

Give Birth to the End of Hepatitis B

LiverConnects

Feb 14, 2017

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Disclosure

Rosalyn Singleton has no conflicts of interest to disclose, but has a new beautiful granddaughter.



Objectives

1. Understand the impact of neonatal hepatitis B infection in the US and world wide.
2. Recognize the efficacy of routine birth hepatitis B vaccine in preventing hepatitis B infection and complications.
3. Recognize the importance of a strong recommendation for birth hep B vaccine.

Pop Quiz

35 y.o. HBsAg-negative mother was born in the Philippines and came to US at age 5. She is married to a US born Caucasian male. Her children have been vaccinated against HBV. Her provider tells her that since she is HBsAg-negative she would suggest waiting until the baby is 2 months old to start hepatitis B vaccine. The mother is a stay at home mom.

- a) The child is at not risk of HBV infection in the first 2 months of life and this is perfectly acceptable option
- b) The child is at a remote risk of HBV infection but the risk benefit ratio of vaccination allows the option to delay vaccine
- c) This child could conceivably be at risk for HBV infection

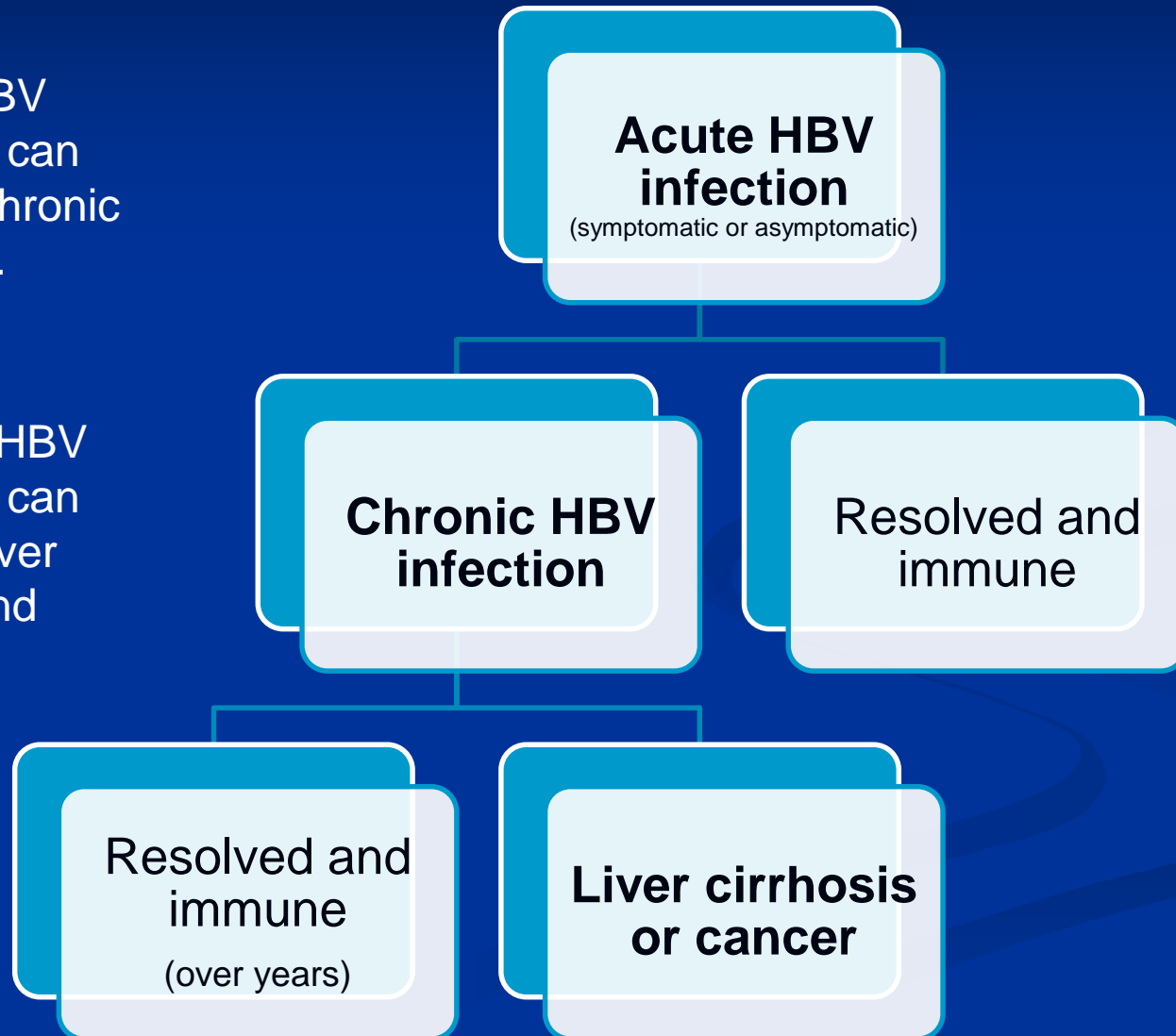
Hepatitis B background

- Hepatitis B is a liver disease caused by hepatitis B virus (HBV) preventable by hepatitis B vaccine.
- HBV is found in blood and other body fluids of infected people (e.g., serum, semen, saliva, vaginal secretions)
- There are 1.4 million chronic Hep B carriers in the U.S.
- An infant can acquire HBV from:
 - An infected mother (transmitted at birth)
 - A chronically infected member of household

