



Perinatal Hepatitis B

Noele Nelson, MD, PhD, MPH

Acting Branch Chief, Prevention Branch

Division of Viral Hepatitis

NCHHSTP/Centers for Disease Control and Prevention

May 1, 2019

Outline

- Overview of Perinatal Hepatitis B and Prevention Strategies
- Hepatitis B Vaccination
- Post-vaccination Serologic Testing
- Perinatal Hepatitis B Prevention Program

Perinatal Hepatitis B

- Hepatitis B virus (HBV) transmission occurs through percutaneous or mucosal exposure to infectious blood or body fluids
- 80%-90% of infants who are infected with HBV become chronically infected
- About 25% of individuals chronically infected will develop cirrhosis or liver cancer and die prematurely
- HBV infected infants are usually asymptomatic

Perinatal Hepatitis B Case Definition

- Confirmed
 - Child born in the United States to a **HBV-infected mother** and infant is positive for hepatitis B surface antigen (HBsAg) at ≥ 1 month of age and ≤ 24 months of age OR positive for HBeAg or HBV DNA ≥ 9 months of age and ≤ 24 months of age.
- Probable
 - Child born in the United States and infant is positive for HBsAg at ≥ 1 month of age and ≤ 24 months of age OR positive for HBeAg or HBV DNA ≥ 9 months of age and ≤ 24 months of age, but whose **mother's hepatitis B status is unknown** (i.e. epidemiologic linkage not present).

Steps to Prevent Perinatal Transmission of HBV

- Maternal screening

- Test all women for Hepatitis B surface antigen (HBsAg) with each pregnancy
- American Association for the Study of Liver Diseases (AASLD) suggests antiviral therapy to reduce perinatal HBV transmission when maternal HBV DNA is >200,000 IU/mL

- Infant vaccination

All infants born to HBsAg-positive women need to:

- Receive hepatitis B vaccine (with passive immunoprophylaxis [HBIG]) within 12 hours of birth
- Complete the hepatitis B vaccine series

- Post Vaccination Serologic Testing (PVST)



Elements of Performance Related to Maternal Status Documentation Prior to Delivery

APPLICABLE TO CRITICAL ACCESS HOSPITALS AND HOSPITALS

Effective xxx

Provision of Care, Treatment, and Services (PC)

PC.01.02.01

The organization assesses and reassesses its patients.

Elements of Performance for PC.01.02.01

14. **For organizations that provide obstetric services:** Upon admission to labor and delivery, the mother’s status of the following diseases (during the current pregnancy) is documented in the mother’s medical record:

elect not to perform this test but instead administer prophylactic antibiotics to the mother.

16. **For organization that provide obstetric services:** If the mother tests positive for human immunodeficiency virus (HIV), hepatitis B, group

- Human immunodeficiency virus (HIV)
- Hepatitis B
- Group B streptococcus (GBS)
- Syphilis

15. **For organizations that provide obstetric services:** If the mother had no prenatal care or the disease status is unknown, testing for the following diseases are performed and the results documented in the mother’s medical record:

- Human immunodeficiency virus (HIV)
- Hepatitis B
- Group B Streptococcus (GBS)
- Syphilis

Note: *Because GBS test results may not be available for 24-48 hours, organizations may*

B streptococcus (GBS), or syphilis when tested in labor and delivery or during the current pregnancy, that information is also documented in the newborn’s medical record after delivery.

Hepatitis B Vaccine

Hepatitis B Vaccine

- Introduced in 1982
 - Safe, immunogenic, effective
- Administered as 3- or 4-dose series, starting at birth
- Primary 3-dose series efficacy, 90-95%
- Hepatitis B vaccine induces antibody to hepatitis B surface antigen (anti-HBs)
 - Protection against infection is associated with initial antibody concentration ≥ 10 mIU/mL after a complete vaccine series
 - Estimate that $\geq 90\%$ of participants had evidence of protection 30 years later*
 - Booster doses not routinely recommended

HBIG and Hepatitis B Vaccine Efficacy

- Hepatitis B immune globulin (HBIG), passive immunoprophylaxis, provides a short-term increase (i.e., 3-4 months) in the antibody to hepatitis B surface antigen (anti-HBs) which might improve protection until the infant responds to vaccine

Schillie, S.F. and T.V. Murphy, *Vaccine*, 2013. 31(21): p. 2506-16.

- For prevention of mother to child transmission of HBV the efficacy of:
 - HBIG and HepB vaccine combined is ~94%
 - HBIG alone is ~71%
 - Hepatitis B vaccine alone is ~75%

Based on infants of mothers HBsAg-positive and HBeAg-positive

Beasley RP, et al. *Lancet*. Nov 12 1983;2(8359):1099-1102.

Lee C, Gong Y, Brok J, Boxall EH, Gluud C. *BMJ*. Feb 11 2006;332(7537):328-336.

