Perinatal Hepatitis B Prevention

November 2025 Lunch & Learn

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Hepatitis

Inflammation of the liver
- Viral or bacterial infection
- Damage/trauma
- Tumor
- Toxic exposure (high amounts of alcohol or other chemicals, fungal toxins, etc.)
- Effects of another disease or condition

Liver function tests (LFTs)
- Enzymes: ALT, AST, ALP
- Waste product: Bilirubin
- Protein: Albumin
- Prothrombin Time (PT)

Signs and Symptoms
- Jaundice
- Itching
- Dark urine
- Light stool
- Fatigue
- Abdominal pain
- Nausea/vomiting

Viral hepatitis (A-E)
- Serology
  - Surface antigen: HbSAg(+)
  - Core antigen: HbC(+)
  - Surface antibody: anti-HBs(-)

Hepatitis simply means an inflamed liver. This can be caused by (list) but is often the result of a viral infection.

Hepatitis is usually detected through a combination of signs like jaundice, dark urine, light stool in combination with symptoms that a patient might report like abdominal pain, nausea, fatigue, and itching.

If hepatitis is suspected, a healthcare provider will run liver function tests to assess and confirm the diagnosis and then do a serologic test and sometimes a viral PCR test to detect antibodies to viral hepatitis or viral RNA/DNA.

Viral Hepatitis

Type	Spread	Vaccine	Chronic or acute	Epidemiology	Treatment
A	Fecal/oral, foodborne, water, sexual	Yes	Acute	Sporadic in US, usually travel-associated. Sometimes caused by contaminated food	Supportive
B	Bloodborne, vertical (mother to child), sexual, IV drug use	Yes	Acute or Chronic	Increasingly less common in the U.S., still prevalent globally	GI treatment, antivirals
C	Bloodborne, IV drug use, sexual	No	Usually chronic unless cured	Common in the U.S.	Antivirals
D	Bloodborne	Yes*	Actue or Chronic	Uncommon in the U.S.	GI treatment, antivirals
E	Fecal/oral, foodborne	No	Acute	Uncommon in the U.S.	Supportive

*Individuals must be infected with Hepatitis B to become infected by Hepatitis D virus

There are five classified types of hepatitis. Hep A and E are acute, foodborne illnesses. Hepatitis B, C, and D are bloodborne pathogens and may be acute or chronic. There is a vaccine to prevent hepatitis B, which we will be the focus for the rest of this presentation. This vaccine also protects against hepatitis D because a person needs to be infected with hepatitis B in order to become infected with Hep D. There is currently no vaccine to prevent hepatitis C.

Also on this table is a description of incidence/prevalence in the US. Hepatitis B is increasingly less common in the United States due to routine vaccination, improved sanitation, blood donation screening, and other public health interventions. Rates of new hepatitis B diagnoses dropped significantly in areas that implement mass vaccination campaigns.

Hepatitis B

Mother-to-child transmission is the most common way to contract Hepatitis B

- A child born to a HBV+ mom has a 95% chance of contracting disease, UNLESS they are given HBV vaccine and/or HBIG
- If a child contracts HBV from their mother perinatally, or from another source while an infant, they have a 90% chance of developing chronic hepatitis B.
- Birth dose vaccination alone reduces this chance to under 10%
- Ig administration alone reduces this chance to under 30%
- Combined HBV vaccine and HBIG administration reduces this to almost zero

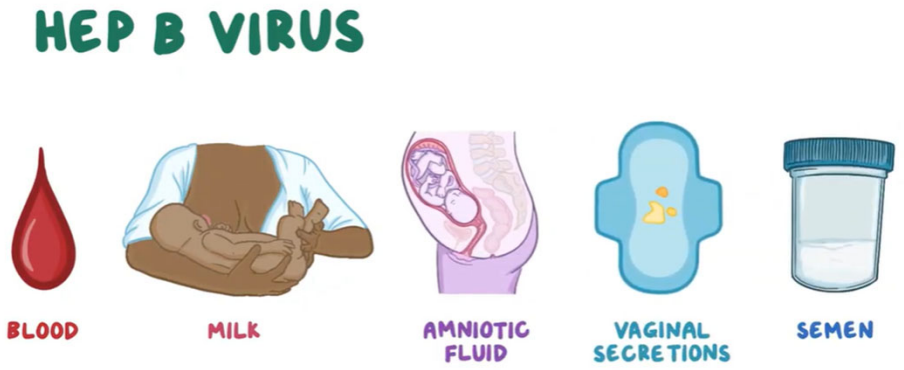
Only 13% of all people living with chronic hepatitis B infection know of their infection status. Only 3% of people living with HBV are receiving treatment.

Mother to child transmission at birth is the most common way hepatitis B is contracted. If an expectant mother is infected with Hep B, her baby has a NINETY-FIVE percent chance of contracting the virus. If a child contracts Hep B during infancy from their mother perinatally or from another source, they have a 90% chance of developing chronic disease.

Hepatitis B vaccination immediately after birth reduces that risk to only ten percent, and HBIG administration diminishes the risk to almost zero.

Because of this enormously high risk for developing chronic disease, many countries around the world have a universal birth dose recommendation.

How is hepatitis B spread?



There is an often-repeated falsehood about Hep B that it is only spread by injection drug use or sexual exposure, and while those are certainly high-risk behaviors for all bloodborne pathogens, any activity that could cause blood-to-blood exposure could spread HBV. Perinatal exposure is highest risk, but household members and caretakers are capable of spreading hep B to an infant.

Addiitonally, hepatitis B is more infectious than other blood-borne pathogens. It is 10x more infectious than Hep C and 100x more infectious than HIV. Amounts of blood too small to be seen can contain enough virus to cause infection and the virus can live for up to seven days on surfaces or objects touched by an infected person.