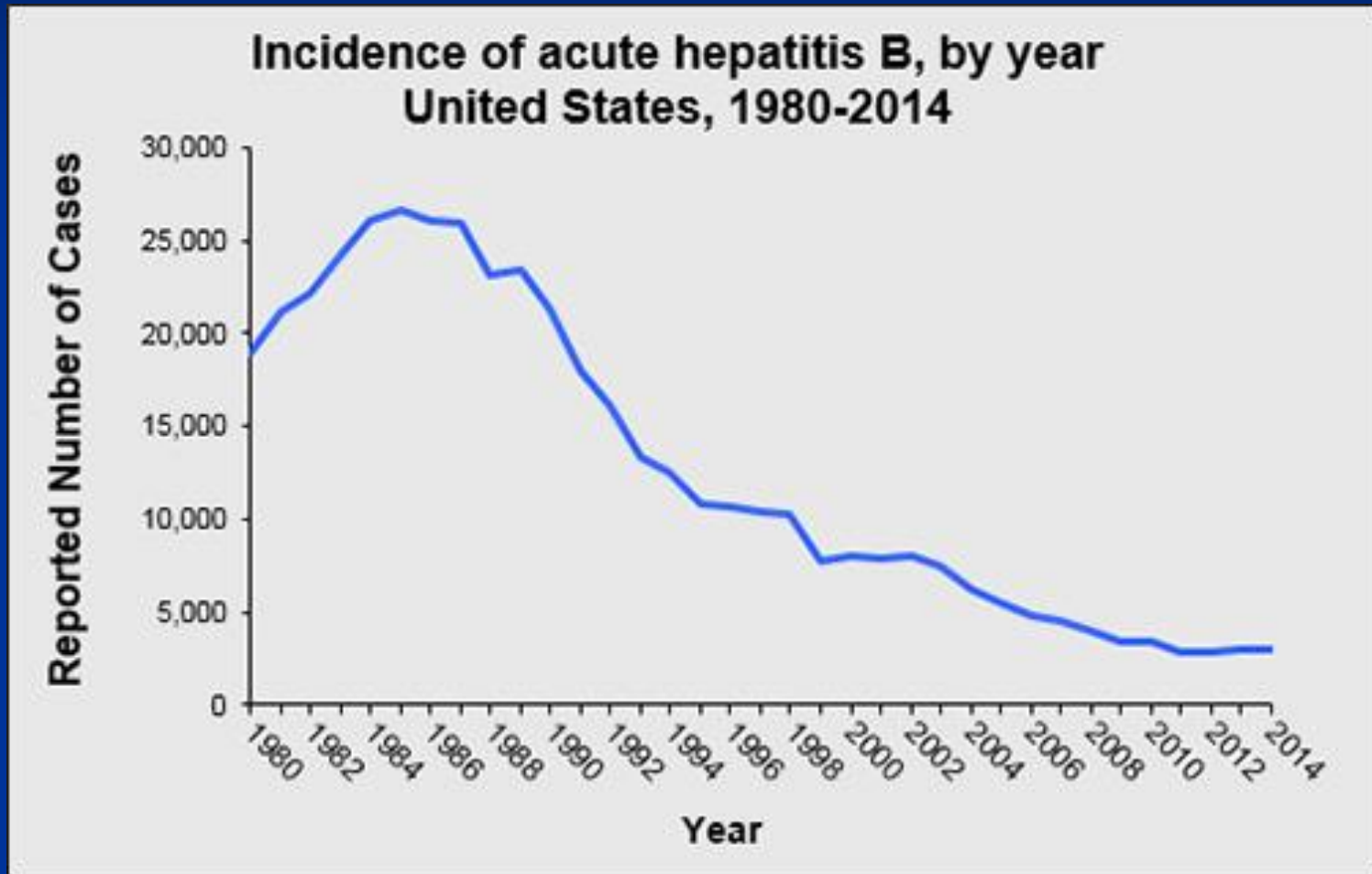
Natural history of HBV infection

Acute HBV infection can lead to chronic infection.

Chronic HBV infection can lead to liver failure and cancer.



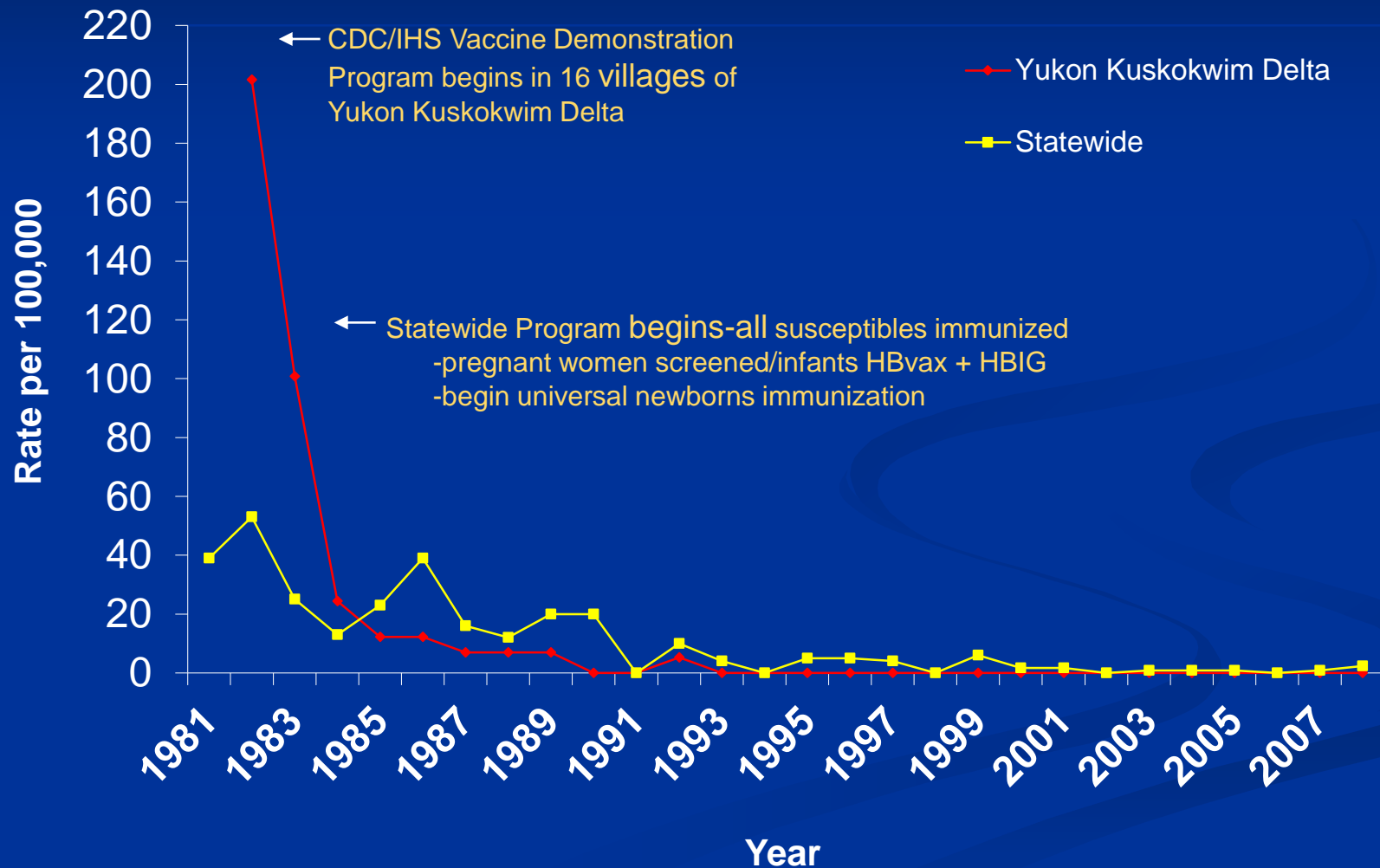
Reported number of acute hepatitis B cases United States 1980-2014



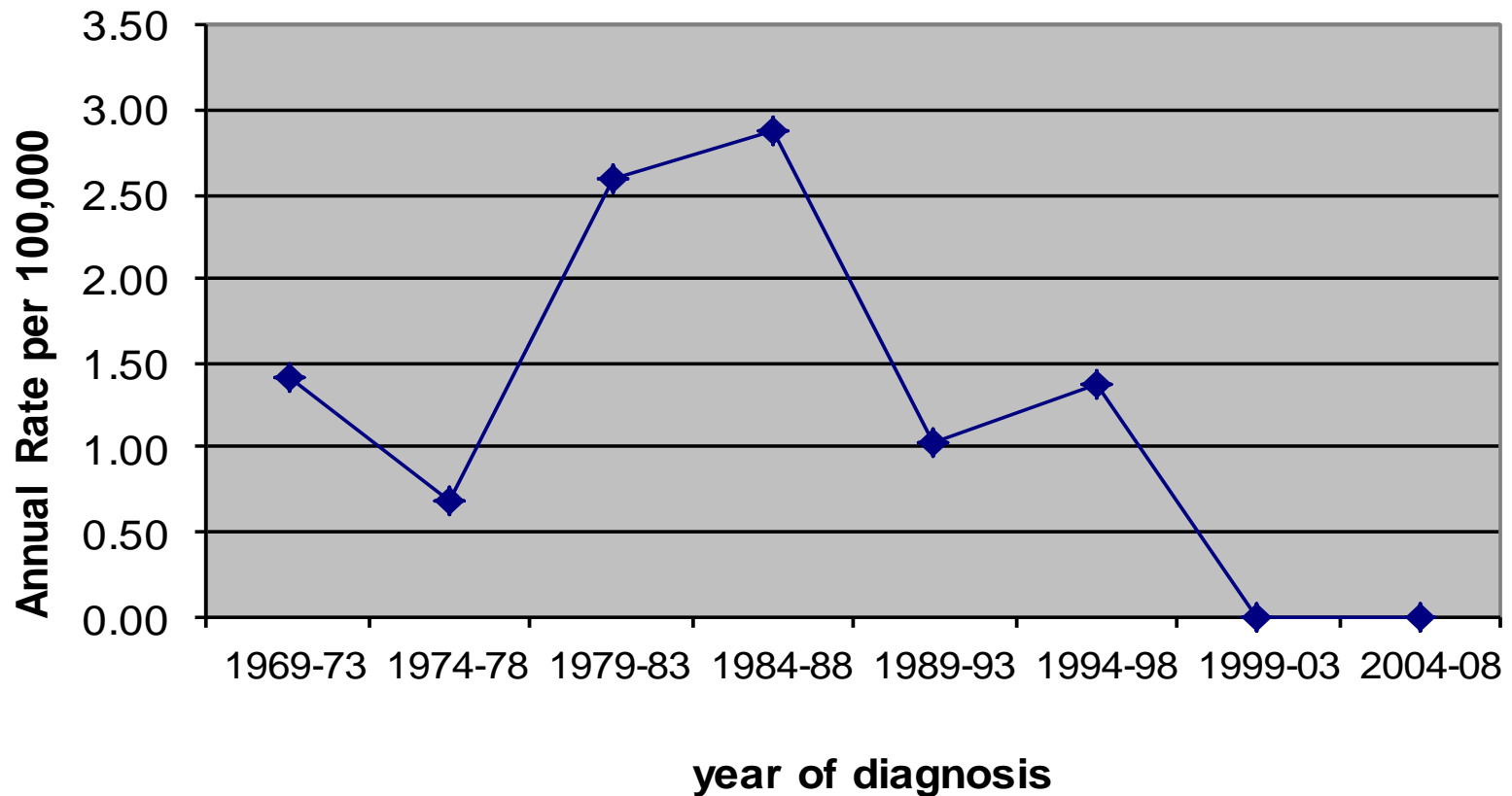
Source: National Notifiable Diseases Surveillance System (NNDSS)

