
  - Sexually active persons who are not in a long-term, mutually monogamous relationship (e.g., persons with more than one sex partner during the previous 6 months)
  - Persons seeking evaluation or treatment for a sexually transmitted infection
  - Men who have sex with men
- Persons at risk for infection by percutaneous or mucosal exposure to blood
  - Persons with current or recent injection drug use
  - Household contacts of persons testing positive for HBsAg
  - Residents and staff members of facilities for persons with developmental disabilities
  - Health care and public safety personnel with reasonably anticipated risk for exposure to blood or blood-contaminated body fluids
  - Persons on maintenance dialysis, including in-center or home hemodialysis and peritoneal dialysis, and persons who are predialysis
  - Persons with diabetes at the discretion of the treating clinician
- Others
  - International travelers to countries with high or intermediate levels of endemic hepatitis B virus infection (HBsAg prevalence of ≥2%)
  - Persons with hepatitis C virus infection
  - Persons with chronic liver disease (including, but not limited to, persons with cirrhosis, fatty liver disease, alcoholic liver disease, autoimmune hepatitis, and an alanine aminotransferase or aspartate aminotransferase level greater than twice the upper limit of normal)
  - Persons with HIV infection
  - Persons who are incarcerated

Adults aged ≥60 years without known risk factors for hepatitis B may receive hepatitis B vaccines

Abbreviation: HBsAg = hepatitis B surface antigen.

Centers for Disease Control and Prevention
MMWR
Morbidity and Mortality Weekly Report
Weekly / Vol. 71 / No. 13
April 1, 2022

Universal Hepatitis B Vaccination in Adults Aged 19–59 Years: Updated Recommendations of the Advisory Committee on Immunization Practices — United States, 2022

Mark K. Weng, MD[1]; Mona Doshani, MD[1]; Mohammed A. Khan, PhD[1]; Sharon Frey, MD[2]; Kevin Ault, MD[3]; Kelly L. Moore, MD[4]; Eric W. Hall, PhD[5]; Rebecca L. Morgan, PhD[6]; Doug Campos-Outcalt, MD[7]; Carolyn Wester, MD[1]; Noele P. Nelson, MD, PhD[1]

Hepatitis B (HepB) vaccines have demonstrated safety, immunogenicity, and efficacy during the past 4 decades (*1*,*2*). However, vaccination coverage among adults has been suboptimal, limiting further reduction in hepatitis B virus (HBV) infections in the United States. This Advisory Committee on Immunization Practices (ACIP) recommendation expands the indicated age range for universal HepB vaccination to now include adults aged 19–59 years. Removing the risk factor assessment previously recommended to determine vaccine eligibility in this adult age group (*2*) could increase vaccination coverage and decrease hepatitis B cases.

risk behaviors; risk behavior and exposure information were missing for 37.1% of cases. There are an estimated 880,000 (95% CI = 580,000–1,170,000) prevalent chronic HBV infections in the United States based on 2013–2018 National Health and Nutrition Examination Survey data, with a modeled estimate of 1.89 million (range = 1.49–2.40 million) that accounts for potential underrepresentation of the non-U.S.–born population (*5*,*6*). In 2018, the reported HepB vaccination coverage (≥3 doses) was 30.0% among adults aged ≥19 years, only a small increase over the past 4 decades (*7*).

Summary

What is already known about this topic?

Vaccination with hepatitis B (HepB) vaccines shows well-established safety and efficacy. However, because of risk factor–based approaches of previous vaccination recommendations, coverage among adults has been suboptimal.

What is added by this report?

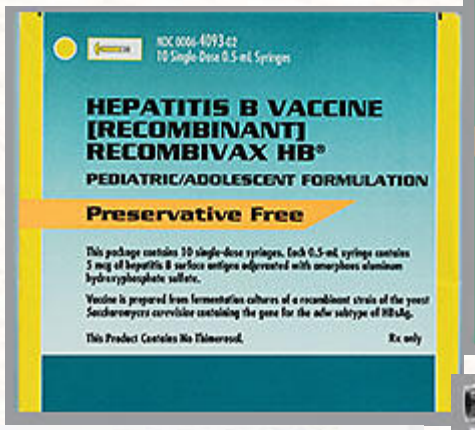
In addition to groups for whom HepB vaccination is already recommended, the Advisory Committee on Immunization Practices recommends that all adults aged 19–59 years should receive HepB vaccines.

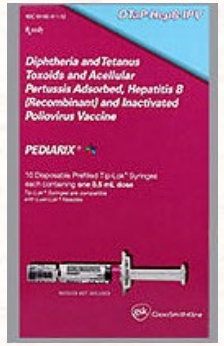
What are the implications for public health practice?

Universal adult HepB vaccination through age 59 years removes the need for risk factor screening and disclosure and could increase vaccination coverage and decrease hepatitis B cases.

What vaccines are available?

- Single-antigen
  - Engerix-B
  - Recombivax HB
  - Helplisav-B
- Three-antigen
  - PreHevbrio
- Combination
  - Pediarix: hepatitis B, diphtheria, tetanus, acellular pertussis (DTaP), inactivated poliovirus (IPV)
  - Twinrix: hepatitis A and B
  - Vaxelis: DTaP, IPV, *Haemophilus infulenzae* type B, and hepatitis B





Hepatitis B vaccines available at ANMC

- The Alaska State immunization program offers Heplisav-B for adults and Engerix-B for pediatrics
  - https://dhss.alaska.gov/dph/Epi/iz/Pages/default.aspx
- ANMC offers the same; Heplisav-B for adults and Engerix-B for pediatrics

Vaccine	Brand Name*	Route	How Supplied	Licensed Age Range
Hepatitis B (pediatric)	Engerix-B®	IM	0.5 mL	Birth through 19 years
Hepatitis B (adult)	Heplisav-B®	IM	0.5 mL	18 years and older
	Engerix-B®	IM	1 mL	20 years and older

*The vaccine products highlighted in grey are not stocked routinely.