No one without Hep B immunity is zero risk

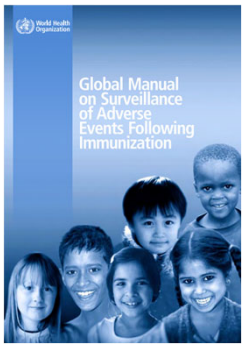
Hepatitis B vaccination is low risk. Hepatitis B infection is high risk.

HBV Birth Dose Talking Points 9.16.25

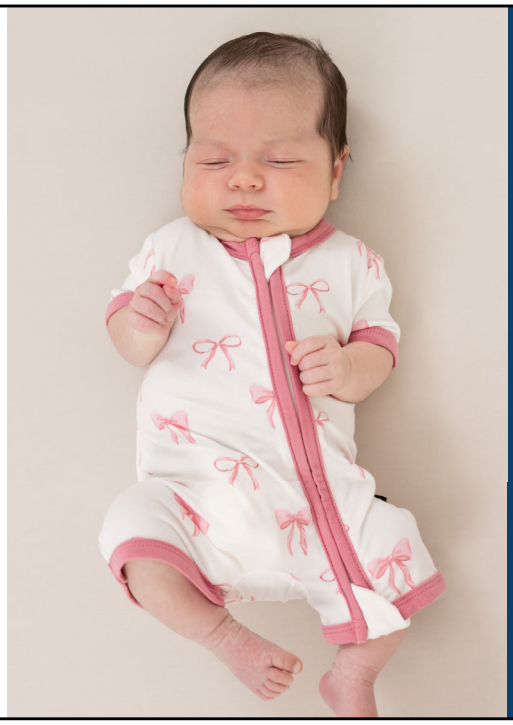
Everyone with a blood stream should get protected against HBV as soon as they are able to do so.

Hepatitis B Adverse Events Summary - WHO

- Common events
  - Pain
  - Erythema
  - Swelling
  - Fever
  - Headache
- Very rare events
  - Anaphylaxis



Source: WHO, Global Manual on Surveillance of Adverse Events Following Immunization



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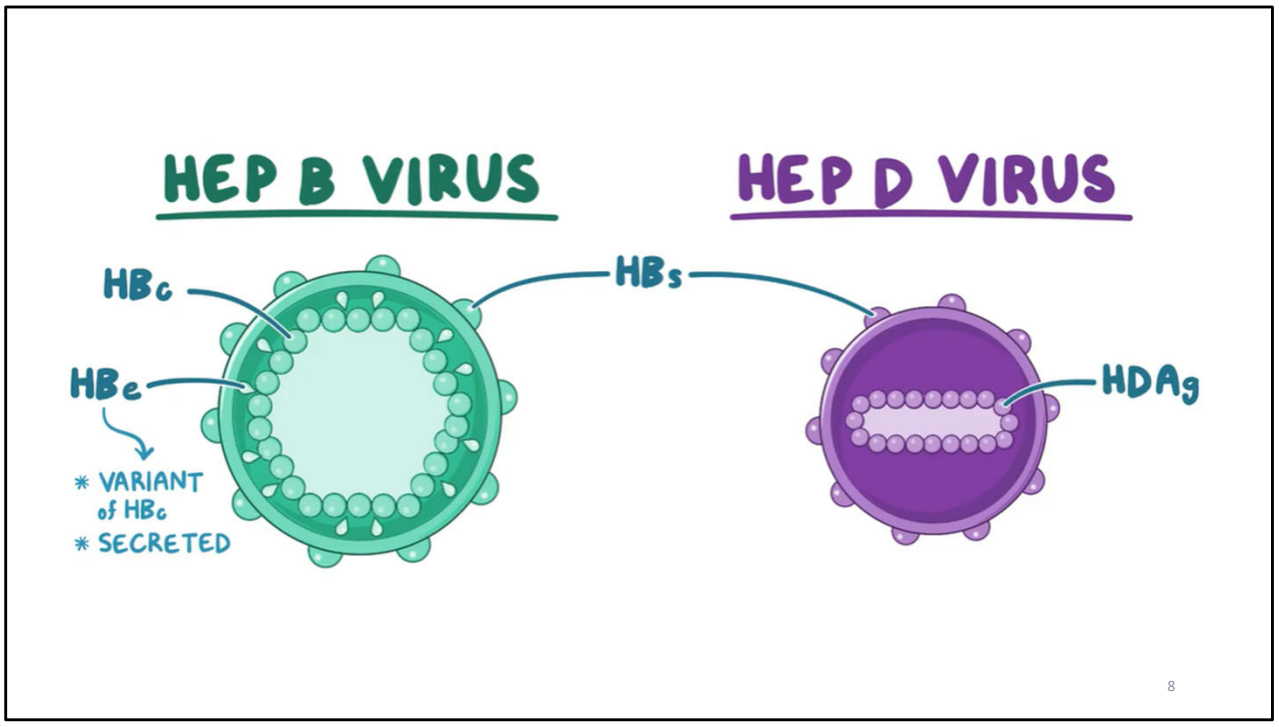
Content