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

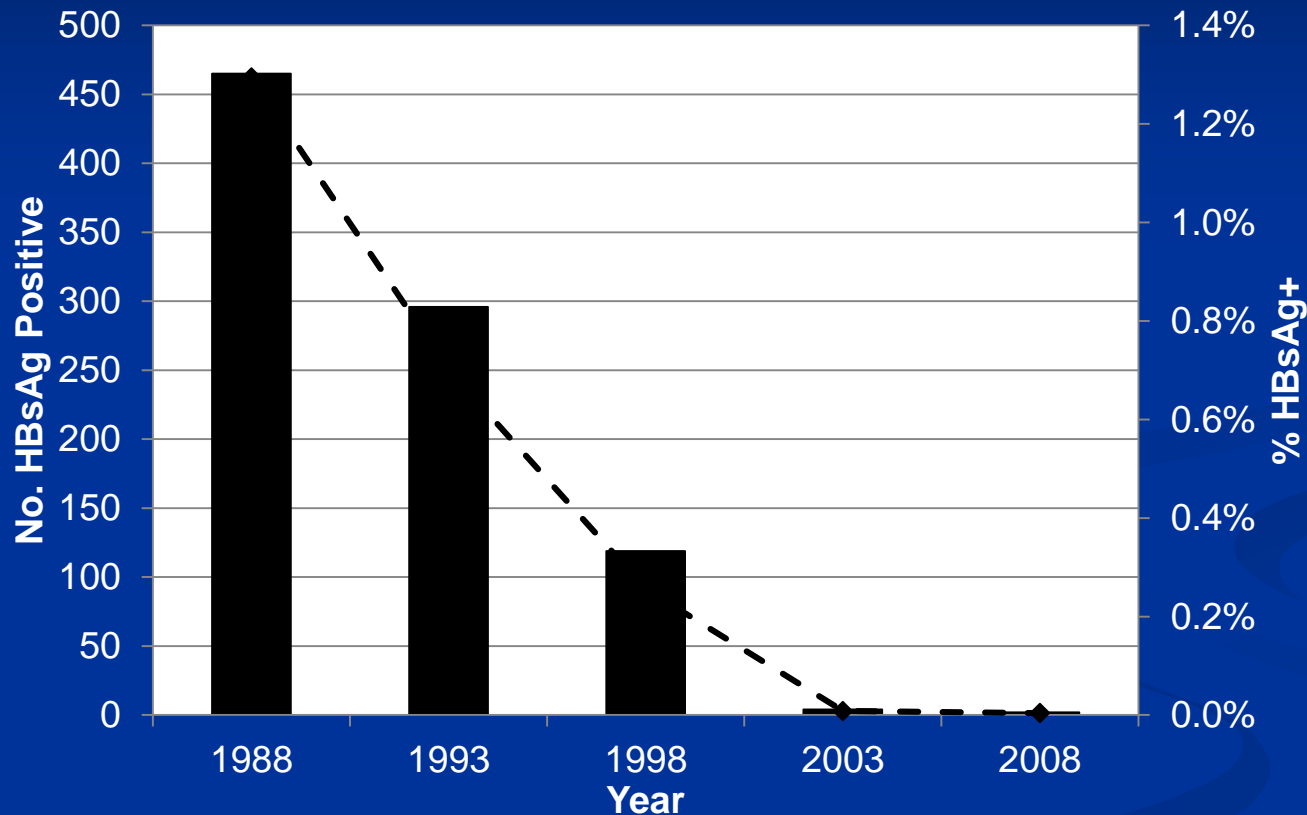
Incidence Acute Symptomatic Hepatitis B in YK Delta, Statewide 1981- 2008



Hepatocellular Carcinoma: Alaska Natives <20 years of age



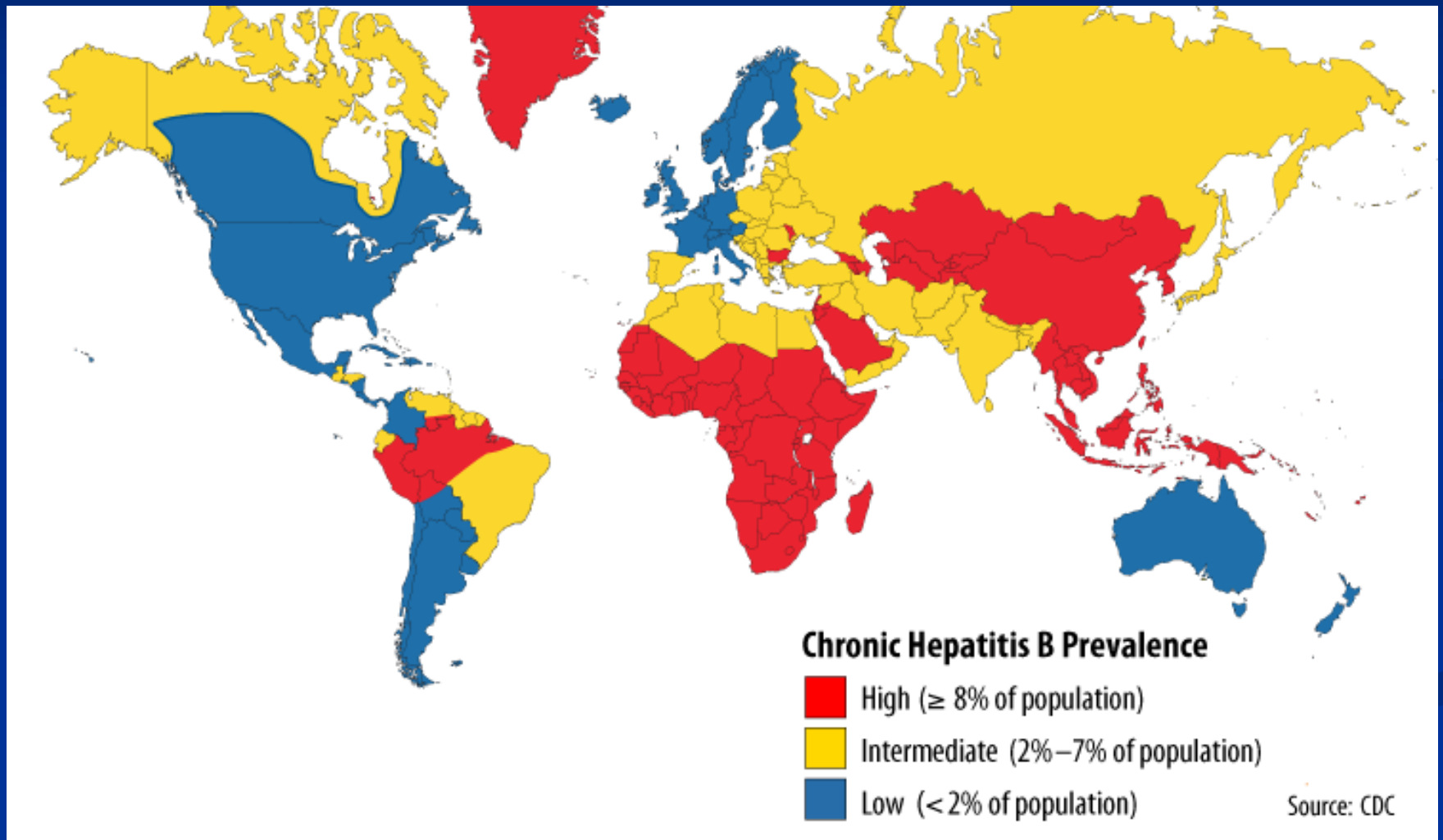
Number of HBsAg-positive Alaska Native Children <20 Years of Age: 1988-2008