Recommended doses of currently licensed formulations of hepatitis B vaccine, by age group and vaccine type

Hepatitis B Vaccine, Age Group (yrs)*	*Dose (µg)*	*Vol (mL)*	*Schedule*
Recombivax HB			
Infants (<1 yr)	5	0.5	3-doses at age 0, 1–2, 6–18 mos
Children (1–10 yrs)	5	0.5	3 doses at 0, 1–2, 6 mos
Adolescents (11–19 yrs)†	5	0.5	3 doses at 0, 1, 6 mos†
Adults (≥20 yrs)	10	1	
Patients on hemodialysis and other immune-compromised persons, <20 yrs§	5	0.5	
Patients on hemodialysis and other immune-compromised persons, ≥20 yrs	40	1	
Engerix-B			
Infants (<1 yr)	10	0.5	3-doses at age 0, 1–2, 6–18 mos
Children (1–10 yrs)	10	0.5	3 doses at 0, 1–2, 6 mos
Adolescents (11–19yrs)	10	0.5	3 doses at 0, 1, 6 mos
Adults (≥20 yrs)	20	1	
Patients on hemodialysis and other immune-compromised persons, <20 yrs§	10	0.5	
Patients on hemodialysis and other immune-compromised persons, ≥20 yrs	40	2	4 doses at 0, 1, 2, 6 mos ¶
Heplisav-B			
Adults (≥18 yrs**)	20	0.5	2 doses at 0 and 1 mos
PreHevbrio (FDA-approved in 2021)			
Adults (≥18 yrs**)	10	1	3 doses at 0, 1, 6 mos
Pediarix (combination hepatitis B, diphtheria, tetanus, acellular pertussis, and inactivated poliovirus)			
Infants (<1 yr)	10	0.5	3-doses at age 0, 1–2, 6–18 mos
Children (1–6 yrs)††	10	0.5	3 doses at 0, 1–2, 6 mos
Vaxelis (combination diphtheria, tetanus, acellular pertussis, inactivated poliovirus, *Haemophilus influenzae* type b, and hepatitis B)			
Infants (<1 yr)	10	0.5	3 doses at age 0, 1–2, 6–18 mos
Children (1–4 yrs) §§	10	0.5	3 doses at 0, 1–2, 6 mos
Twinrix (combination hepatitis A-hepatitis B) ¶¶			
Adults (≥18 yrs)	20	1	3 doses at 0, 1, 6 mos (standard) or 4 doses at 0, 7d, 21–30 d, 12 mos (accelerated)

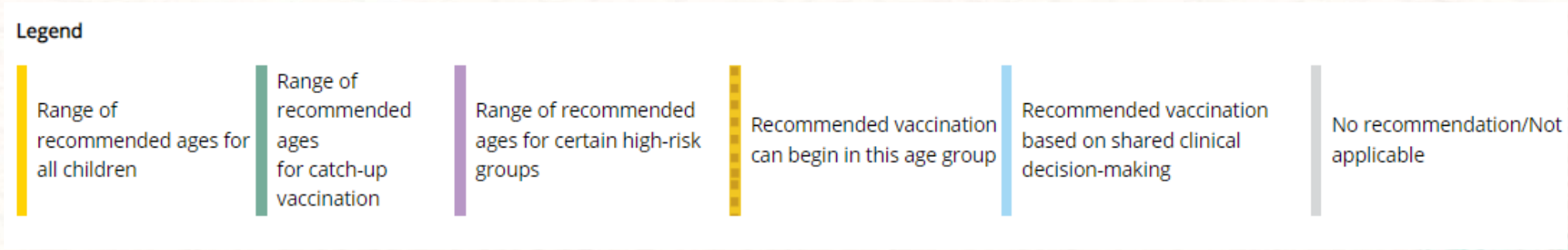
https://www.cdc.gov/hepatitis/hbv/hbvfaq.htm#overview

CDC Immunization Schedules

Using the schedule

To make vaccination recommendations, healthcare providers should:

1. Determine needed vaccines **based on age** (Table 1)
2. Determine appropriate intervals for **catch-up**, if needed (Table 2)
3. Assess for **medical conditions and other indications** (Table 3)
4. Review **special situations** (Vaccination Notes)
5. Review **contraindications and precautions to vaccination** (Appendix)



CDC Immunization Schedules

Birth to 15 Months

Vaccine	Birth	1 mo	2 mos	4 mos	6 mos	9 mos	12 mos	15 mos
Hepatitis B (HepB)	1st dose	←2nd dose→			←3rd dose→			

18 Months to 18 Years

Vaccines	18 mos	19-23 mos	2-3 yrs	4-6 yrs	7-10 yrs	11-12 yrs	13-15 yrs	16 yrs	17-18 yrs
Hepatitis B (HepB)	←3rd dose→								

Vaccine	19-26 years	27-49 years	50-64 years	≥65 years
Hepatitis B (HepB)	2, 3, or 4 doses depending on vaccine or condition			

https://www.cdc.gov/vaccines/schedules/hcp/imz/child-adolescent.html
https://www.cdc.gov/vaccines/schedules/hcp/imz/adult.html

Pediatric Notes

Hepatitis B vaccination

(minimum age: birth)