Birth Dose Provides a “Safety Net”

- The birth dose provides a “safety net” for:
 - Infants of HBsAg-positive women not identified for post-exposure prophylaxis (PEP) because of:
 - Medical errors in interpreting or documenting maternal screening results
 - Failure to test women at delivery who are admitted without prenatal HBsAg test results
 - Infants who have contact with a HBsAg-positive caretaker or household member
 - Infants at risk for exposure after the perinatal period

MMWR Recomm Rep. 2018 Jan 12;67(1):1-31.

Willis, B.C., et al., 2010. 125(4): p. 704-11.

Birth Dose

- All infants born to HBsAg-positive women should receive HepB vaccine and HBIG within **12 hours of birth**, administered at different injection sites.
 - Only single-antigen HepB vaccine should be used for the birth dose
- Recommend hepatitis B vaccine birth dose within **24 hours of birth** for medically stable infants weighing $\geq 2,000$ grams and born to HBsAg-negative mothers.
 - Aligns with the World Health Organization (WHO) recommendations

ACIP Recommendations PEP: For all infants born to KNOWN HBsAg-positive women (all birth weights)

- Administer HBIG and monovalent hepatitis B vaccine within 12 hours of birth (separate injection sites – separate limbs)
- Document date and time of administration
- Timely completion of ≥ 3 -doses HepB vaccine, either as monovalent or combination vaccine

Question - 1

- For infants with birth weight <2000 grams born to mothers with unknown HBsAg status, what post-exposure prophylaxis should the infant receive within 12 hours of birth?
 - A. Hepatitis B vaccine alone
 - B. HBIG alone
 - C. HBIG + hepatitis B vaccine
 - D. None of the above

Question - 1

- For infants with birth weight <2000 grams born to mothers with unknown HBsAg status, what post-exposure prophylaxis should the infant receive within 12 hours of birth?
 - A. Hepatitis B vaccine alone
 - B. HBIG alone
 - C. HBIG + hepatitis B vaccine**
 - D. None of the above

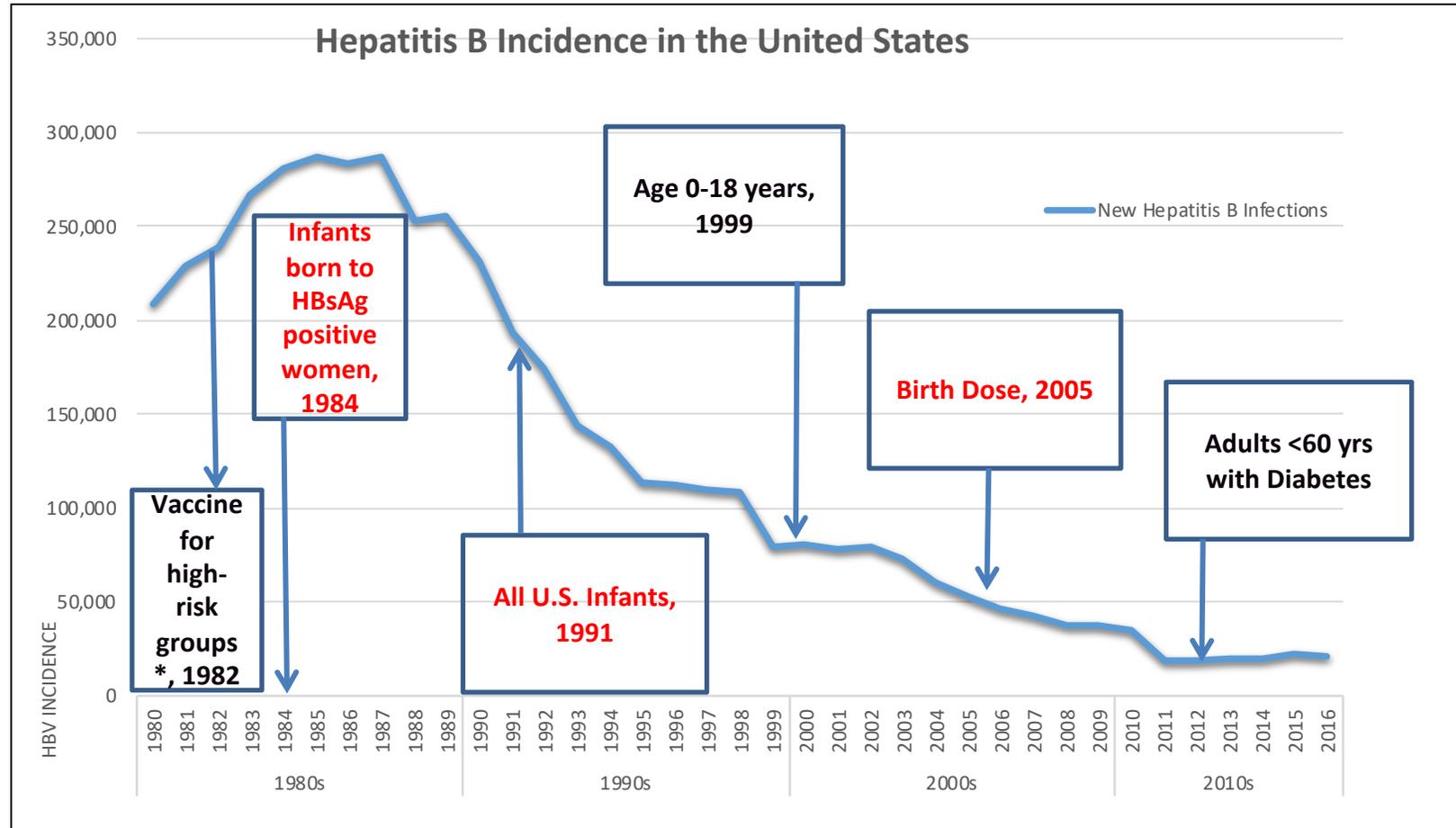
ACIP Recommendations PEP: Maternal HBsAg Status UNKNOWN Infant Low Birth Weight (<2000 grams)