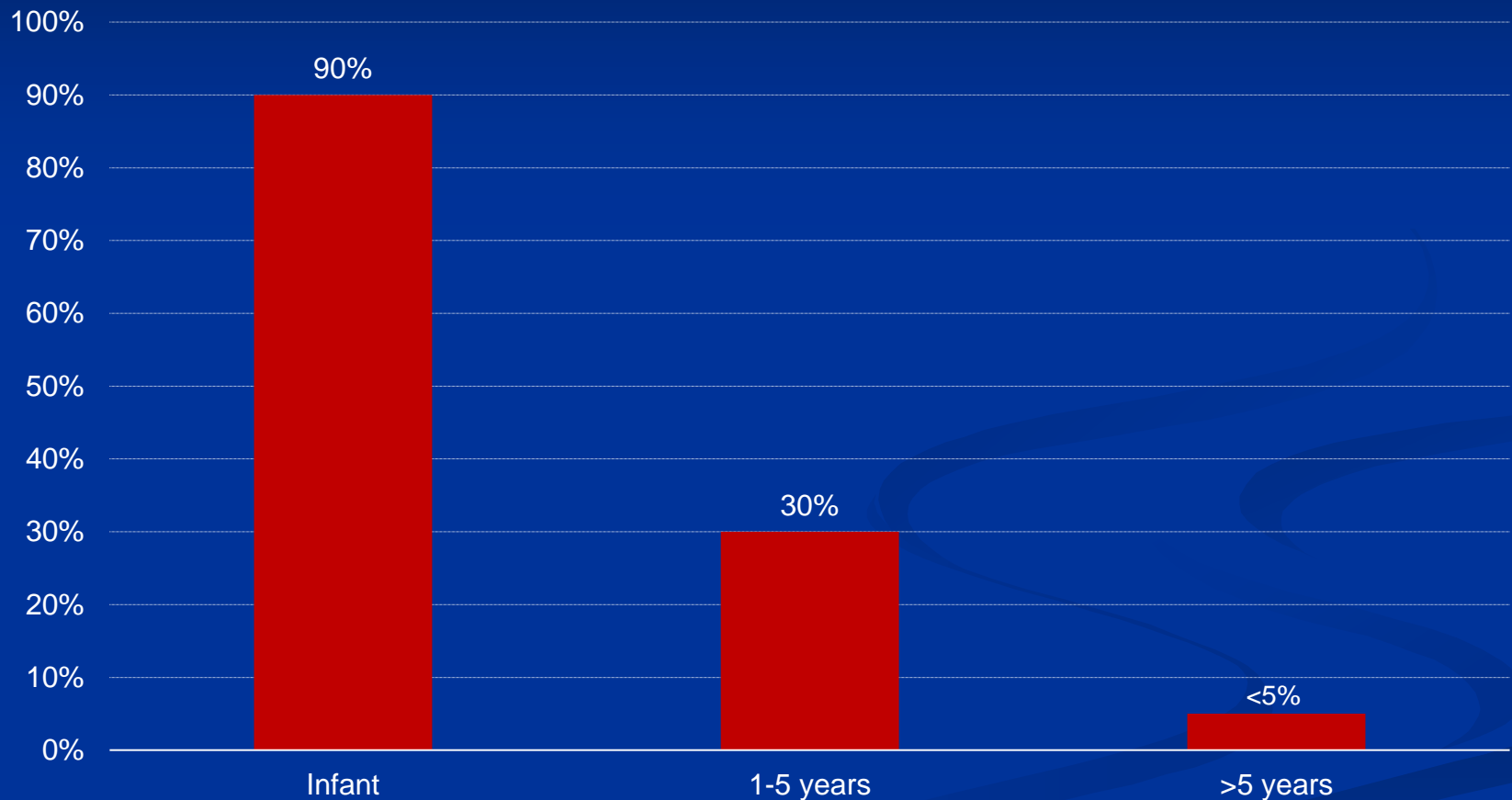
Hepatology 2011;54:801-7

There are ~1500 HBsAg carriers in the Alaska Native HBsAg registry. Only 4 of them are <30 years old, because of effective Hep B vaccine.

Chronic Hepatitis B Prevalence



Risk of developing chronic hepatitis B by age of infection



McMahon BJ, J Infect Dis 1985;151:599

Edmonds WJ Proc R Soc Lond B Biol Sc 1993; 253:197

Hyams KC. Clin Infect Dis 1995;20:992

How effective is hepatitis B vaccine starting at birth?

- Post-exposure prophylaxis of infants born to infected mothers is 85-95% effective within 12 hours of birth
 - Hepatitis B vaccine + hepatitis B immune globulin (HBIG) at birth and completion of hep B vaccine series.
- Hepatitis B vaccine at birth even without HBIG will prevent infection in 70-95% of infants born to infected mothers.

Recombinant Hepatitis B Vaccine Efficacy (VE) among Infants Born to HBeAg-Positive Women by Vaccine Type and Dosage

Country	HBIG	Hepatitis B Vaccine Efficacy Without and With HBIG Ages 0, 1, 6 months	
Burma Thailand	No	MSD 5 ug	93% 86%-89%
Thailand		GSK 10 ug	92%
Thailand USA	Yes	MSD 5 ug	89% 92%
Thailand Taiwan		GSK 10 ug	100% 90%

Pongpipat D. 1989; Stevens CE. 1975, 1979;1985,1992. Lee C-Y. 1991, 997; Poovorawan Y. 1989; 997; 2009; Lolekha S. 2002; Mast E. *Vaccine*, Eds. Orenstein W, Plotkin S, 2004, 2009

Key studies showed high effectiveness of Hep B vaccine with and without HBIG

Birthing hospitals and centers

- Hospitals and birthing centers have an opportunity to protect the future health of infants:
 - Each year in the US, about 25,000 infants are born to mothers infected with HBV
 - Some infants are exposed shortly after birth to HBV by household members with chronic HBV infection.
- Most infants can be protected if hospitals routinely provide birth dose hepatitis B vaccine to all newborns.

Hep B birth dose is recommended by ACIP, AAP, AAFP and ACOG

- Test all pregnant women for HBsAg
- Hepatitis B birth dose for all infants
- Infants born to HBsAg-positive mothers
 - HBV vaccine and HBIG within 12 hours of birth.
 - Infants <2000 gm – dose 1 doesn't count.
- Infants born to HBsAg-unknown mothers
 - Draw mother blood for HBsAg. Give HBV vaccine.
 - If <2000 gm give HBV and HBIG by 12 hours.
 - If mother HBsAg positive, give HBIG by 7 days.