Birth dose (monovalent HepB vaccine only)

- **Mother is HBsAg-negative:**
  - **All** medically stable infants ≥2,000 grams: 1 dose within 24 hours of birth
  - Infants <2,000 grams: Administer 1 dose at chronological age 1 month or hospital discharge (whichever is earlier and even if weight is still <2,000 grams).
- **Mother is HBsAg-positive:**
  - Administer **HepB vaccine** and **hepatitis B immune globulin (HBIG)** (in separate limbs) within 12 hours of birth, regardless of birth weight. For infants <2,000 grams, administer 3 additional doses of vaccine (total of 4 doses) beginning at age 1 month.
  - Test for HBsAg and anti-HBs at age 9–12 months. If HepB series is delayed, test 1–2 months after final dose.
- **Mother's HBsAg status is unknown:**
  - Administer **HepB vaccine** within 12 hours of birth, regardless of birth weight.
  - For infants <2,000 grams, administer **HBIG** in addition to HepB vaccine (in separate limbs) within 12 hours of birth. Administer 3 additional doses of vaccine (total of 4 doses) beginning at age 1 month.
  - Determine mother's HBsAg status as soon as possible. If mother is HBsAg-positive, administer **HBIG** to infants ≥2,000 grams as soon as possible, but no later than 7 days of age.

Routine vaccination

- 3-dose series at age 0, 1–2, 6–18 months (use monovalent HepB vaccine for doses administered before age 6 weeks)
- Infants who did not receive a birth dose should begin the series as soon as feasible (see Table 2).
- Administration of **4 doses** is permitted when a combination vaccine containing HepB is used after the birth dose.
- **Minimum age** for the final (3rd or 4th) dose: 24 weeks
- **Minimum intervals:** dose 1 to dose 2: 4 weeks / dose 2 to dose 3: 8 weeks / dose 1 to dose 3: 16 weeks (when 4 doses are administered, substitute "dose 4" for "dose 3" in these calculations)

Catch-up vaccination

- Unvaccinated persons should complete a 3-dose series at 0, 1–2, 6 months.
- Adolescents age 11–15 years may use an alternative 2-dose schedule with at least 4 months between doses (adult formulation **Recombivax HB®** only).
- Adolescents age 18 years or older may receive a 2-dose series of HepB **(Heplisav-B®)** at least 4 weeks apart.
- Adolescents age 18 years or older may receive the combined HepA and HepB vaccine, **Twinrix®**, as a 3-dose series (0, 1, and 6 months) or 4-dose series (3 doses at 0, 7, and 21–30 days, followed by a booster dose at 12 months).
- For other catch-up guidance, see Table 2.

Special situations

- Revaccination is not generally recommended for persons with a normal immune status who were vaccinated as infants, children, adolescents, or adults.
- **Post-vaccination serology testing and revaccination** (if anti-HBs < 10mIU/mL) is recommended for certain populations, including:
  - **Infants born to HBsAg-positive mothers**
  - **Hemodialysis patients**
  - **Other immunocompromised persons**

For detailed revaccination recommendations, see http://www.cdc.gov/vaccines/hcp/acip-recs/vacc-specific/hepb.html.

https://www.cdc.gov/vaccines/schedules/hcp/imz/child-adolescent.html#note-hepb

Adult Notes

Hepatitis B vaccination

Routine vaccination

- **Age 19 through 59 years:** complete a 2- or 3-, or 4-dose series
  - 2-dose series only applies when 2 doses of Heplisav-B* are used at least 4 weeks apart
  - 3-dose series Engerix-B or Recombivax HB at 0, 1, 6 months [minimum intervals: dose 1 to dose 2: 4 weeks / dose 2 to dose 3: 8 weeks / dose 1 to dose 3: 16 weeks])
  - 3-dose series HepA-HepB (Twinrix at 0, 1, 6 months [minimum intervals: dose 1 to dose 2: 4 weeks / dose 2 to dose 3: 5 months])
  - 4-dose series HepA-HepB (Twinrix) accelerated schedule of 3 doses at 0, 7, and 21–30 days, followed by a booster dose at 12 months
  - 4-dose series Engerix-B at 0, 1, 2, and 6 months for persons on adult hemodialysis (note: each dosage is double that of normal adult dose, i.e., 2 mL instead of 1 mL)

***Note:** Heplisav-B not recommended in pregnancy due to lack of safety data in pregnant women

Special situations

- **Age 60 years or older* and at risk for hepatitis B virus infection:** 2-dose (Heplisav-B) or 3-dose (Engerix-B, Recombivax HB) series or 3-dose series HepA-HepB (Twinrix) as above
  - **Chronic liver disease** (e.g., persons with hepatitis C, cirrhosis, fatty liver disease, alcoholic liver disease, autoimmune hepatitis, alanine aminotransferase [ALT] or aspartate aminotransferase [AST] level greater than twice upper limit of normal)
  - **HIV infection**
  - **Sexual exposure risk** (e.g., sex partners of hepatitis B surface antigen [HBsAg]-positive persons; sexually active persons not in mutually monogamous relationships; persons seeking evaluation or treatment for a sexually transmitted infection; men who have sex with men)
  - **Current or recent injection drug use**
  - **Percutaneous or mucosal risk for exposure to blood** (e.g., household contacts of HBsAg-positive persons; residents and staff of facilities for developmentally disabled persons; health care and public safety personnel with reasonably anticipated risk for exposure to blood or blood-contaminated body fluids; hemodialysis, peritoneal dialysis, home dialysis, and predialysis patients; patients with diabetes)
  - **Incarcerated persons**
  - **Travel in countries with high or intermediate endemic hepatitis B**

***Note:** Anyone age 60 years or older who does not meet risk-based recommendations may still receive Hepatitis B vaccination.

https://www.cdc.gov/vaccines/schedules/hcp/imz/adult.html#note-hepb

Can Heplisav-B be used to complete a vaccination series started with Engerix-B or Recombivax HB?