- Test mother as soon as possible; document, and communicate HBsAg results to mother's provider(s)
- Administer both HBIG and monovalent hepatitis B vaccine within 12 hours of birth at separate injection sites
- For infants weighing <2000 grams, the birth dose is not counted toward a ≥3-dose HepB vaccine series

ACIP Recommendations PEP: Maternal HBsAg Status UNKNOWN Infant Birth Weight ≥ 2000 grams

- Test mother for HBsAg as soon as possible
- Administer monovalent hepatitis B vaccine within 12 hours of birth - **Do not wait for mother's results**
- If infant is discharged before results known, inform:
 - Mother
 - Pediatric provider
 - Perinatal Hepatitis B Prevention Coordinator
- If results are positive or remain unknown, administer HBIG to infant within 7 days of life

Hepatitis B Vaccine Policy and Reported Number of Acute Hepatitis B Cases – United States, 2000-2016



*Health care providers, MSM, IDU, hemodialysis patients, household & sexual partners of persons with chronic HBV, persons in certain institutional settings, e.g., inmates of long-term correctional facilities.

Question - 2

According to the National Immunization Survey-Child, the percent of infants 0-3 days of age who received the hepatitis B vaccine birth dose in 2017 was closest to:

- A. 60%
- B. 70%
- C. 80%
- D. 90%

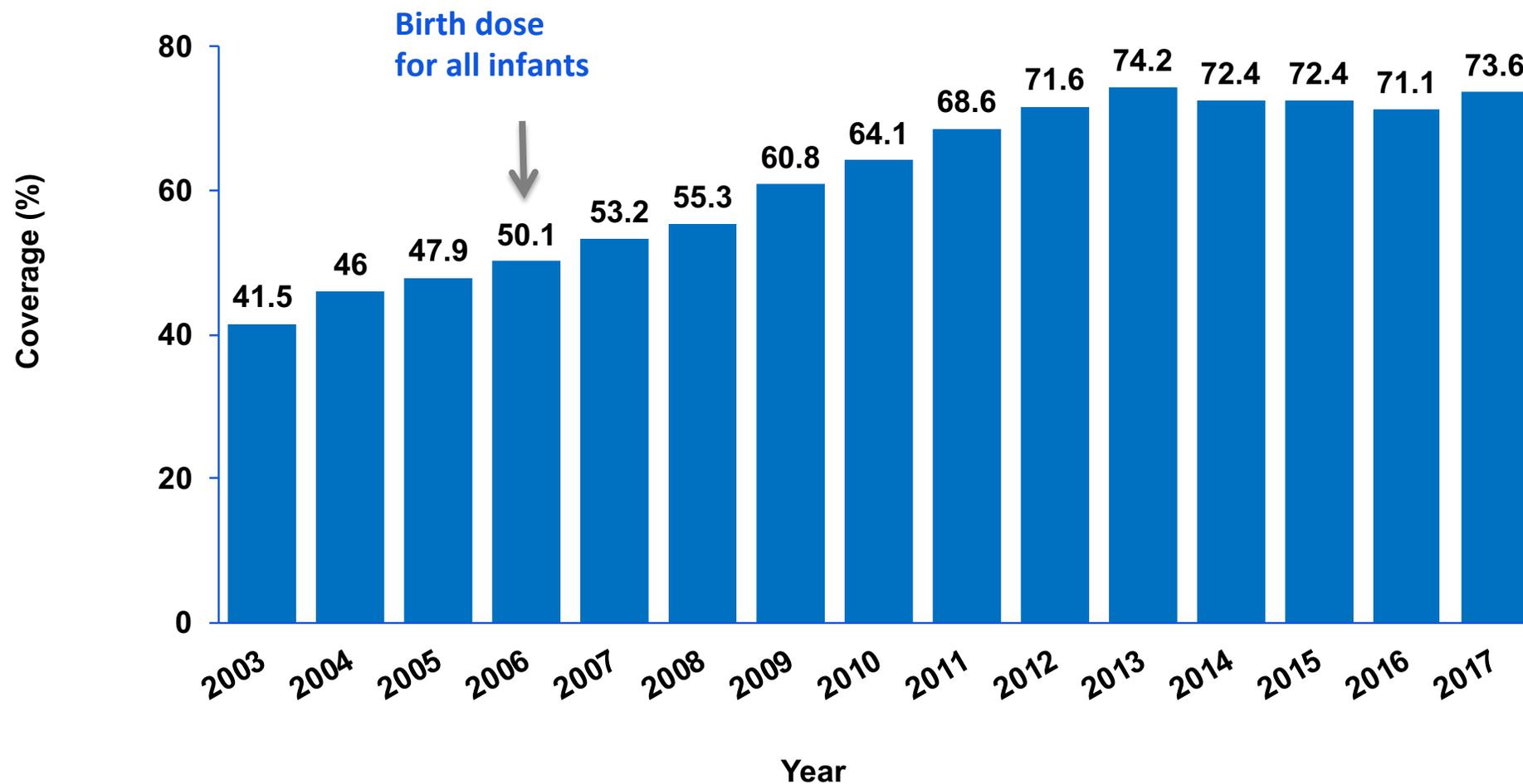
Question - 2

The percent of infants 0-3 days of age who received the hepatitis B vaccine birth dose in 2017 was closest to:

- A. 60%
- B. 70%**
- C. 80%
- D. 90%

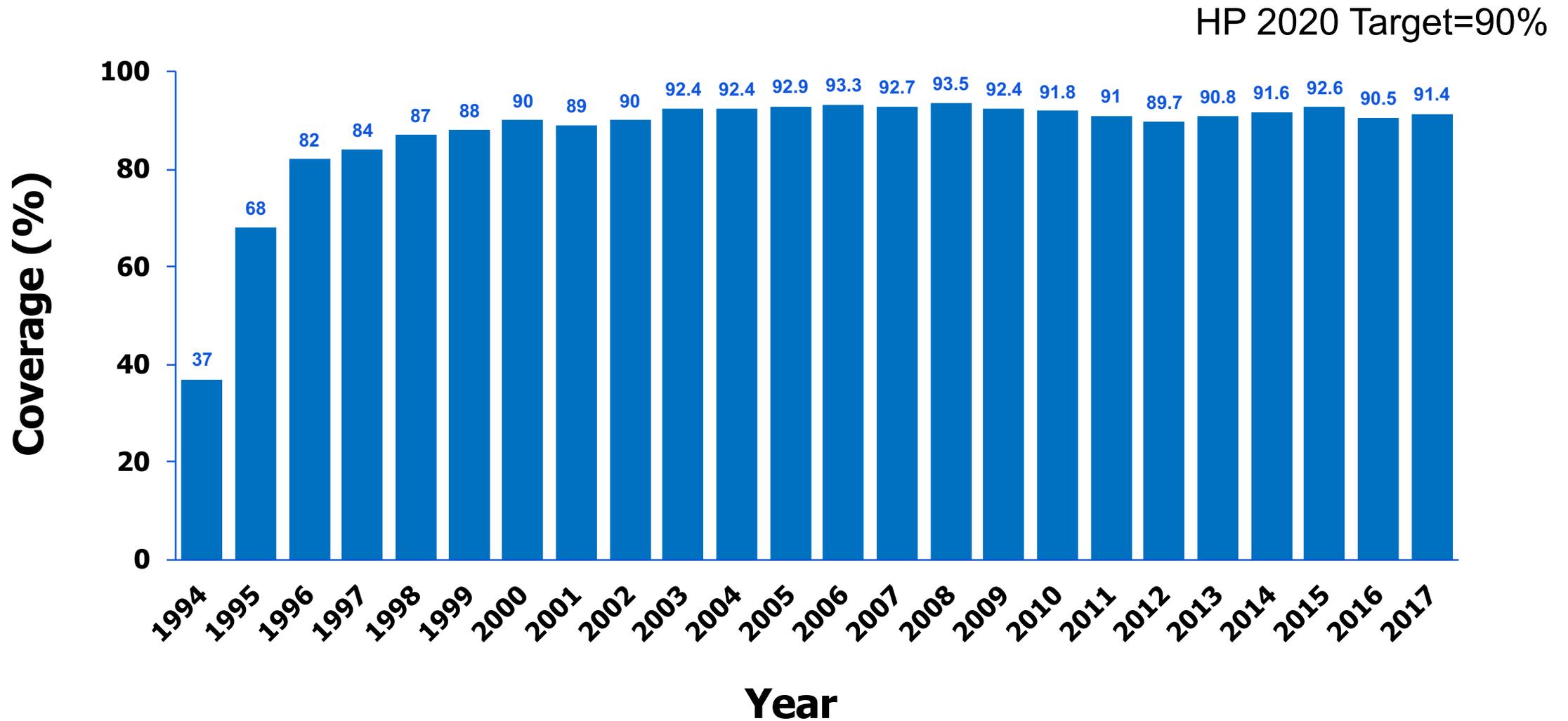
Hepatitis B Birth Dose (0 to 3 Days of Age) Vaccine Coverage, U.S., 2003-2017

Healthy People
2020 target: 85%



Source: National Immunization Survey, CDC

Estimated Hepatitis B Vaccination Coverage 19-35 Months of Age, U.S., 1994-2017



Post-vaccination Serologic Testing (PVST)