New in the 2017 Childhood Vaccine Schedule

Hepatitis B

New in the Schedule: one dose of hepatitis B vaccine is recommended for all newborn children within 24 hours of birth.

Previously: a birth dose was recommended, but that was interpreted to mean the first couple of weeks of life.

Rationale: There are about 25,000 babies a year born to mothers who are chronically infected with hepatitis B. The risk of transmission to a baby from a mother chronically infected can be as high as 90%. If babies are infected at birth, they have a significant risk of developing cirrhosis or cancer of the liver. 1000 babies are infected each year because the vaccine was not administered or was administered too late. Pediatricians, he said, sometimes assume incorrectly that the mother is negative and the vaccination can wait until the first visit.

Birth Dose Coverage: National Quality Forum (NQF) Measure 0475

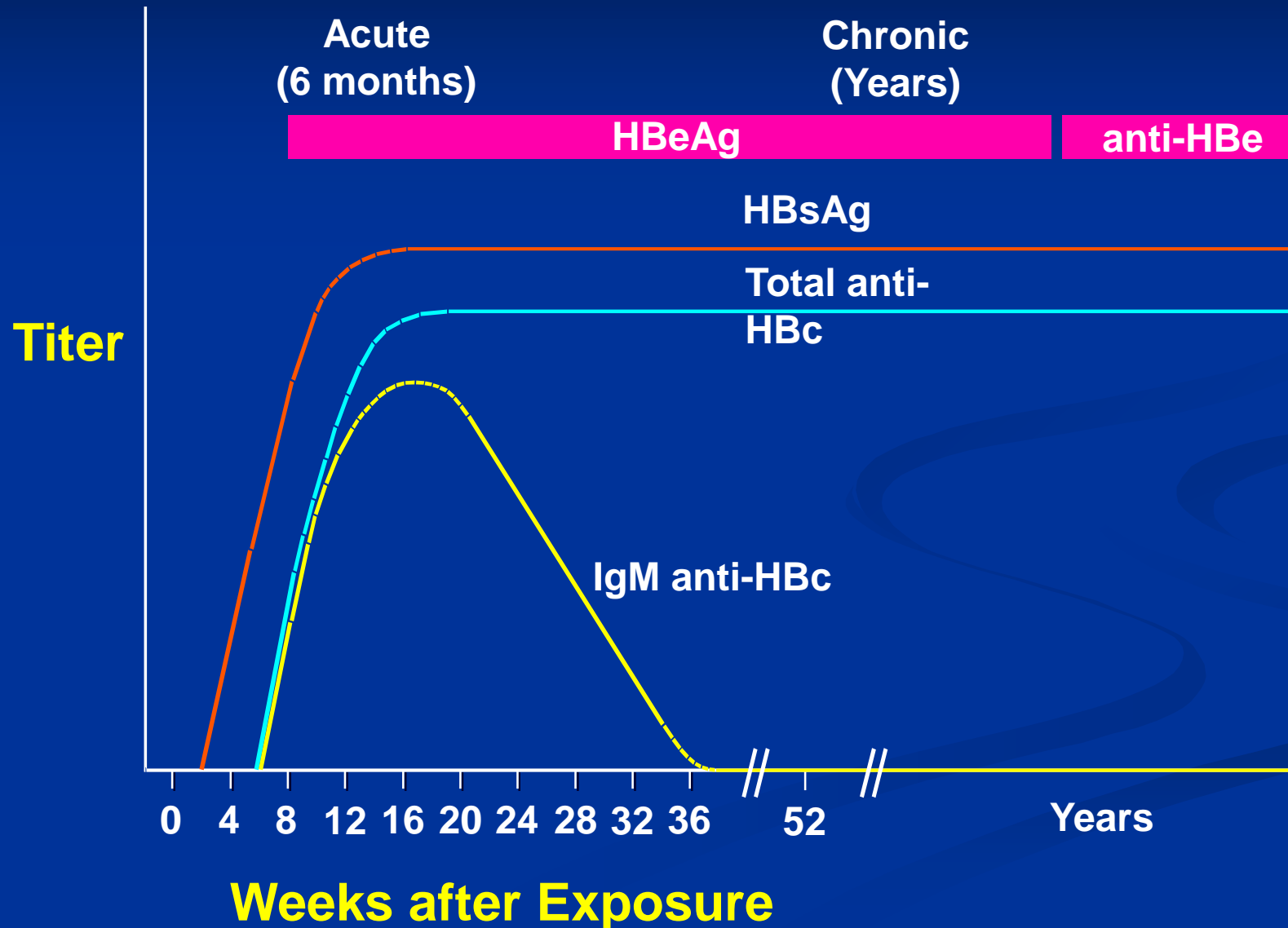
Recommends that hospitals measure and report the “percent of live newborn infants that receive hepatitis B vaccination before discharge at each single hospital/birthing facility during the given time period (one year),” excluding infants whose parents refuse vaccination.

NQF measure 0475 endorsed on 4/2/2012

Perinatal Transmission

- Transmission from infected mother to infant
 - Much higher occurrence with HBV genotype C
 - Much higher with HBeAg +
- Occurs through percutaneous and mucosal exposure to mother's blood
- Usually occurs during birth
- *In utero* transmission rare: accounts for ~5% of perinatal infections
- HBV not transmitted by breastfeeding

Acute Hepatitis B Virus Infection with Progression to Chronic Infection



Risk of Perinatal HBV Transmission by HBeAg Serostatus of Mother

<u>Serostatus of Mother</u>		<u>% Infants Infected</u>
<u>HBsAg</u>	<u>HBeAg</u>	
Positive	Positive	85% -100%
Positive	Negative	10%

CDC Epidemiology and Prevention of Vaccine-Preventable Diseases Pink Book, Hepatitis B section.

The Problem

- Routine birth dose of hepatitis B will prevent nearly all cases of perinatally-acquired hepatitis B
- Many infants in the U.S. are not receiving the birth dose of hepatitis B vaccine
 - In 2013 74.2% of U.S. newborns received hepatitis B within 3 days of birth
- ~ 800 U.S. newborns are still chronically infected with hepatitis B each year from exposure

2013 National Immunization Survey www.cdc.gov/mmwr/preview/mmwrhtml/mm6334a1.htm

<http://www.immunize.org/protect-newborns/guide/birth-dose.pdf>

2010 Institute of Medicine report: Perinatal HBV Infection

IOM Report: ~1,000 infants in the US per year develop chronic hepatitis B infection.

- 2 primary reasons :
 - Lack of screening of mother for HBsAg
 - Failure to give birth dose
- Other reasons included:
 - Very high HBV DNA viral load in mother
 - Antiviral prophylaxis of mother may prevent this
 - Failure to give HBIG post delivery

Over 90% of perinatal HBV can be prevented by birth Hep B vaccine and series completion

Rationale for Universal Birth Dose of Hepatitis B Vaccine

- Prevents most vertical HBV transmission to infants born to HBsAg-positive women, and
- Provides “safety net” for infants whose mother’s status unknown or uncertain at delivery
- Prevents horizontal HBV infection during childhood regardless of HBsAg-status of mother & contacts
- First dose at birth results in higher rates of on-time completion of hepatitis B series, other vaccines*

*Jacques-Carroll L et al. Arch Pediatr Adolesc Med 2009;163: 489

Why is a Safety Net needed? Medical Errors.

- Ordering the wrong hepatitis B screening test
- Misinterpreting/mistranscribing hepatitis B test results
- Failing to communicate HBsAg test results to or within the hospital
- Not giving birth hepatitis B vaccine to infants of mothers with unknown HBsAg status
- Not giving prophylaxis to an infant even when mother's HBsAg-positive status is known.