- Yes. However, data are limited on the safety and immunogenicity effects when Heplisav-B is interchanged with hepatitis B vaccines from other manufacturers. When feasible, the same manufacturer's vaccines should be used to complete the series. However, vaccination should not be deferred when the manufacturer of the previously administered vaccine is unknown or when the vaccine from the same manufacturer is unavailable.

- The 2-dose HepB series for adults only applies when both doses in the series consist of Heplisav-B. Series consisting of a combination of 1 dose of Heplisav-B and a vaccine from a different manufacturer should consist of 3 total vaccine doses and should adhere to the 3-dose schedule minimum intervals of 4 weeks between dose 1 and 2, 8 weeks between dose 2 and 3, and 16 weeks between dose 1 and 3. Doses administered at less than the minimum interval should be repeated. However, a series containing 2 doses of Heplisav-B administered at least 4 weeks apart is valid, even if the patient received a single earlier dose from another manufacturer.

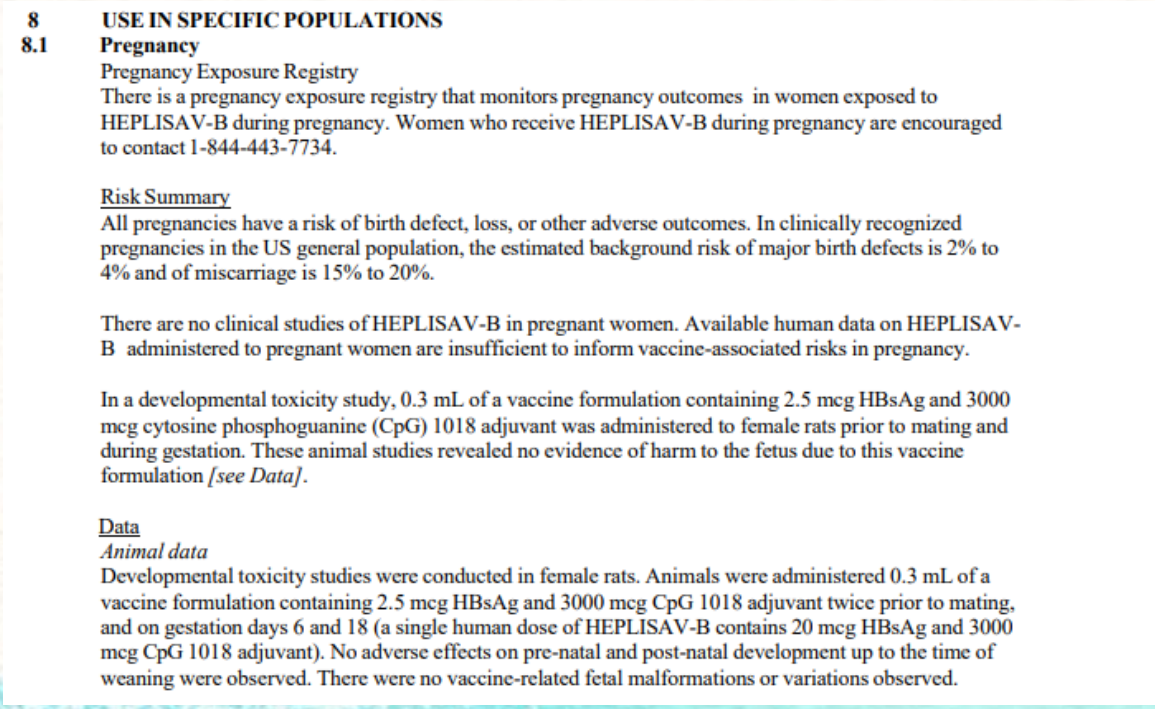
- https://www.immunize.org/askexperts/experts_hepb.asp

Should pregnant women be vaccinated against hepatitis B during pregnancy?

- Yes; women who are identified as being at risk for HBV infection during pregnancy should be vaccinated. They also should be counseled concerning other methods to prevent HBV infection. Providers should administer an age-appropriate 3-dose series of Twinrix, Engerix-B or Recombivax HB. Until safety data are available for Heplisav-B administration during pregnancy, ACIP recommends providers vaccinate pregnant women needing HepB vaccination with a vaccine from a different manufacturer.

- https://www.immunize.org/askexperts/experts_hepb.asp

- https://www.heplisavb.com/assets/pdfs/HEPLISAV-B-Prescribing-Information.pdf



8 USE IN SPECIFIC POPULATIONS

8.1 Pregnancy

Pregnancy Exposure Registry

There is a pregnancy exposure registry that monitors pregnancy outcomes in women exposed to HEPLISAV-B during pregnancy. Women who receive HEPLISAV-B during pregnancy are encouraged to contact 1-844-443-7734.

Risk Summary

All pregnancies have a risk of birth defect, loss, or other adverse outcomes. In clinically recognized pregnancies in the US general population, the estimated background risk of major birth defects is 2% to 4% and of miscarriage is 15% to 20%.

There are no clinical studies of HEPLISAV-B in pregnant women. Available human data on HEPLISAV-B administered to pregnant women are insufficient to inform vaccine-associated risks in pregnancy.