Question - 3

Post-vaccination serologic testing of infants born to HBsAg-positive mothers should be done after how many months of age?:

- A. 6 months
- B. 9 months
- C. 12 months
- D. 15 months

Question - 3

Post-vaccination serologic testing of infants born to HBsAg-positive mothers should be done after how many months of age?:

- A. 6 months
- B. 9 months**
- C. 12 months
- D. 15 months

Post-vaccination Serologic Testing

- Infants born to Hepatitis B-infected mothers should undergo post-vaccination serologic testing (PVST) after completion of the HepB vaccine series to identify:
 - Infected infants so that they can receive treatment
 - Infants not responding to vaccination so they can be revaccinated
- Post-vaccination serologic testing:
 - At 9-12 months of age, if series completed on schedule
 - 1-2 months after final dose in series, if series completion is delayed
 - Never before 9 months of age (NO GRACE PERIOD)
 - Test for both HBsAg and anti-HBs
 - Don't test for antibody to hepatitis B core antigen (anti-HBc)

PVST for Infants, cont.

- **Why wait and test at 9 months of age or older?**
 - Earlier testing may detect anti-HBs from HBIG administered at birth and not vaccination outcome
 - Maximize the likelihood of detecting late HBV infection

MMWR Recomm Rep. 2018 Jan 12;67(1):1-31.

Euler, G.L., et al., *Pediatr Infect Dis J*, 2003. 22(2): p. 123-9.

Ko, S.C., et al., *Vaccine*, 2014. 32(18): p. 2127-2133.

Perinatal Hepatitis B Prevention Program (PHBPP)

U.S. Perinatal Hepatitis B Prevention Program (PHBPP)

- In 1990, CDC funded the PHBPP
 - Funded in CDC Immunization Cooperative Agreements (Section 317 funding)
- Programs in 64 jurisdictions (50 states, 6 cities, 5 territories & 3 freely associated island nations)
- PHBPPs aim to ensure:
 - Identification of all Hepatitis B-infected pregnant women
 - Timely receipt of infant prophylaxis
 - Infant post-vaccination testing after completion of Hepatitis B vaccine series
 - Revaccination of infants with non-response to Hepatitis B vaccine

Perinatal Hepatitis B

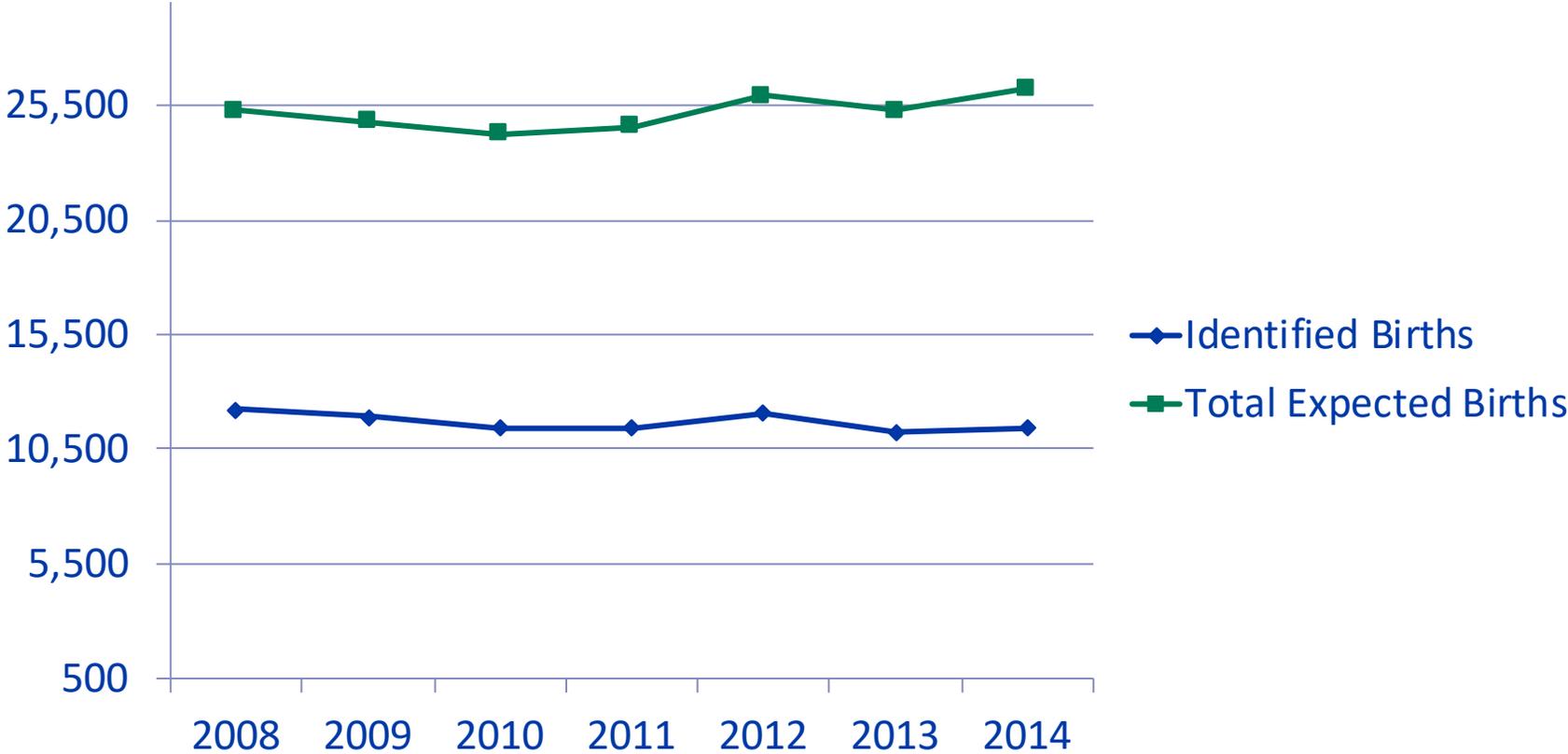
- In 2016, **32** cases of perinatal hepatitis B were reported to CDC from 13 states

