Perinatal Hepatitis B

Wisconsin Department of Health Services

1

Wisconsin Immunization Program Contacts

Stephanie Borchardt, Ph.D, MPH
Perinatal Hepatitis B Coordinator
Stephanie.borchardt@wi.gov

Sarah Born, RN
Perinatal Hepatitis B Coordinator
Sarah.born2@wi.gov

Alexandria Cull
Perinatal Hepatitis B Outreach
Alexandria.cull@wi.gov

Wisconsin Department of Health Services

2

Hepatitis B Virus (Hep B or HBV)

- DNA hepadnavirus
- Antigenic components: HBsAg, HBcAg and HBeAg
- Remains infectious on environmental surfaces for at least 7 days at room temperature
- Transmittable in the absence of visible blood

Wisconsin Department of Health Services

3

Epidemiology of Hepatitis B Infection

United States

- About 1,000 cases of perinatal HBV infection reported each year

Wisconsin

- Approximately 160 maternal-infant pairs are reported to public health each year
- 2015, 2 cases of perinatal Hepatitis B

Wisconsin Department of Health Services

4

How is infection spread?

- Infected blood or body fluid
- Although HBsAg detected in breast milk, saliva, urine & tears, *ONLY* blood, serum, semen, vaginal fluids, CSF, synovial, pleural, pericardial, peritoneal and amniotic fluids are potentially infectious
- Primary reservoir of infection is the chronically infected
- Thus, transmission is most commonly through perinatal, household or sexual contact

Wisconsin Department of Health Services

5

Risk factors

- Injection drug use
- Birth in an endemic country
- Birth to an infected mother
- Household contact of an acutely infected person or chronic carrier
- Multiple sexual partners or high risk sexual behavior
- Diabetic or on dialysis
- Occupational exposure to blood or body fluids

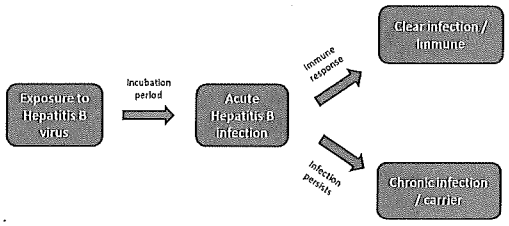
6

What about breastfeeding?

No increased risk to an infant who has received HBIG and Hep B vaccine per recommendations

Wisconsin Department of Health Services

7



Wisconsin Department of Health Services

8

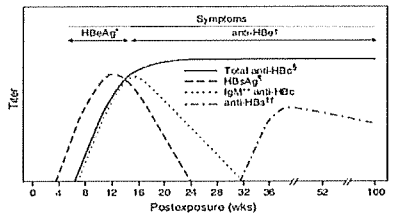
Acute Hepatitis B Infection

- Incubation period of 45-160 days
- May be asymptomatic – age dependent
  - decreased age, less likely to develop symptoms
  - 50% of adults and almost all children have no clinical symptoms
- Insidious onset of symptoms
- Clinical symptoms may include: anorexia, nausea, vomiting, lethargy, abdominal pain, joint pain or rash
- Jaundice and/or elevated LFTs (ALT > 100)

Wisconsin Department of Health Services

9

Figure 1. Typical serologic course of acute Hepatitis B virus infection with recovery



* Hepatitis B e antigen.
† Antibody to HBeAg.
§ Antibody to hepatitis B core antigen.
¶ Hepatitis B surface antigen.
** Immunoglobulin M.
†† Antibody to HBsAg.

10

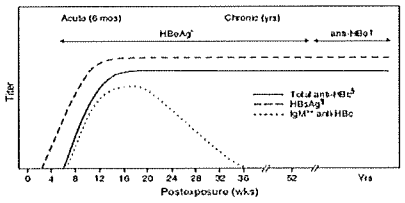
Chronic Hepatitis B Infection

- Usually asymptomatic with no history of clinical hepatitis
- HBsAg, HBV DNA and/or HBeAg persist for at least 6 months
- May have elevated LFTs or evidence of liver damage on biopsy

Wisconsin Department of Health Services

11

Figure 2. Typical serologic course of acute Hepatitis B virus (HBV) infection with progression to chronic infection



* Hepatitis B e antigen.
† Antibody to HBeAg.
§ Antibody to hepatitis B core antigen.
¶ Hepatitis B surface antigen.
** Immunoglobulin M.

12

Hepatitis B Surface Antigen (HBsAg)

- Present in acute and chronic infection
- Anyone who is HBsAg-positive is potentially infectious
- Antigen used in the vaccine
  - may be detected up to one month following vaccination

Wisconsin Department of Health Services

13

Antibody to Hepatitis B Surface Antigen (anti-HBs or HBsAb)

- Immune from resolved infection or vaccination
- Develops 1-2 months following vaccination or infection

Wisconsin Department of Health Services

14

Total Antibody to Hep B Core Antigen (total anti-HBc or total HBcAb)

- Present during acute, resolved or chronic infection
- NOT present following vaccination
- Passively transferred from a HBsAg-positive mother to her infant
  - may be detected up to 24 months following birth

Wisconsin Department of Health Services

15

IgM Antibody to Hepatitis B Core Antigen (IgM anti-HBc or IgM HBcAb)

- Acute or recent infection
- Specific for establishing a diagnosis of acute Hepatitis B
- Appears around time of illness onset
- Only marker positive during "window period" – time between disappearance of HBsAg and appearance of anti-HBs

Wisconsin Department of Health Services

16

Hepatitis B e Antigen (HBeAg)