In a developmental toxicity study, 0.3 mL of a vaccine formulation containing 2.5 mcg HBsAg and 3000 mcg cytosine phosphoguanine (CpG) 1018 adjuvant was administered to female rats prior to mating and during gestation. These animal studies revealed no evidence of harm to the fetus due to this vaccine formulation *[see Data]*.

Data

Animal data

Developmental toxicity studies were conducted in female rats. Animals were administered 0.3 mL of a vaccine formulation containing 2.5 mcg HBsAg and 3000 mcg CpG 1018 adjuvant twice prior to mating, and on gestation days 6 and 18 (a single human dose of HEPLISAV-B contains 20 mcg HBsAg and 3000 mcg CpG 1018 adjuvant). No adverse effects on pre-natal and post-natal development up to the time of weaning were observed. There were no vaccine-related fetal malformations or variations observed.

How do I interpret some of the common hepatitis B panel results?

Tests	Results	Interpretation	Vaccinate?
HBsAg anti-HBc anti-HBs	negative negative negative	susceptible	vaccinate if indicated
HBsAg anti-HBc anti-HBs	negative negative positive with ≥10mIU/mL*	immune due to vaccination (or may represent passive transfer of antibodies from receipt of HBIG)	no vaccination necessary
HBsAg anti-HBc IgM anti-HBc anti-HBs	negative positive negative positive	immune due to natural infection	no vaccination necessary
HBsAg anti-HBc IgM anti-HBc anti-HBs	negative positive positive positive	acute resolving infection	no vaccination necessary
HBsAg anti-HBc IgM anti-HBc anti-HBs	positive positive positive negative	acutely infected	no vaccination necessary
HBsAg anti-HBc IgM anti-HBc anti-HBs	positive positive negative negative	chronically infected	no vaccination necessary (may need treatment)
HBsAg anti-HBc anti-HBs	negative positive negative	four interpretations possible†	use clinical judgment

* Postvaccination testing, when it is recommended, should be performed 1-2 months after the last dose of vaccine. Infants born to HBsAg-positive mothers should be tested for HBsAg and anti-HBs after completion of at least 3 doses of a licensed hepatitis B vaccination series, at age 9-18 months (generally at the next well child visit).

†1. May be distantly immune, but the test may not be sensitive enough to detect a very low level of anti-HBs in serum

2. May be susceptible with a false positive anti-HBc

3. May be chronically infected and have an undetectable level of HBsAg present in the serum

4. Passive transfer of antibody following HBIG administration or from an HBsAg-positive mother to her newborn

- https://www.immunize.org/askexperts/experts_hepb.asp

Pneumococcal Vaccine Updates

- Pneumococcal disease is common in young children, but older adults are at greatest risk of serious illness and death
- Conjugate vaccines
  - PCV13
  - PCV15
  - PCV20
- Polysaccharide vaccine
  - PPSV23

Summary

What is already known about this topic?

Currently, the 13-valent pneumococcal conjugate vaccine (PCV) (PCV13) and the 23-valent pneumococcal polysaccharide vaccine (PPSV23) are recommended for U.S. adults. Recommendations vary by age and risk groups.

What is added by this report?

On October 20, 2021, the Advisory Committee on Immunization Practices recommended 15-valent PCV (PCV15) or 20-valent PCV (PCV20) for PCV–naïve adults who are either aged ≥65 years or aged 19–64 years with certain underlying conditions. When PCV15 is used, it should be followed by a dose of PPSV23, typically ≥1 year later.

What are the implications for public health practice?

Pneumococcal vaccination recommendations were simplified across age and risk group. Eligible adults may receive either PCV15 in series with PPSV23 or PCV20 alone.

Centers for Disease Control and Prevention

MMWR

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Use of 15-Valent Pneumococcal Conjugate Vaccine and 20-Valent Pneumococcal Conjugate Vaccine Among U.S. Adults: Updated Recommendations of the Advisory Committee on Immunization Practices — United States, 2022

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In 2021, 20-valent pneumococcal conjugate vaccine (PCV) (PCV20) (Wyeth Pharmaceuticals LLC, a subsidiary of Pfizer Inc.) and 15-valent PCV (PCV15) (Merck Sharp & Dohme Corp.) were licensed by the Food and Drug Administration for adults aged ≥18 years, based on studies that compared antibody responses to PCV20 and PCV15 with those to 13-valent PCV (PCV13) (Wyeth Pharmaceuticals LLC, a subsidiary of Pfizer Inc.). Antibody responses to two additional serotypes included in PCV15 were compared to corresponding responses after PCV13 vaccination, and antibody responses to seven additional serotypes included in PCV20 were compared with those to the 23-valent pneumococcal polysaccharide vaccine (PPSV23) (Merck Sharp & Dohme Corp.). On October 20, 2021, the Advisory Committee on Immunization Practices (ACIP) recommended use of either PCV20 alone or PCV15 in series with PPSV23 for all adults aged ≥65 years, and for adults aged 19–64 years with certain underlying medical conditions or other risk factors* who have not previously received a PCV or whose previous vaccination history is unknown. ACIP employed the Evidence to Recommendation (EtR) framework,† using the Grading of Recommendations, Assessment, Development and Evaluation (GRADE)§ approach to guide its deliberations regarding use of these vaccines. Before this, PCV13 and PPSV23 were recommended for use for U.S. adults

* Alcoholism; chronic heart, liver, or lung disease; chronic renal failure; cigarette smoking; cochlear implant; congenital or acquired asplenia; cerebrospinal fluid leak; diabetes mellitus; generalized malignancy; HIV; Hodgkin disease; immunodeficiency; iatrogenic immunosuppression; leukemia, lymphoma, or multiple myeloma; nephrotic syndrome; solid organ transplant; sickle cell disease; or other hemoglobinopathies.