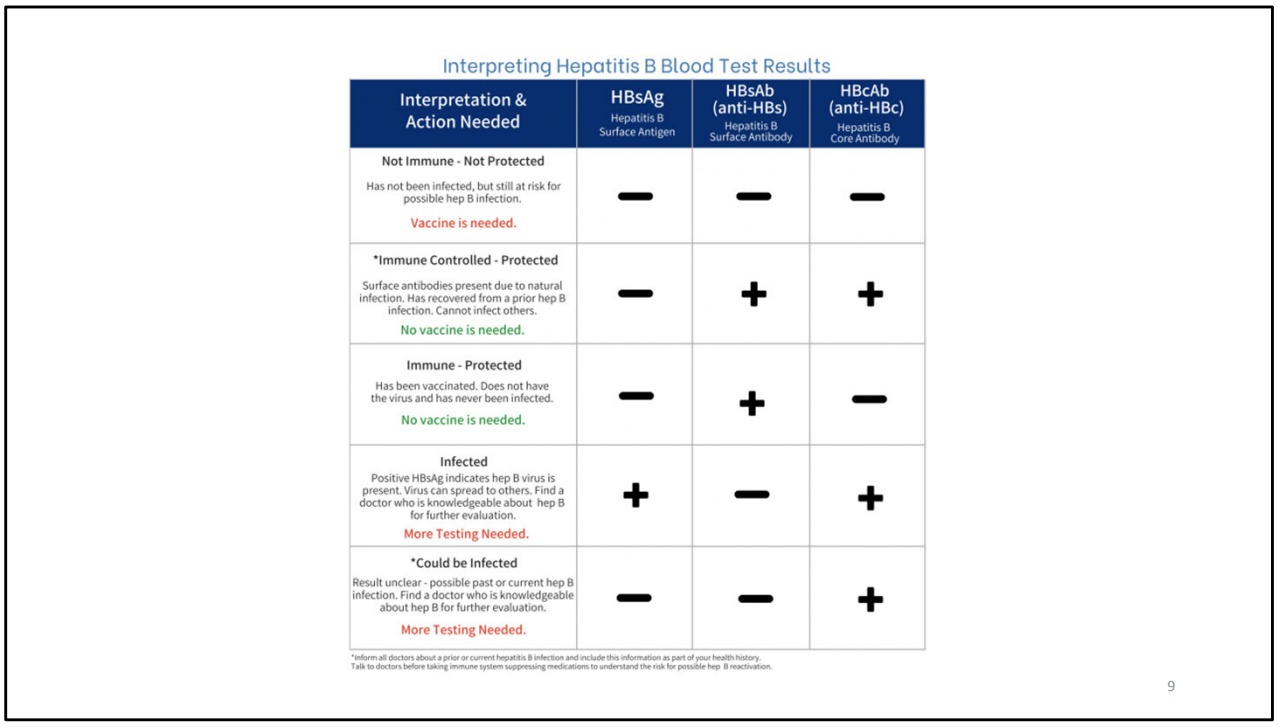
Global Manual on Surveillance of Adverse Events following Immunization summarizes an enormous amount of safety data on this vaccine given in many different settings worldwide. It concluded that Hep B vaccine is associated with no long-term risks. The main risk is a severe allergic response, which itself is rare and treatable in a setting that is giving a HBV vaccine.

Safety data for this vaccine has also been reinforced and reproduced by the IOM, US vaccine monitoring infrastructure, and the CDC.



As mentioned on a previous slide, Hep B vaccine prevents Hep D virus, as well. Patients with both hepatitis D and hepatitis B are more than twice as likely to develop hepatocellular carcinoma and decompensation and to die of liver-related causes than those with hepatitis B virus alone, according to a study of Veterans Health Administration data. This is uncommon in the US but does highlight an additional benefit of this vaccine – especially for people who may travel to areas with higher prevalence of both diseases.

Hepatitis D co-infection linked with worse outcomes, higher mortality in hepatitis B | ACP Gastroenterology Monthly



Interpreting Hepatitis B Blood Test Results

Interpretation & Action Needed	HBsAg Hepatitis B Surface Antigen	HBsAb (anti-HBs) Hepatitis B Surface Antibody	HBcAb (anti-HBc) Hepatitis B Core Antibody
Not Immune - Not Protected Has not been infected, but still at risk for possible hep B infection. Vaccine is needed.	−	−	−
***Immune Controlled - Protected** Surface antibodies present due to natural infection. Has recovered from a prior hep B infection. Cannot infect others. No vaccine is needed.	−	+	+
Immune - Protected Has been vaccinated. Does not have the virus and has never been infected. No vaccine is needed.	−	+	−
Infected Positive HBsAg indicates hep B virus is present. Virus can spread to others. Find a doctor who is knowledgeable about hep B for further evaluation. More Testing Needed.	+	−	+
***Could be Infected** Result unclear - possible past or current hep B infection. Find a doctor who is knowledgeable about hep B for further evaluation. More Testing Needed.	−	−	+

*Inform all doctors about a prior or current hepatitis B infection and include this information as part of your health history.
Talk to doctors before taking immune system suppressing medications to understand the risk for possible hep B reactivation.

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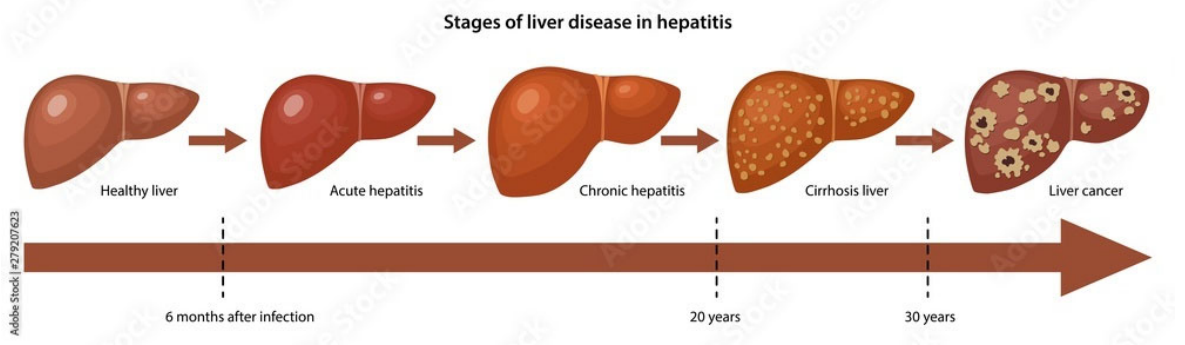
This table provides guidance for interpreting hepatitis B blood test results. A person much show positive hepatitis b surface antibody test results in order to be considered protected and vaccination is not needed.