Year	Perinatal B Cases (HBsAg-positive infants)
2016	32
2015	37
2014	47
2013	48
2012	40

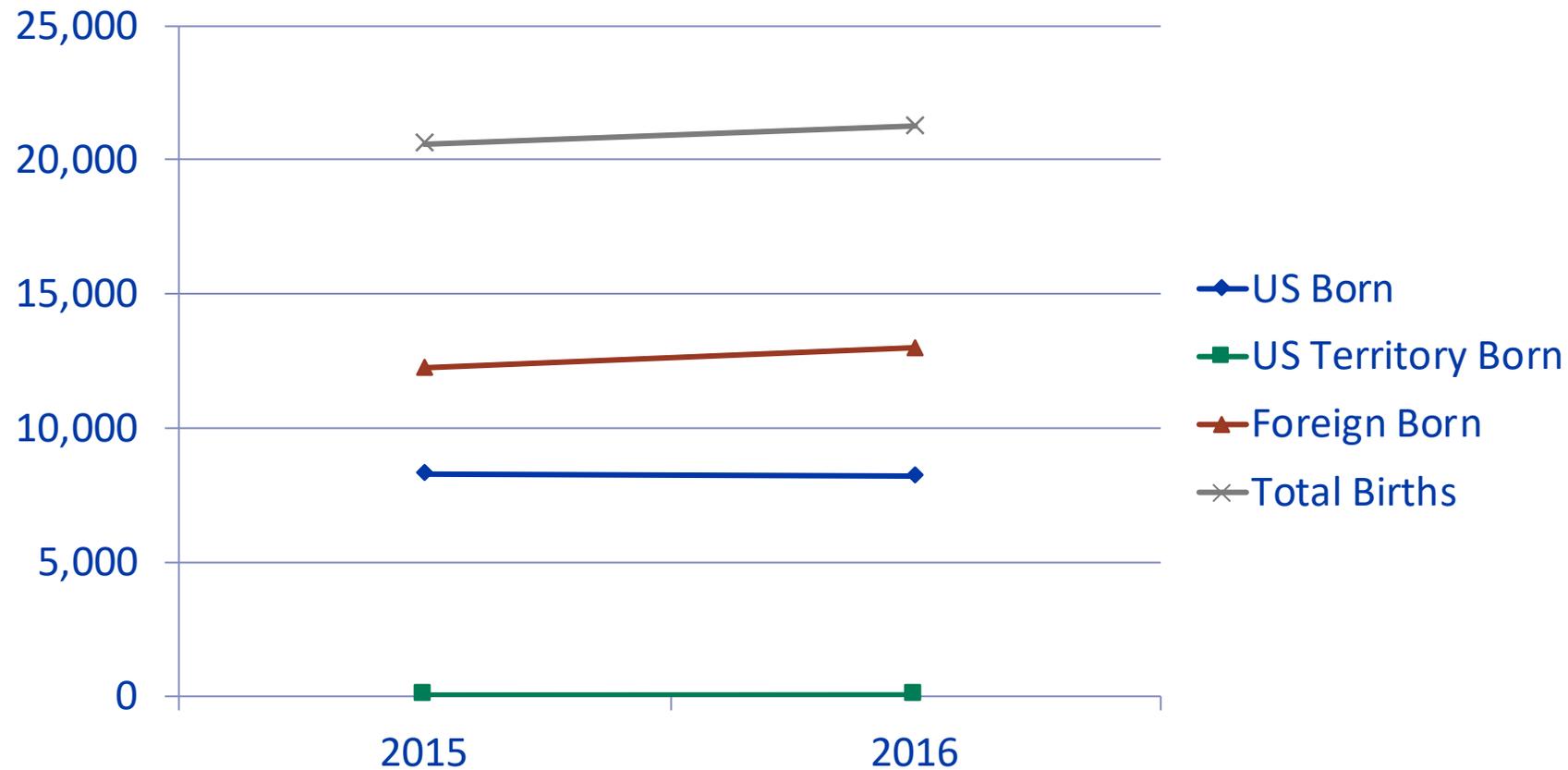
Source: CDC, National Notifiable Diseases Surveillance System.