† https://www.cdc.gov/vaccines/acip/recs/grade/downloads/acip-evidence-recs-framework.pdf

§ https://www.cdc.gov/vaccines/acip/recs/grade/about-grade.html

INSIDE

Continuing Education examination available at https://www.cdc.gov/mmwr/mmwr_continuingEducation.html

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

https://www.cdc.gov/mmwr/volumes/71/wr/pdfs/mm7104a1-H.pdf

Who should get pneumococcal vaccines?

- All children younger than 2 years old
- All adults 65 years or older

- PCVs
  - PCV13 for all children younger than 2 years old and children 2 through 18 years with certain medical conditions
  - For those who have never received ANY pneumococcal conjugate vaccine, the CDC recommends PCV15 or PCV20 for adults 65 years or older, and adults 19 through 64 with certain medical conditions or other risk factors
- PPSV23
  - Children 2 through 18 years old with certain medical conditions
  - Adults 19 years or older who receive PCV15

CDC Immunization Schedules

Birth to 15 Months

Vaccine	Birth	1 mo	2 mos	4 mos	6 mos	9 mos	12 mos	15 mos
Pneumococcal conjugate (PCV13)			1st dose	2nd dose	3rd dose		←4th dose→	

18 Months to 18 Years

Vaccines	18 mos	19-23 mos	2-3 yrs	4-6 yrs	7-10 yrs	11-12 yrs	13-15 yrs	16 yrs	17-18 yrs
Pneumococcal conjugate (PCV13)									
Pneumococcal polysaccharide (PPSV23)			See notes						

https://www.cdc.gov/vaccines/schedules/hcp/imz/child-adolescent.html

Pneumococcal vaccination

(minimum age: 6 weeks [PCV13], 2 years [PPSV23])

Routine vaccination with PCV13

- 4-dose series at age 2, 4, 6, 12–15 months

Catch-up vaccination with PCV13

- 1 dose for healthy children age 24–59 months with any incomplete* PCV13 series
- For other catch-up guidance, see Table 2.

* Incomplete series = Not having received all doses in either the recommended series or an age-appropriate catch-up series See Tables 8, 9, and 11 in the ACIP pneumococcal vaccine recommendations (www.cdc.gov/mmwr/pdf/rr/rr5911.pdf) for complete schedule details.

Special situations

Underlying conditions below: When both PCV13 and PPSV23 are indicated, administer PCV13 first. PCV13 and PPSV23 should not be administered during same visit.

Chronic heart disease (particularly cyanotic congenital heart disease and cardiac failure); chronic lung disease (including asthma treated with high-dose, oral corticosteroids); diabetes mellitus:

Age 2–5 years
- Any incomplete* series with:
  - 3 PCV13 doses: 1 dose PCV13 (at least 8 weeks after any prior PCV13 dose)
  - Less than 3 PCV13 doses: 2 doses PCV13 (8 weeks after the most recent dose and administered 8 weeks apart)
- No history of PPSV23: 1 dose PPSV23 (at least 8 weeks after completing all recommended PCV13 doses)

Age 6–18 years
- No history of PPSV23: 1 dose PPSV23 (at least 8 weeks after completing all recommended PCV13 doses)

Cerebrospinal fluid leak, cochlear implant:

Age 2–5 years
- Any incomplete* series with:
  - 3 PCV13 doses: 1 dose PCV13 (at least 8 weeks after any prior PCV13 dose)
  - Less than 3 PCV13 doses: 2 doses PCV13 (8 weeks after the most recent dose and administered 8 weeks apart)
- No history of PPSV23: 1 dose PPSV23 (at least 8 weeks after any prior PCV13 dose)

Age 6–18 years
- No history of either PCV13 or PPSV23: 1 dose PCV13, 1 dose PPSV23 at least 8 weeks later
- Any PCV13 but no PPSV23: 1 dose PPSV23 at least 8 weeks after the most recent dose of PCV13
- PPSV23 but no PCV13: 1 dose PCV13 at least 8 weeks after the most recent dose of PPSV23

Sickle cell disease and other hemoglobinopathies; anatomic or functional asplenia; congenital or acquired immunodeficiency; HIV infection; chronic renal failure; nephrotic syndrome; malignant neoplasms, leukemias, lymphomas, Hodgkin disease, and other diseases associated with treatment with immunosuppressive drugs or radiation therapy; solid organ transplantation; multiple myeloma:

Age 2–5 years
- Any incomplete* series with:
  - 3 PCV13 doses: 1 dose PCV13 (at least 8 weeks after any prior PCV13 dose)
  - Less than 3 PCV13 doses: 2 doses PCV13 (8 weeks after the most recent dose and administered 8 weeks apart)
- No history of PPSV23: 1 dose PPSV23 (at least 8 weeks after any prior PCV13 dose) and a dose 2 of PPSV23 5 years later

Age 6–18 years
- No history of either PCV13 or PPSV23: 1 dose PCV13, 2 doses PPSV23 (dose 1 of PPSV23 administered 8 weeks after PCV13 and dose 2 of PPSV23 administered at least 5 years after dose 1 of PPSV23)
- Any PCV13 but no PPSV23: 2 doses PPSV23 (dose 1 of PPSV23 administered 8 weeks after the most recent dose of PCV13 and dose 2 of PPSV23 administered at least 5 years after dose 1 of PPSV23)
- PPSV23 but no PCV13: 1 dose PCV13 at least 8 weeks after the most recent PPSV23 dose and a dose 2 of PPSV23 administered 5 years after dose 1 of PPSV23 and at least 8 weeks after a dose of PCV13

Chronic liver disease, alcoholism:

Age 6–18 years
- No history of PPSV23: 1 dose PPSV23 (at least 8 weeks after any prior PCV13 dose)

*Incomplete series = Not having received all doses in either the recommended series or an age-appropriate catch-up series. See Tables 8, 9, and 11 in the ACIP pneumococcal vaccine recommendations (www.cdc.gov/mmwr/pdf/rr/rr5911.pdf) for complete schedule details.