Chronic Liver Disease Progression



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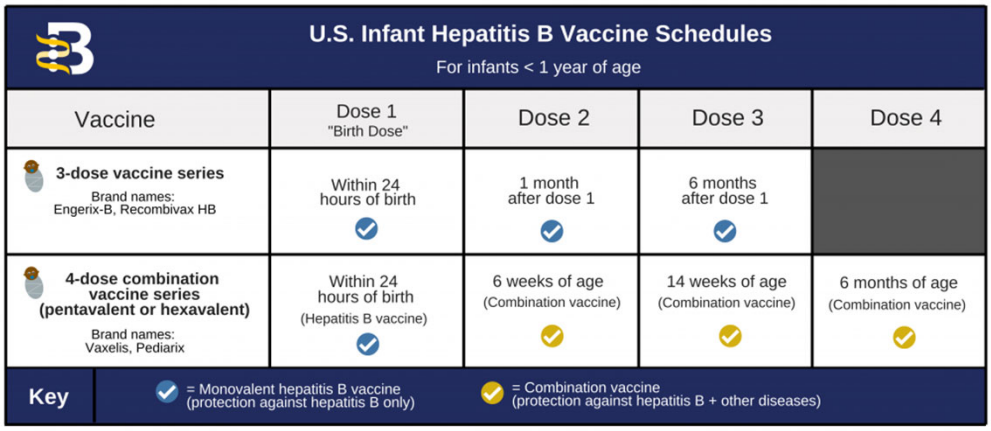
The effects of hep b are usually drawn out. While some will progress through these phases of hepatitis quickly (fulminant hepatitis), this usually takes years or decades to manifest as liver damage, cirrhosis, and ultimately cancer. Treatment improves these outcomes, but this means a lifetime of chronic disease management including pain, medication, medical costs, and the possibility of transmitting the disease to others.

Infant Hepatitis B Vaccination



U.S. Infant Hepatitis B Vaccine Schedules

For infants < 1 year of age

Vaccine	Dose 1 "Birth Dose"	Dose 2	Dose 3	Dose 4
3-dose vaccine series Brand names: Engerix-B, Recombivax HB	Within 24 hours of birth	1 month after dose 1	6 months after dose 1	
4-dose combination vaccine series (pentavalent or hexavalent) Brand names: Vaxelis, Pediarix	Within 24 hours of birth (Hepatitis B vaccine)	6 weeks of age (Combination vaccine)	14 weeks of age (Combination vaccine)	6 months of age (Combination vaccine)

Key: = Monovalent hepatitis B vaccine (protection against hepatitis B only); = Combination vaccine (protection against hepatitis B + other diseases)