- A 2009 modeling study estimated that **952** chronic hepatitis B cases occur each year among persons infected with HBV at birth, for a baseline annual rate of 3.84%, among infants of HBsAg-positive women

Identified Births to HBsAg-positive Women Compared to Total Expected Births to HBsAg-positive Women, 2008-2014



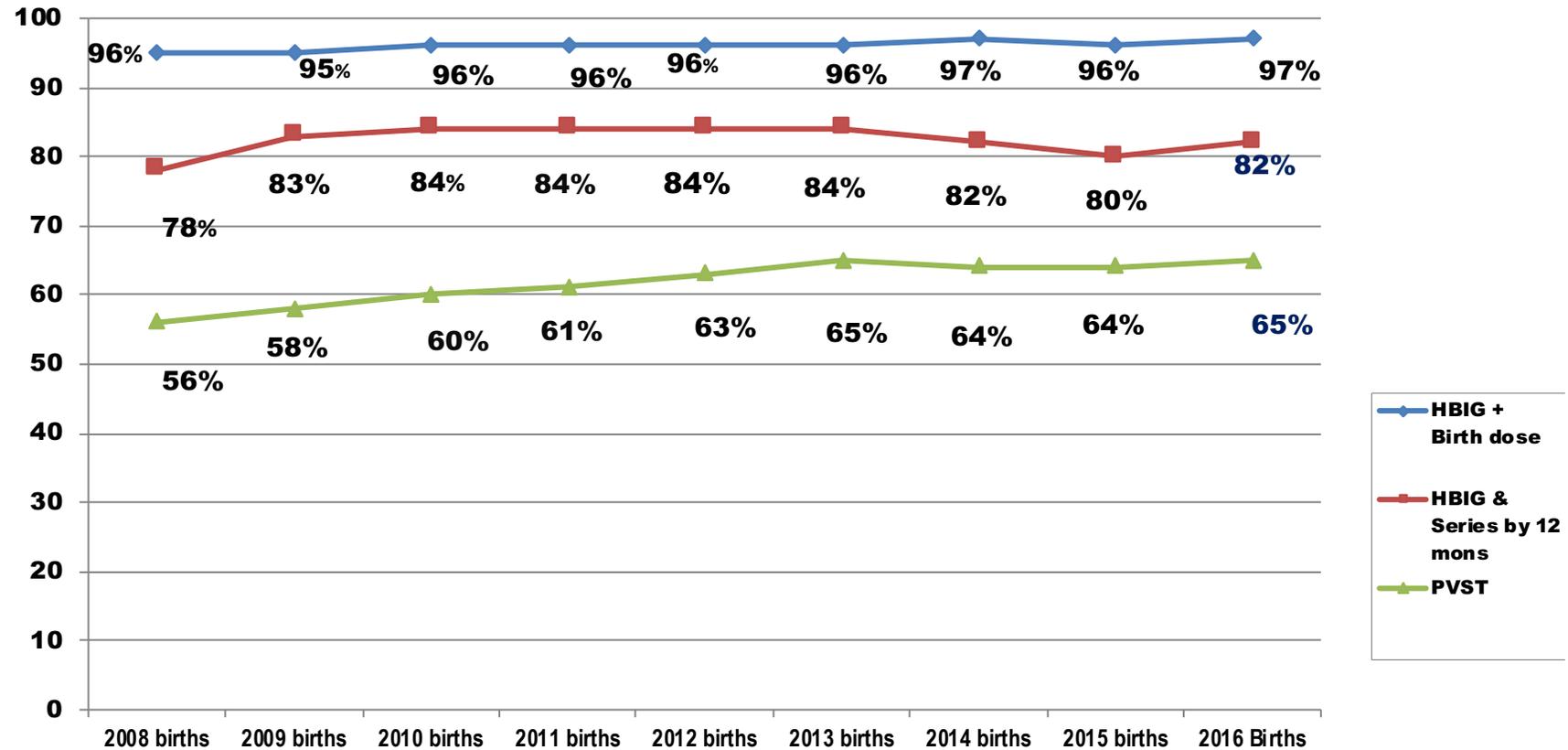
Expected Births to HBsAg-positive Women 2015-2016 by Mother's Region of Birth (PE)



Perinatal Hepatitis B Prevention Program

Koneru A, Schillie S, Roberts H, Sirotkin B, Fenlon N, Murphy TV, Nelson NP. Estimating Annual Births to Hepatitis B Surface Antigen-Positive Women in the United States by Using Data on Maternal Country of Birth. Public Health Rep. 2019 Apr

National Trends in PHBPP Indicators, 2008-2016



Provisional Data: Do Not Reference

Conclusions

- To decrease perinatal hepatitis B infections the following are needed:
 - Increase identification of HBsAg-positive pregnant women
 - Maternal management
 - Maternal 3rd trimester antivirals if indicated
 - Timely infant prophylaxis and infant management
 - Increase hepatitis B birth dose coverage overall
 - Increase post-vaccination serologic testing of infants born to HBsAg-positive mothers