Unfortunate Incidents

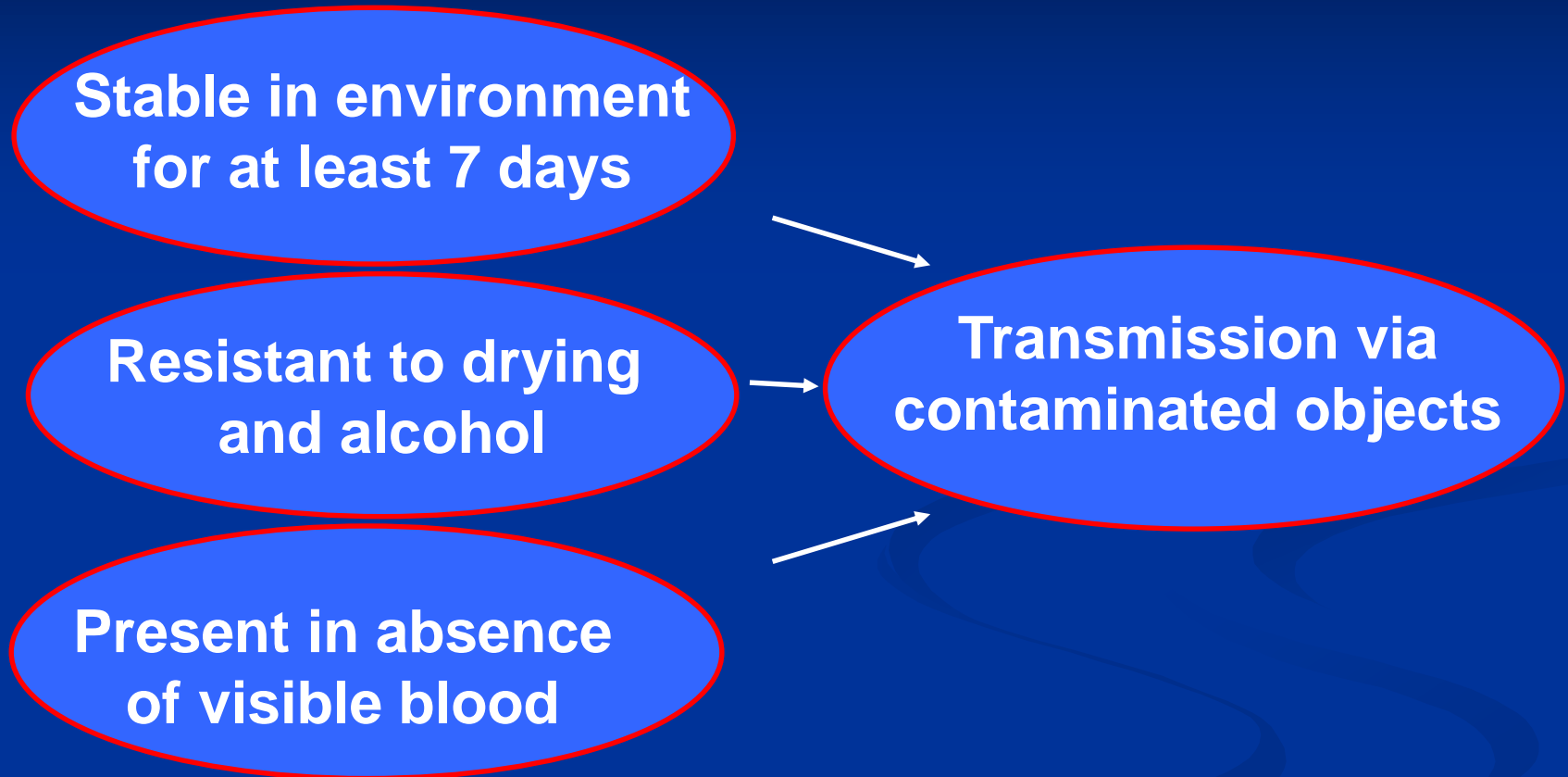
Hospital 1: “The mother had been diagnosed with chronic hepatitis B. In her prenatal record she was documented to be HBeAg positive. Despite this, her baby did not receive HBIG or the first dose of hepatitis B vaccine in the hospital. The first dose of vaccine was given when the infant was three weeks of age. The child was diagnosed HBsAg positive at 19 months of age, and is being followed by a liver specialist for chronic hepatitis B.”

Hospital 2: “We have two cases where infants born to carrier mothers received the first dose of hepatitis B vaccine three weeks after birth and no HBIG. In one case, a resident interviewed the mother who claimed she was not HBsAg positive.”

Case Reports from “Immunization Action Coalition”

Are infants at risk after birth??

Hepatitis B Virus in the Environment



Contact with HBV in body fluids from infected persons or contaminated surfaces
Transmission via breaks in skin, e.g., cuts or dermatitis, or via mucosal exposures, e.g., biting, sharing tooth brushes

Administration of Hepatitis B Vaccine

- Typically given as a three dose series
 - Four dose series routine in Alaska because of combination DTaP-HepB-IPV (Pediatrix)
 - Schedule flexible
 - 0,1-2,6 month schedule most common
- Excellent protection (>95%) is provided with 4 doses of hepatitis B vaccine
- A fourth dose does not improve seroconversion rate but provides higher level of anti-HBs post vaccination series
- Dose (mcg) varies by manufacturer and age of recipient

Hepatitis B Vaccine Safety

- Hepatitis B vaccine administered to millions of infants, children and adults worldwide
- Side effects rare
- Anaphylaxis estimated to occur in 1 per 600,000 doses administered
- No scientific data linking hepatitis B vaccine and multiple sclerosis, other autoimmune diseases, autism

Hepatitis B Vaccine Long-term Protection from HBV Infection

- A child or adult who responds to hepatitis B vaccine is protected from acute symptomatic hepatitis B and chronic carrier state for at least 30 years

Bruce M, JID, 2016

- Infants who respond to hepatitis B vaccine are protected for up to 20 years, although anti-HBs is likely to have disappeared and they may not respond to a booster dose
 - Cellular immunity likely provides long-term protection
 - Breakthrough infections reported to not result in symptomatic infection or lead to chronic carrier stage

Management of Pregnant Women who have Hepatitis B

- GI and Hepatologists play an important role in assisting OB/GYN providers managing pregnant women with HBV
- Tenofovir Disoproxil (TDF) or Telbivudine (LdT) are safe and effective and women in the immune active phase should be treated during their entire pregnancy
- Mothers not in the immune active phase with high levels of HBV DNA should be referred to hepatologists to receive TDF or LdT during the 3rd trimester of pregnancy

Pop Quiz Answer

35 y.o. HBsAg-negative mother was born in the Philippines and come to US at age 5. She is married to a US born Caucasian male. All of her children have been vaccinated against HBV. The mother is a stay at home mom.

This child could conceivably be at risk for HBV infection

WHY?

- Large extended family, most were born in the Philippines
- Mom is getting pressure to bring baby over to see relatives in the Philippines

What could the provider do if she does not want to give birth dose?

- Investigate all family members and friends from mom's family to make sure they were screened and vaccinated
- Urge no contact with any members found to be HBsAg+
- Tell her she absolutely cannot go the Philippine Islands now.

Alaska Birth Hep B coverage rates

2015 National Immunization Survey

Alaska's coverage rate for a birth dose of Hepatitis B vaccine increased from 54% in 2014 to 66% in 2015!

The Immunization Action Coalition's Hepatitis B Birth Dose Honor Roll

- shows appreciation for birthing facilities that support the Hepatitis B Birth dose
- recognizes high coverage rates for administering the Hepatitis B Birth Dose.
- Congratulations to the 673rd Medical Group at JBER, honor roll recipients with a reported coverage rate of 93%!
- Visit the IAC website www.immunize.org for more information.