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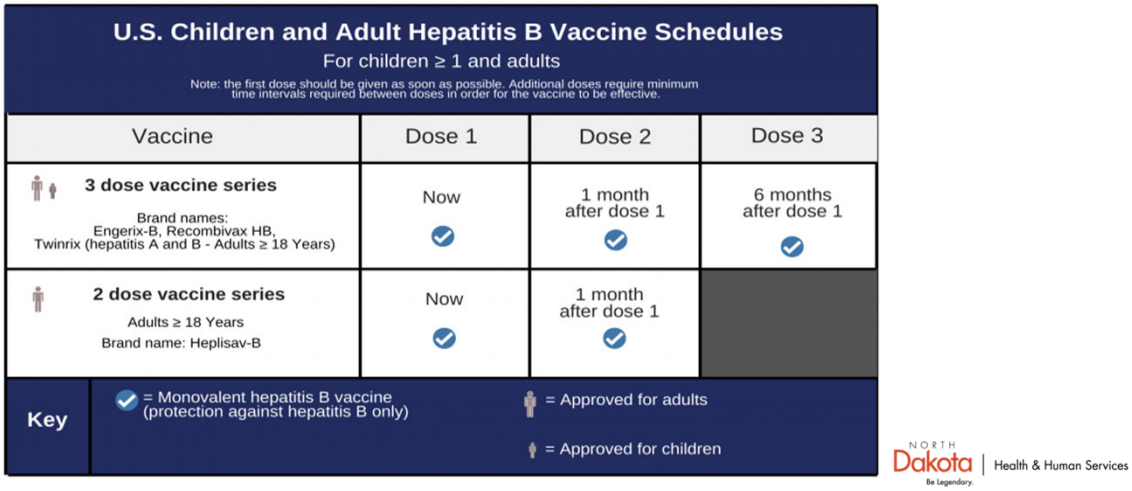
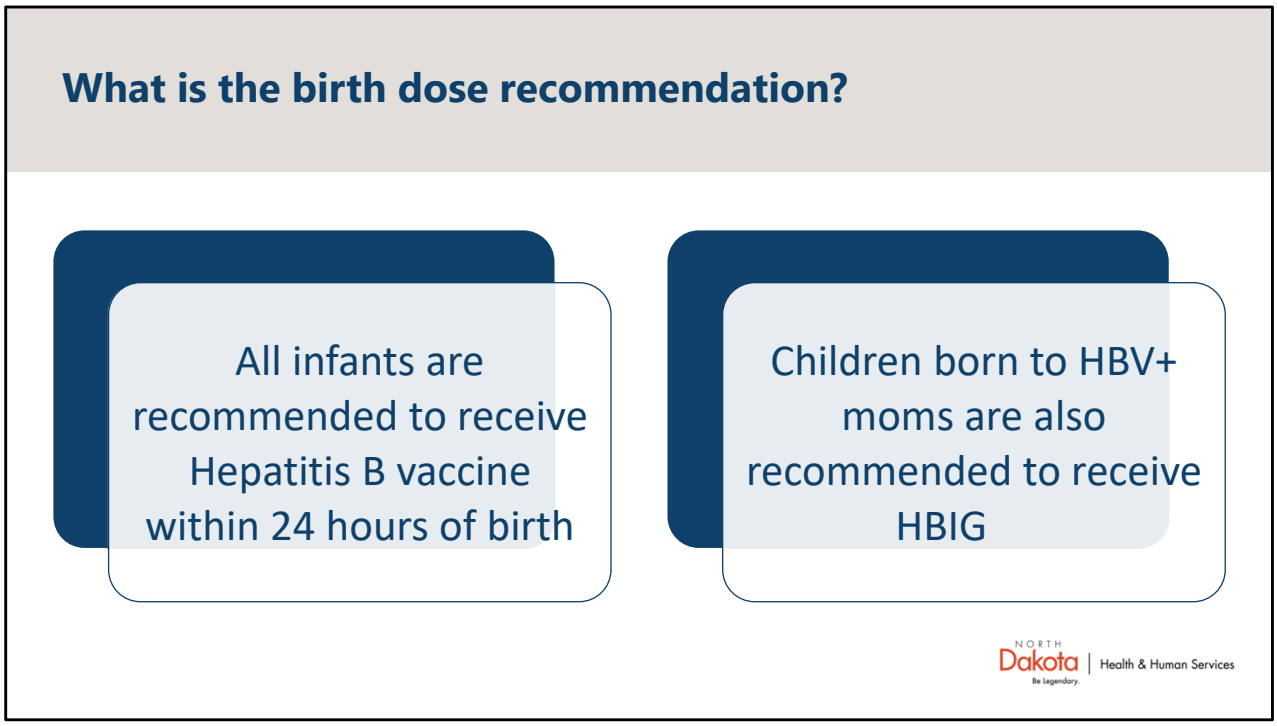
Hepatitis B vaccine is rourtinely recommended as a 3-dose series with the first dose given within 24 hours of birth and the final dose administered at 6 months of age. Children who are vaccinated with either the Pediarix or Vaxelis combination vaccine will end up receiving four doses of hepatitis B but will still complete the full series by 6 months.

Hepatitis B vaccination in children and adults



Hepatitis B vaccine is routinely recommended for all individuals through 59 years of age. Single antigen Engerix and Recombivax brand vaccines as well as the Hep A/Hep B combination vaccine, brand name Twinrix, is a 3-dose series given over 6 months. The Heplisav brand vaccine is a 2-dose series with the doses separated by 1 month.



What is the birth dose recommendation?

All infants are recommended to receive hepatitis B vaccine within 24 hours of birth. Children born to moms who are hepatitis B positive are also recommended to receive hepatitis B immune globulin.

Why vaccinate at birth?

- Having a universal birth dose recommendation catches children who may otherwise be missed.
- Risk-based recommendations are confusing and difficult to implement.
- Due to the disease's long incubation period, Hepatitis B vaccine is useful as post-exposure prophylaxis.
- If there is vertical exposure during birth, the infant may avoid infection.
- When birth dose vaccination programs are suspended, even briefly, there is a notable increase in perinatal infection.

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Why are we vaccinating infants at birth?

- Having a universal birth dose recommendation catches children who are at high risk for contracting hepatitis B at birth who may otherwise be missed. Some children need Hepatitis B vaccination at birth, and while we can identify many of them, we can never identify all of them.
- Risk-based recommendations are confusing and difficult to implement.
- Due to the disease's long incubation period, Hepatitis B vaccine is useful as post-exposure prophylaxis.
- If there is vertical exposure during birth, the infant may avoid infection. Birth dose vaccination reduces risk of developing chronic disease from 90% to less than 10%.
- Instances when birth dose vaccination programs are suspended, even briefly, an increase in perinatal infection is seen. One notable example is from1999 when the suspension birth dose vaccination led to an infant death from HBV infection.

Why can't we just test mom?

- False negatives are possible for any test.
- Testing occurs early in pregnancy and is often not repeated.
- Continued exposure to Hep B virus is likely.
- Universal vaccination helps babies who would otherwise get missed.
- Birth mothers are the largest, but not the only, risk for exposure to infants.

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Why can't we just test mom for hepatitis?

- False negatives are possible which would put baby at risk without knowing it.
- Testing for hepatitis B status occurs early in pregnancy and is often not repeated prior to delivery. A person can become infected between the time of the screening and the birth of their baby.
- Not all pregnant women receive comprehensive pre-natal care meaning we are not testing every mom to know their status at the time of delivery.
- Universal vaccination at birth helps babies would otherwise be missed.
- Birth mothers are the largest but not the only risk for exposure and delaying vaccination continues to keep baby at risk.

Goal is fully vaccinated by six months old.

Why?...

- Maternal antibodies passed to baby are expected to have worn off by the time the infant reaches 6 months of age.
- The cell mediated response will not be properly developed until 12 months , leaving children especially vulnerable in months 6-11 if they do not have their own humoral immunity (circulating antibodies).
  - This is also why, if they are infected in infancy (under 12 months), the infection is 90% likely to become chronic.