Viral Hepatitis

Viral Hepatitis > Hepatitis B Information

Home Hepatitis B Information

Q&As for Health Professionals

Q&As for the Public

Vaccination of Infants, Children, and Adolescents

Vaccination of Adults

Perinatal Transmission

Laboratory Reporting

PVST panels for infants born to HBV-infected women

Chronic Infection Testing

Statistics & Surveillance +

Postexposure Prophylaxis

Professional Resources

Patient Education Resources

A Hepatitis A

B Hepatitis B

Perinatal Transmission



Hepatitis B virus (HBV) infection in a pregnant woman poses a serious risk to her infant at birth. Without postexposure immunoprophylaxis, approximately 40% of infants born to HBV-infected mothers in the United States will develop chronic HBV infection, approximately one-fourth of whom will eventually die from chronic liver disease.

Perinatal HBV transmission can be prevented by identifying HBV-infected (i.e., hepatitis B surface antigen [HBsAg]-positive) pregnant women and providing hepatitis B immune globulin and hepatitis B vaccine to their infants within 12 hours of birth.

Preventing perinatal HBV transmission is an integral part of the national strategy to eliminate hepatitis B in the United States. National guidelines call for the following:

- Universal screening of pregnant women for HBsAg during each pregnancy
- Screening all HBsAg-positive pregnant women for HBV DNA to guide the use of maternal antiviral therapy during pregnancy. AASLD suggests maternal antiviral therapy when HBV DNA is >200,000 IU/mL
- Case management of HBsAg-positive mothers and their infants
- Provision of immunoprophylaxis for infants born to infected mothers, including hepatitis B vaccine and hepatitis B immune globulin within 12 hours of birth
- Routine vaccination of all infants with the hepatitis B vaccine series, with the first dose administered within 24 hours of birth

Guidelines and Recommendations

[Prevention of Hepatitis B Virus Infection in the United States: Recommendations of the Advisory Committee on Immunization Practices](#)

MMWR 2018; 67 (RR 1):1–31

On This Page

[Guidelines and Recommendations](#)

[Scientific Tools and Resources](#)

[Policies and Procedures for Prenatal Care and Delivery Hospitals](#)

[Additional Resources](#)

[Patient Education Tools](#)



Protect Your Baby for Life

When a Pregnant Woman Has Hepatitis B

Resources - II

<https://www.cdc.gov/knowhepatitisb/materials.htm#pregnantwomen>

Information for Pregnant Women

<p>“Protect Your Baby For Life” fact sheet</p>  <p>This 2-page fact sheet is for pregnant women who have Hepatitis B and explains the importance of the Hepatitis B vaccine in preventing the spread of hepatitis B to their infants.</p>	<p>English [PDF – 839KB] Hmong [PDF – 1.4MB] Chinese [PDF – 1.4MB] Khmer [PDF – 2.7MB] Vietnamese [PDF – 1.7MB] Lao [PDF – 5.9MB] Korean [PDF – 1.1MB] Russian [PDF – 0.6MB] Burmese [PDF – 2.9MB] Spanish [PDF – 0.7MB] French [PDF – 0.7MB] Tagalog [PDF – 1.5MB]</p>
<p>Vaccinate Your Baby Against Hepatitis B</p>  <p>This two page infographic answers commonly asked questions about hepatitis B and explains the importance of the vaccine for infants</p>	<p>English [PDF – 2 MB] Customizable version files Spanish [PDF – 2 MB] Perinatal Infographic-Customizable Version [PDF – 3 MB] Logo + Og Info PDF Template [DOC – 28 KB] Customized Infographic Directions [PDF – 443 KB]</p>
<p>Hepatitis B and a Healthy Baby</p>  <p>This audio-visual presentation explains why infants need to get the hepatitis B vaccine if their mother has hepatitis B. This presentation is available in English, Chinese, Vietnamese, Korean, Hmong and Tagish, and allows participants to read and listen along to the presentation.</p>	<p>English Chinese Vietnamese Korean Hmong Tagish</p>
<p>Hepatitis B and Your Healthy Baby</p>  <p>This presentation provides details on the Hepatitis B vaccine that an infant will receive at birth if the infant’s mother has Hepatitis B. It also includes information on how common Hepatitis B is and how it is spread. The presentation contains pictures along with written text and is available in English and Spanish.</p>	<p>English Spanish</p>

Resources - III

- **2018 ACIP Recommendations**
 - <https://www.cdc.gov/mmwr/volumes/67/rr/pdfs/rr6701-H.pdf>
- **IAC Website: Birth dose initiative**
 - <http://www.immunize.org/protect-newborns/>
- **Asian Liver Center**
 - <http://liver.stanford.edu/>
- **Patient Education Resources - CDC Materials and Links**
 - <https://www.cdc.gov/hepatitis/hbv/patienteduhbv.htm>

For more information, contact CDC
1-800-CDC-INFO (232-4636)
TTY: 1-888-232-6348 www.cdc.gov

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