Vaccine	19-26 years	27-49 years	50-64 years	≥65 years
Pneumococcal (PCV15, PCV20, PPSV23)	1 dose PCV15 followed by PPSV23 OR 1 dose PCV20 (see notes)			1 dose PCV15 followed by PPSV23 OR 1 dose PCV20

Routine vaccination

- **Age 65 years or older** who have not previously received a pneumococcal conjugate vaccine or whose previous vaccination history is unknown: 1 dose PCV15 or 1 dose PCV20. If PCV15 is used, this should be followed by a dose of PPSV23 given at least 1 year after the PCV15 dose. A minimum interval of 8 weeks between PCV15 and PPSV23 can be considered for adults with an immunocompromising condition,* cochlear implant, or cerebrospinal fluid leak to minimize the risk of invasive pneumococcal disease caused by serotypes unique to PPSV23 in these vulnerable groups.
- For guidance for patients who have already received a previous dose of PCV13 and/or PPSV23, see https://www.cdc.gov/mmwr/volumes/71/wr/mm7104a1.htm.

*Note: Immunocompromising conditions include chronic renal failure, nephrotic syndrome, immunodeficiency, iatrogenic immunosuppression, generalized malignancy, human immunodeficiency virus, Hodgkin disease, leukemia, lymphoma, multiple myeloma, solid organ transplants, congenital or acquired asplenia, sickle cell disease, or other hemoglobinopathies.

Special situations

- **Age 19–64 years** with certain underlying medical conditions or other risk factors** who have not previously received a pneumococcal conjugate vaccine or whose previous vaccination history is unknown: 1 dose PCV15 or 1 dose PCV20. If PCV15 is used, this should be followed by a dose of PPSV23 given at least 1 year after the PCV15 dose. A minimum interval of 8 weeks between PCV15 and PPSV23 can be considered for adults with an immunocompromising condition,* cochlear implant, or cerebrospinal fluid leak to minimize the risk of invasive pneumococcal disease caused by serotypes unique to PPSV23 in these vulnerable groups.
- For guidance for patients who have already received a previous dose of PCV13 and/or PPSV23, see https://www.cdc.gov/mmwr/volumes/71/wr/mm7104a1.htm.

*Note: Immunocompromising conditions include chronic renal failure, nephrotic syndrome, immunodeficiency, iatrogenic immunosuppression, generalized malignancy, human immunodeficiency virus, Hodgkin disease, leukemia, lymphoma, multiple myeloma, solid organ transplants, congenital or acquired asplenia, sickle cell disease, or other hemoglobinopathies.

**Note: Underlying medical conditions or other risk factors include alcoholism, chronic heart/liver/lung disease, chronic renal failure, cigarette smoking, cochlear implant, congenital or acquired asplenia, CSF leak, diabetes mellitus, generalized malignancy, HIV, Hodgkin disease, immunodeficiency, iatrogenic immunosuppression, leukemia, lymphoma, multiple myeloma, nephrotic syndrome, solid organ transplants, or sickle cell disease or other hemoglobinopathies.

https://www.cdc.gov/vaccines/schedules/hcp/imz/adult.html

State of Alaska Vaccine Formulary

- https://dhss.alaska.gov/dph/Epi/iz/Pages/vaxpacket/default.aspx
- Not updated since April 2020

https://dhss.alaska.gov/dph/Epi/iz/Documents/ssv/Formulary.pdf

Vaccine Formulary

ALASKA IMMUNIZATION PROGRAM

Pediatric Vaccines	Brand Name®	Manufacturer	NDC Code
DT (Diphtheria/ Tetanus)	DT	Sanofi Pasteur	49281-0225-10 (1 pk, vial)
DTaP (Diphtheria/ Tetanus/acellular Pertussis)	Infanrix®	GlaxoSmithKline	58160-0810-52 (10 pk, syr)
DTaP/ Hepatitis B/ IPV	Pediarix®	GlaxoSmithKline	58160-0811-52 (10 pk, syr)
DTaP/ IPV	Kinrix®	GlaxoSmithKline	58160-0812-52 (10 pk, syr)
Hepatitis A	Havrix®	GlaxoSmithKline	58160-0825-52 (10 pk, syr)
Hepatitis B	Engerix-B®	GlaxoSmithKline	58160-0820-52 (10 pk, syr)
Hib (Haemophilus influenzae type b)	PedvaxHIB®	Merck	00006-4897-00 (10 pk vial)
9vHPV (Human Papillomavirus 9-valent)	Gardasil®9	Merck	00006-4121-02 (10 pk, syr)
Influenza	Varies: Influenza Vaccines		
IPV (Inactivated poliovirus)	IPOL®	Sanofi Pasteur	49281-0860-10 (10 pk, vial)
MCV4 (Meningococcal conjugate)	Menactra®	Sanofi Pasteur	49281-0589-05 (5 pk, vial)
MVC4O (Meningococcal conjugate)	Menveo®	GlaxoSmithKline	58160-0955-09 (5 pk, vial)
MenB (Serogroup B Meningococcal)	Bexsero®	GlaxoSmithKline	58160-0976-20 (10 pk, syr)
MMR (Measles/ Mumps/ Rubella)	M-M-R®II	Merck	00006-4681-00 (10 pk, vial)
PCV13 (Pneumococcal conjugate)	Prevnar 13™	Pfizer	00005-1971-02 (10 pk, syr)
PPSV23 (Pneumococcal polysaccharide)	Pneumovax®23	Merck	00006-4837-03 (1 pk, syr)
RV5 (Rotavirus)	RotaTeq®	Merck	00006-4047-41 (10 pk, tube)
Td (Tetanus/ diphtheria)	TDVAX™	Grifols	13533-0131-01 (1 pk, vial)
Tdap (Tetanus/ Diphtheria/Acellular Pertussis)	Boostrix®	GlaxoSmithKline	58160-0842-11 (10 pk, vial)
Varicella (Chickenpox)	Varivax®	Merck	00006-4827-00 (10 pk, vial)