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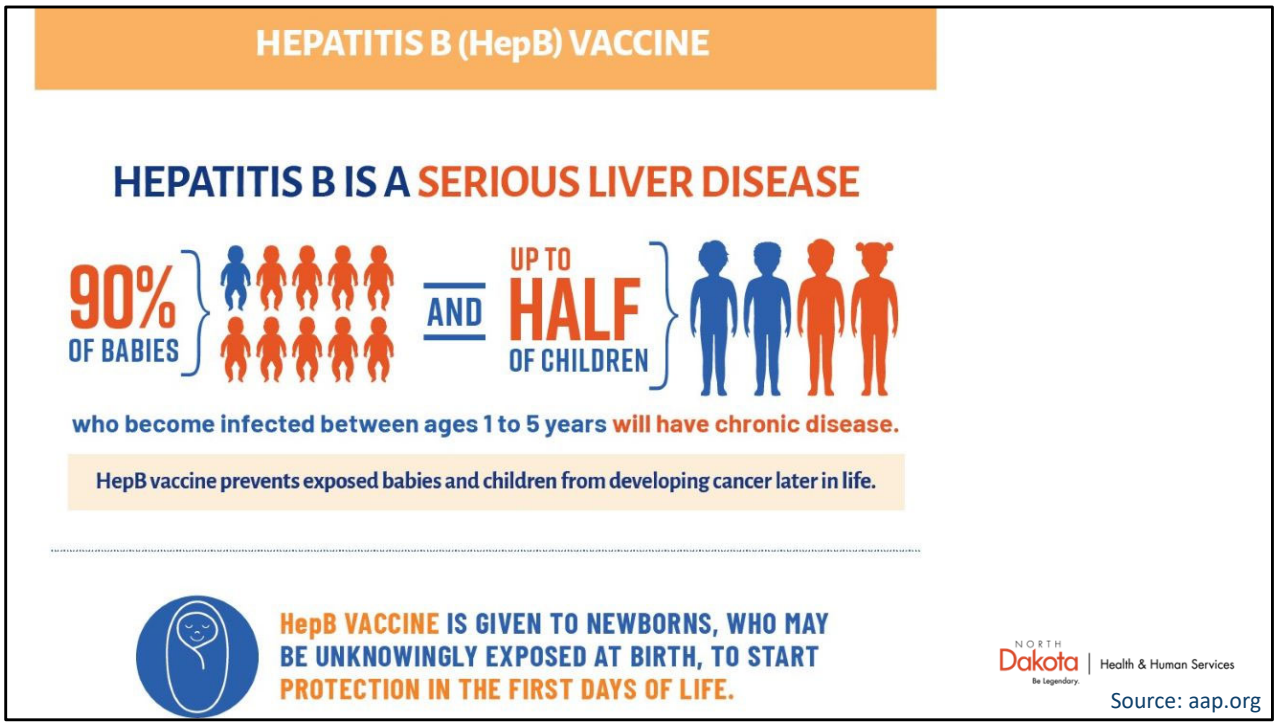
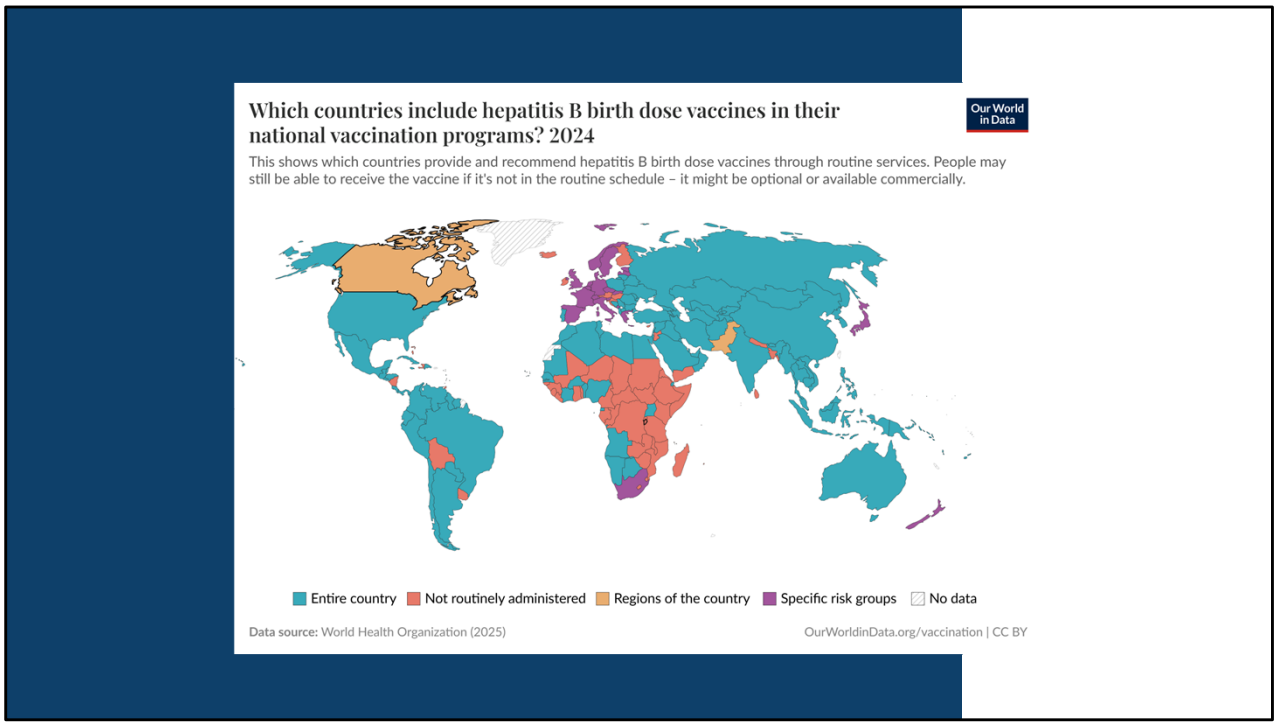
The ultimate goal for hepatitis b vaccination is to have all children fully vaccinated by 6 months of age. Immunity from maternal antibodies passed to baby will have waned by the time baby reaches 6 months of age. Even with complete vaccination, the body's immune response will not be fully developed until 12 months of age. This leaves unvaccinated babies especially vulnerable to infection and the infection acquired during infancy is 90% likely to become chronic.