Strategies to Eliminate Hepatitis B Virus Transmission

National guidelines

- Universal screening of pregnant women for HBsAg during each pregnancy
- 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 immunoglobulin (HBIG)
- Routine vaccination of all infants with Hepatitis B vaccine series, with the first dose administered at time of birth

Immunization Action Coalition

Give birth to the end of Hep B

Protect newborns - Administer hepatitis B vaccine at birth

The Immunization Action Coalition (IAC) is urging hospitals and birthing centers to meet the national standard of care by providing a universal birth dose of hepatitis B vaccine.



It prevents mother-to-infant transmission

Prevents 70%–95% of transmission to infants born to HBsAg-positive women



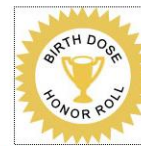
It prevents household transmission

Protects infants from infected family members and other caregivers



It provides protection if medical errors occur

Provides a safety net to prevent perinatal transmission when medical errors occur

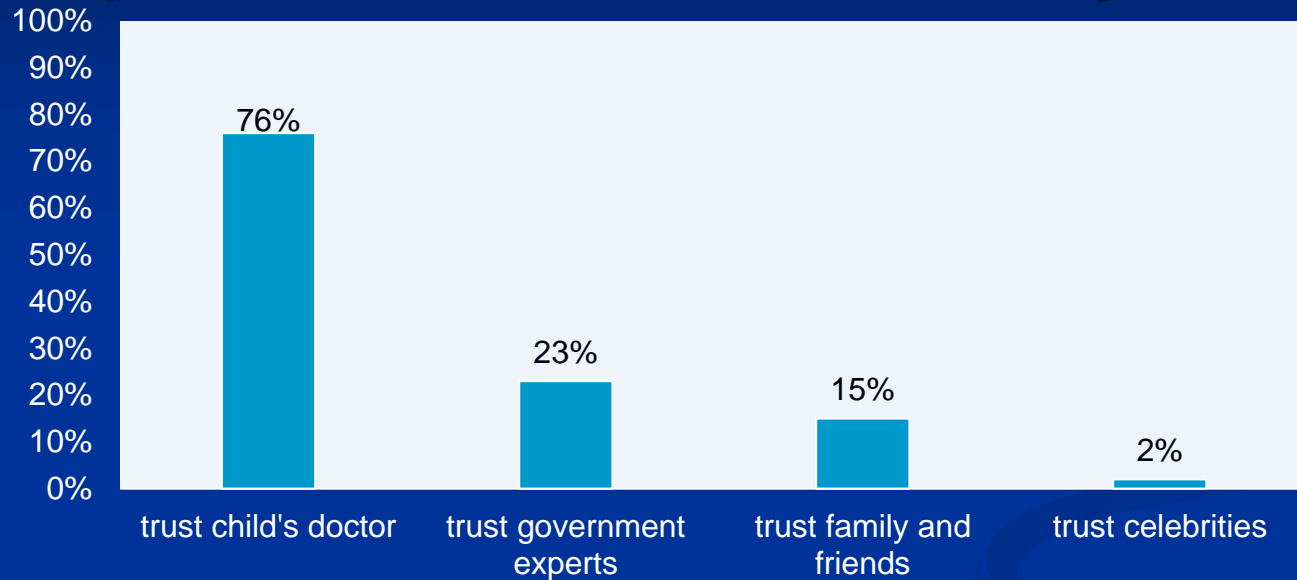


Hepatitis B Birth Dose Honor Roll

Recognizes birthing institutions that have a 90% or greater for administering hepatitis B vaccine before discharge for all newborns.

Importance of Strong Recommendation

Who parents trust for credible Vaccine Safety information



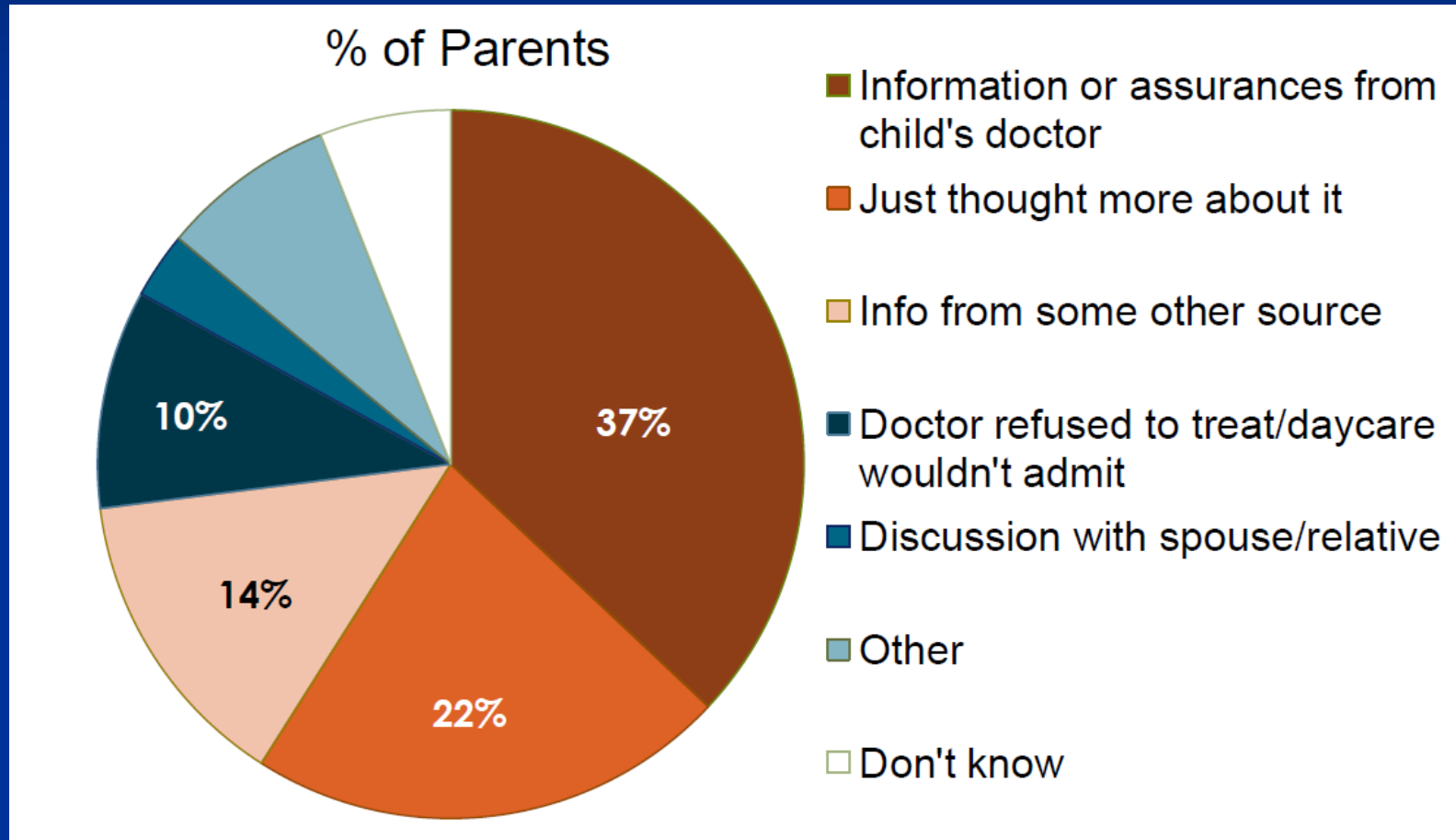
Parents Trust Health Providers

A clear message is important

- How a provider introduces vaccines is critical!
- Address parents' specific concerns
- Give a **strong recommendation for vaccines**