Adult Vaccines	Brand Name®	Manufacturer	NDC Code
Hepatitis A Adult	Havrix®	GlaxoSmithKline	58160-0826-52 (10 pk, syr)
Hepatitis B Adult	Heplisav-B™	Dynavax	43528-0003-05 (5 pk, syr)
9vHPV (Human papillomavirus 9-valent)	Gardasil®9	Merck	00006-4121-02 (10 pk, syr)
Influenza	Varies: Influenza Vaccines		
MCV4 (Meningococcal conjugate)	Menactra®	Sanofi Pasteur	49281-0589-05 (5 pk, vial)
MenB (Serogroup B Meningococcal)	Bexsero®	GlaxoSmithKline	58160-0976-20 (10 pk, syr)
MMR (Measles/ Mumps/ Rubella)	M-M-R®II	Merck	00006-4681-00 (10 pk, vial)
PCV13 (Pneumococcal conjugate)	Prevnar 13™	Pfizer	00005-1971-02 (10 pk, syr)
PPSV23 (Pneumococcal polysaccharide)	Pneumovax®23	Merck	00006-4837-03 (1 pk, syr)
Td (Tetanus/ diphtheria)	TDVAX™	MassBiologics	13533-0131-01 (1 pk, vial)
Tdap (Tetanus/ Diphtheria/acellular Pertussis)	Boostrix®	Sanofi Pasteur	58160-0842-11 (10 pk, vial)
Varicella (Chickenpox)	Varivax®	Merck	00006-4827-00 (10 pk, vial)
Zoster (Shingles)	Shingrix	GlaxoSmithKline	58160-0819-12 (1 pk, vial) 58160-0823-11 (10 pk, vial)

Related CDC links

Vaccine for Children Vaccine Price List

CDC Current Vaccine Shortages and Delays

Immunization Information Systems (IIS) Code Sets

Alaska Immunization Helpline:

Anchorage: 907-269-8088 | Toll Free: 888-430-4321 | Email: immune@alaska.gov

Rev. 4/8/20

Post-test

- T/F: The best way to prevent hepatitis B is through vaccination
- The following groups should be vaccinated against hepatitis B:
  a) All infants
  b) Unvaccinated children aged <19 years
  c) Adults aged 19 through 59 years
  d) Adults aged 60 years and older with risk factors for hepatitis B
  e) All of the above
- T/F: Heplisav-B is a 3 dose series
- T/F: Eligible adults may receive either PCV15 in a series with PPSV23 or PCV20 alone

Post-test

- **T**/F: The best way to prevent hepatitis B is through vaccination
- The following groups should be vaccinated against hepatitis B:
  a) All infants
  b) Unvaccinated children aged <19 years
  c) Adults aged 19 through 59 years
  d) Adults aged 60 years and older with risk factors for hepatitis B
  e) All of the above
- T/**F**: Heplisav-B is a 3 dose series
- **T**/F: Eligible adults may receive either PCV15 in a series with PPSV23 or PCV20 alone

Conclusions

- Vaccination is a highly effective, safe, and easy way to prevent disease.
- Timing of vaccination is important; refer to immunization schedules and the notes for special situations.
  - https://www.cdc.gov/vaccines/schedules/
- There are multiple vaccines on the market, including combination vaccines. Refer to immunization schedules and your local formulary to determine which vaccine you can use.
  - https://www.immunize.org/askexperts/ : Ask the Experts
  - https://vactrak.alaska.gov/iweb/login.jsp : Alaska Immunization Information System
- Check for updates regularly.
  - https://www.cdc.gov/mmwr/index.html

Thank you!

ADDITIONAL LEARNING OPPORTUNITIES

- June 3rd from 12-1:30PM – HCV Simplified Treatment Training for Providers

  Register here: https://echo.zoom.us/meeting/register/tZIqdeqrrjMuG9N3Git-BRF30DBPBP1A9qiC

- AK ID ECHO: HCV, HIV, PrEP, STIs
  - The 2nd Tuesday of every month from 12:00-1:00PM Alaska Standard Time
    - 1CE/CME offered per session
  - anthc.org/project-echo/hcv-hiv-prep-stis-echo
- LiverConnect Webinar Program
  - Second Tuesday of every month 8:00-9:00AM Alaska Standard Time
    - Full Hour didactic topics on Liver Disease and related topics 1CE/CME offered
  - anthc.org/what-we-do/clinical-and-research-services/hep/liverconnect/

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Thank you

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