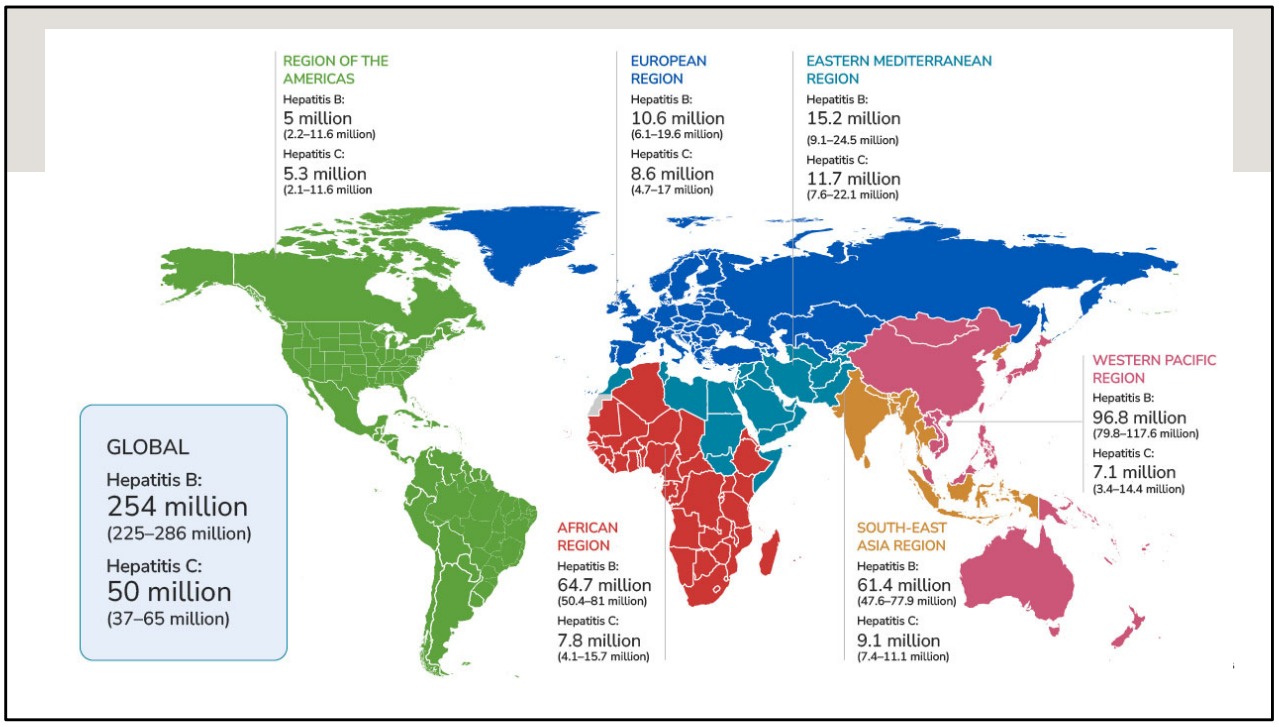


The younger a person is when they are exposed to Hepatitis B, the more likely they are to develop chronic disease. 90% of babies and up to half of children who become infected between ages 1 and 5 years will have chronic disease.



[Which countries include hepatitis B birth dose vaccines in their national vaccination programs? 1989 to 2024]

Countries that do not have a universal birth dose program



Global hepatitis report 2024: action for access in low- and middle-income countries

Opponents of universal Hep B birth dose vaccination will cite other countries or regions (Europe) that do not have HBV birth dose. Those countries have two times as many hep B infections than the Americas.

Some global regions continue to have high hep B infection even with a national policy for universal birth doses. This often represents a failure of health care delivery. The success of the US program is greatly tied to national programs (like VFC) that put a large focus on vaccine delivery infrastructure and address immunization disparities.

No proven benefit in delaying vaccination

- Vaccines are given at stages in life when a human is most likely to contract and/or have serious consequences from a disease.
- Alternative vaccine spacing is impractical and time-consuming – both for parents and the medical professional who is vaccinating them.
- Extra trips to the doctor and more "pokes" can be more emotionally stressful to children.
- Vaccine schedules are based on an incredible amount of data and expertise. Delaying vaccines only lengthens the amount of time a child is vulnerable to potential disease.

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Vaccine Schedule: Altering the Schedule | Children's Hospital of Philadelphia

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them.

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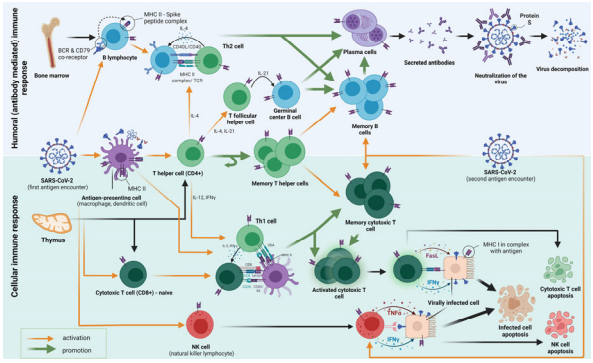
- Vaccine schedules are based on an incredible amount of data and expertise. Delaying vaccines only lengthens the amount of time a child is vulnerable to potential disease.