Why Parents Change Their Minds and Give Vaccines



All Alaska Pediatric Partnership Birth Hep B Initiative – Spring 2017

Presentations to
Alaska hospital
birthing staff

Flyers on Birth
Hep B

Hep B vaccine PROTECTS NEWBORNS THRU ADULthood Children who receive the birth dose of hepatitis B vaccine are more likely to receive other childhood immunizations on time.	Hep B vaccine PREVENTS MOTHER-TO-INFANT and HOUSEHOLD TRANSMISSION Hep B vaccine prevents up to 95% of transmission to infants born to HBsAg-positive women and protects infants from infected caregivers.	Hep B vaccine PROVIDES PROTECTION IF MEDICAL ERRORS OCCUR Hep B vaccine provides a safety net to prevent perinatal transmission when HBIG is missed in HBsAg-positive women.
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YOU ARE A TRUSTED SOURCE OF INFORMATION...
USE YOUR POWERS FOR GOOD!
GIVE A STRONG RECOMMENDATION FOR BIRTH DOSE HEP B VACCINE

Studies indicate that parents turn to health care professionals with questions about vaccines. Discuss with parents and stress the importance of:

- Birth dose Hep B vaccine for all, and HBIG for infants of chronically infected (HBsAg-positive) moms
- Completing the Hep B vaccine series
- Hep B testing (HBsAg & anti-HBs) for infants of HBsAg-positive moms after completing the Hep B vaccine series

A strong recommendation for birth dose Hep B vaccine and hospital standing orders are two important factors in parents' decision for birth dose Hep B. You have the power to make a difference.

For more information on talking with parents about vaccines, visit cdc.gov/vaccines/hcp/conversations/about-vacc-conversations.html

DID YOU KNOW?

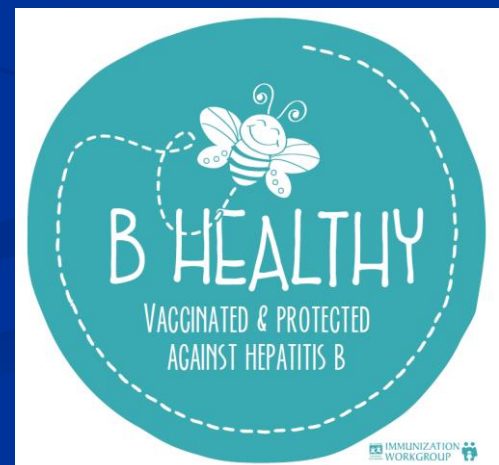
Nearly **ONE IN THREE U.S. AND ALASKAN** newborns leave the hospital unprotected from life-threatening hepatitis B infection.

Approximately **800 U.S. NEWBORNS** are chronically infected each year through perinatal exposure.

Hepatitis B virus can stay infectious on surfaces at least **7 DAYS**. Newborns can be infected after birth.

The birth dose of Hep B vaccine **PREVENTS** most perinatal transmission.

Newborn Onesies with
B Healthy logo



Order resources at
www.A2P2.org

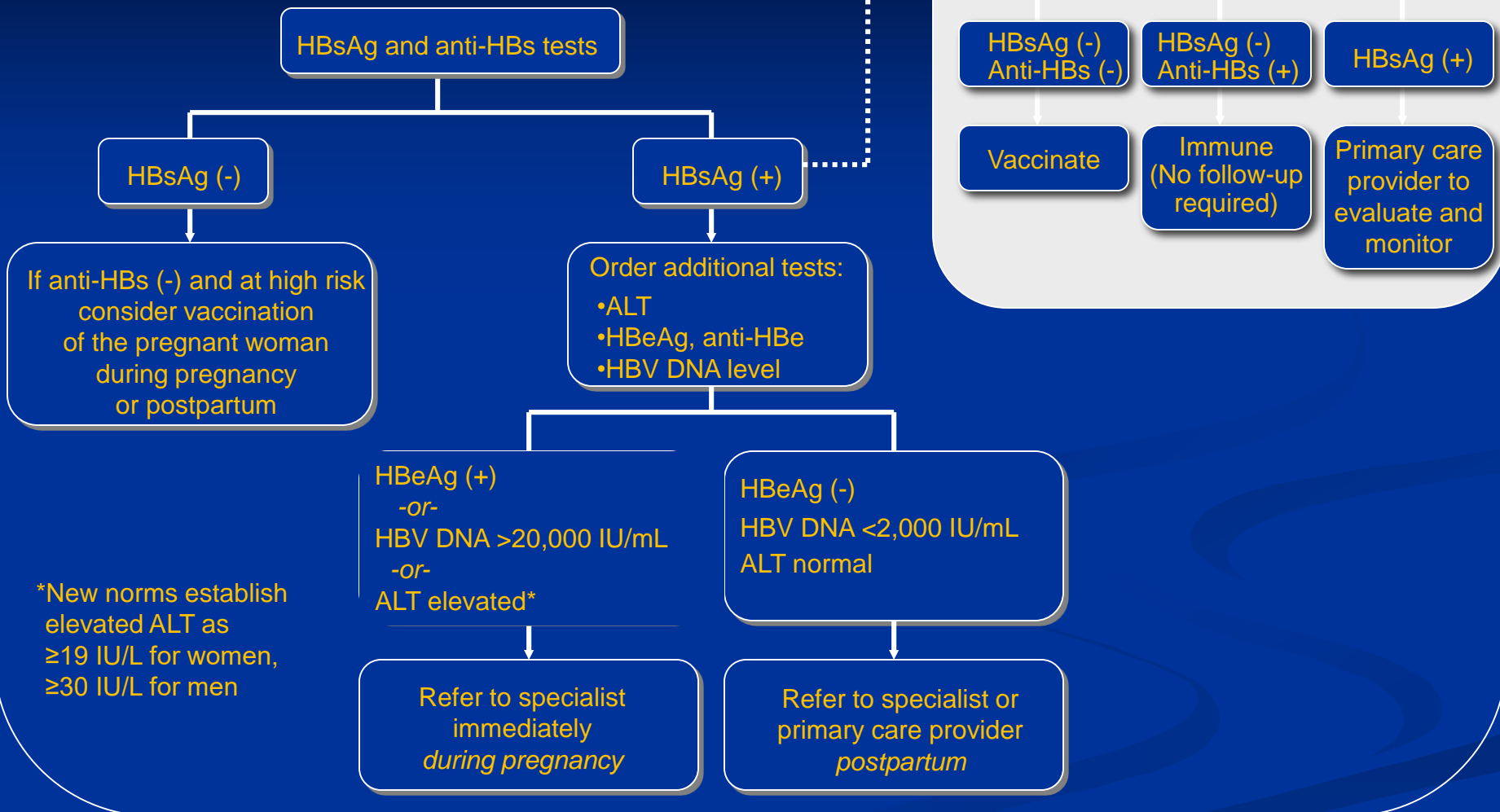


Extra Slides

Interpretation of Hep B Serologic Tests

Tests	Results	Interpretation
HBsAg anti-HBc anti-HBs	negative negative negative	Susceptible
HBsAg anti-HBc anti-HBs	negative positive positive	Immune due to natural infection
HBsAg anti-HBc anti-HBs	negative negative positive	Immune due to hepatitis B vaccination
HBsAg anti-HBc IgM anti-HBc anti-HBs	positive positive positive negative	Acutely infected
HBsAg anti-HBc IgM anti-HBc anti-HBs	positive positive negative negative	Chronically infected
HBsAg anti-HBc anti-HBs	negative positive negative	Interpretation unclear; four possibilities: 1. Resolved infection (most common) 2. False-positive anti-HBc, thus susceptible 3. "Low level" chronic infection 4. Resolving acute infection

HBV Screening Algorithm for Pregnant Women



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Primary Modes of HBV Transmission by Age Group

<u>Age Group</u>	<u>Primary Mode</u>
Birth	→ Perinatal
Early childhood	→ Unsafe injections Inapparent parenteral*
Late childhood, adolescence, adulthood	→ Unsafe injections Sexual Injection drug use

* From family member to child or child to child, through unapparent exposure to HBV infected blood from open cuts

Only 23% of hepatitis B infected persons have an identified risk factor.
No risk data is mentioned for 42%.