An infant's immune system is uniquely vulnerable

- Many vaccines are designed to build immunity in ways that immunity from disease can not.
- These tools are necessary for infants because they lack immune defenses that older children and adults may have.



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[Development of the Immune System | Children's Hospital of Philadelphia]

An infant's immune system is uniquely vulnerable. Many vaccines are designed to build immunity in ways that immunity from disease can not. These tools are necessary for infants because they lack the robust immune defenses to fight off disease that older children and adults may have.

Perinatal Hepatitis B Prevention Program

When maternal hep B status is known to be positive:
HBV vaccine + HBIG at birth
Immunizations are given on schedule and finished by 6 months
Babies are tested for infection and antibodies at 9-12 months

Hepatitis B Disease Reporting & Surveillance

- Hepatitis B is a mandatory reportable condition in North Dakota.
  - All HbSAg+ should be reported to Disease Control
    - Follow up tests and infectious disease consultation can determine additional
  - All HbSAg+ diagnosed during pregnancy should be reported along with the pregnancy status, estimated due date, and should be clearly noted on the mother and baby's charts
- All reported Hepatitis B cases are investigated by NDHHS.
- For female cases between 14 and 50 years of age, pregnancy status must be obtained for every Hepatitis B lab results reported.
  - Additional monitoring and follow-up is required for pregnant cases.
  - Pregnant cases are monitored throughout the duration of the pregnancy and post-delivery.

- **Birthing hospitals MUST notify us at Disease Control & Forensic Pathology when a pregnant woman is positive for Hep B and when she delivers**
- **HBIG and HBV must be entered into NDIIS**

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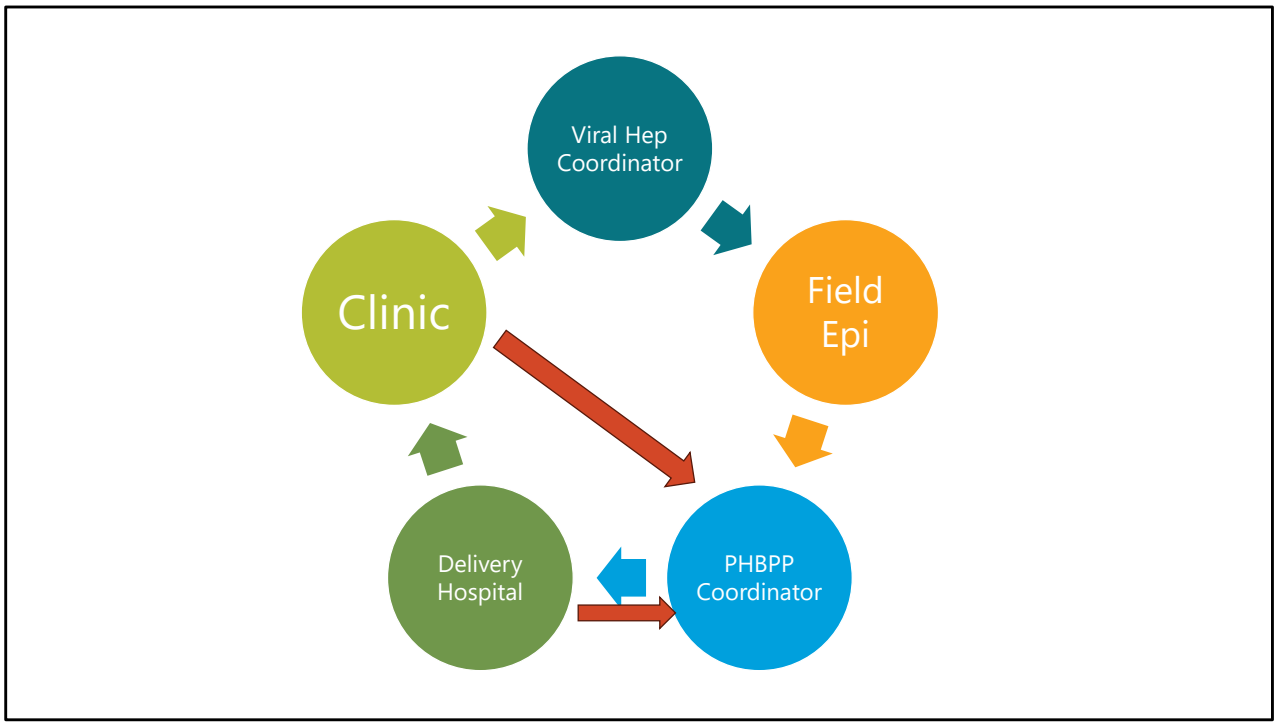

The circle of hep prevention

This is how the various parties identify

Additional resources

- CIDRAP Vaccine Integrity Project
- CHOP Children's Hospital of Philadelphia
- Hepatitis B Foundation
- AAP American Academy of Pediatrics
  - Red Book Section(s) on Hepatitis B: vaccination and perinatal prevention

Post-Test

- Successfully complete the five-question post-test to receive your certificate for nursing credit using the link below: https://ndhealth.co1.qualtrics.com/jfe/form/SV_eLEAtVXhm8aqZsa
- Credit for this session will be available until December 9, 2025.
- This presentation will be posted to our website at: www.hhs.nd.gov/immunizations

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Immunization Unit Staff Members

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