- Indicates infectiveness
- HBeAg positivity usually indicates a higher HBV viral load, and thus increased infectivity
- Eventually become undetectable in chronic infection

Wisconsin Department of Health Services

17

Antibody to Hepatitis B e Antigen (anti-HBe or HBeAb)

- Presence of anti-HBe indicates lower risk of transmission / lower infectiveness

Wisconsin Department of Health Services

18

Hepatitis B DNA or Viral Load (HBV DNA)

- Qualitative or quantitative
- Trends used to monitor effectiveness of treatment and/or eligibility for treatment

Wisconsin Department of Health Services

19

Antigen	Significance	Corresponding antibody	Significance
HBsAg	Anyone with detectable antigen is infectious	anti-HBs	Indicates immunity
HBcAg	N/A – no lab test to detect	anti-HBc	Indicates acute, chronic or resolved infection
HBeAg	Viral replication is occurring	anti-HBe	Lower risk of transmission

Wisconsin Department of Health Services

20

Comprehensive strategy to eliminate HBV transmission

1. universal immunization of infants at birth
2. prevent perinatal HBV infection by:
   routine screening of all pregnant women AND appropriate immunoprophylaxis to all infants born to HBsAg-positive and HBsAg-unknown mothers
3. routine immunization of children
4. immunization of all at risk adults

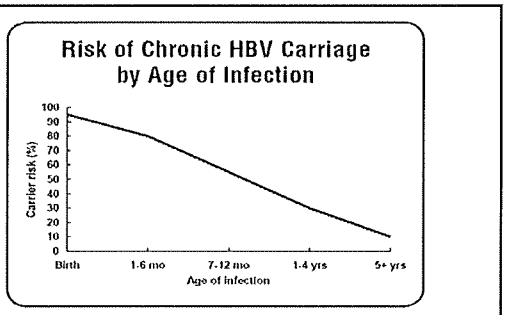
Wisconsin Department of Health Services

21

Why is perinatal Hepatitis B especially important?

- Perinatal transmission is highly efficient
- In the absence of appropriate prophylaxis, 70 - 90% infants born to HBsAg-positive mothers will develop infection
- In-utero accounts for < 2% all vertical transmission

22



- 90% of infants infected at birth will develop chronic infection
- Conversely, 90% of people infected as adults will clear the infection

23

Children who acquire chronic infection as result of perinatal exposure…

- are usually asymptomatic with normal ALT
- have minimal to mild liver abnormalities
- are often HBeAg-positive with detectable viral loads (contagious)
- may have growth impairment
- 25% will die prematurely of cirrhosis or liver cancer

Wisconsin Department of Health Services

24

Prophylaxis for Infant

HBIG (hepatitis B immune globulin)
- Passive, active immuneprophylaxis
- Short-term protection following exposure
- Prepared from serum with high anti-HBs titers
- Becomes less effective with increasing time since exposure
  - should be administered NO MORE than 7 days following exposure

Hepatitis B Vaccine
- Post-exposure
- Long-term protection

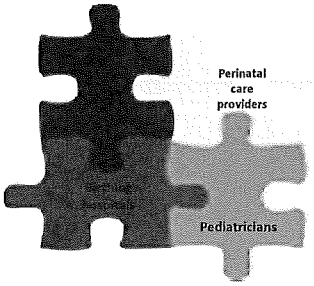
Administer at the same time, in separate sites, within 12 hours of birth

Together, HBIG and vaccine prevent 95% of all perinatal cases!

Wisconsin Department of Health Services

25

Hepatitis B Case Management



26

Local Public Health Departments (LHDs)

- Responsible for managing clients who reside in their jurisdiction
- Contact client
- Typically conduct a risk assessment
- Ensure household and sexual contacts are screened, vaccinated and referred as needed
- Provide education, resources and strategies to prevent transmission
- Remain in contact with mother throughout pregnancy
- Coordinate care with family, prenatal care provider, birthing hospital and/or pediatrician as needed
- Serve as a resource to medical providers
- Document case follow-up information in WEDSS

27

OB-GYN / perinatal care provider

- Routinely screen *all* pregnant women for HBsAg early in *each* pregnancy, regardless of vaccine history or risk factors
- Repeat screening at time of hospital admission if high risk or report new risk behaviors
- Report all positive labs per state statute (252.05)

Wisconsin Department of Health Services

28

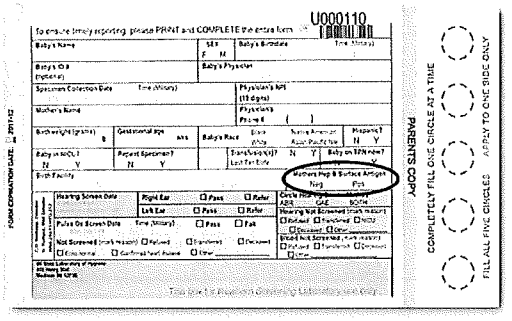
Birthing Hospital

- Maintain stock of HBIG (or be able to obtain as needed)
- Develop policy to verify HBsAg status at admission
- Establish procedure to test women who present with unknown HBsAg status or new risk factors at time of delivery
- The administration of Hep B vaccine to ALL medically stable infants within 24 hours of birth is the standard of care
- Administer HBIG and Hep B vaccine within 12 hours of birth to all infants born to HBsAg-positive mothers
- Knowledge of and policy for special circumstances (i.e. infants weighing less than 2,000 grams)
- Implement a standard practice of administering vaccine and HBIG; standing orders are considered one of the 'best practices'
- Accurately document the mother's HBsAg status on the new born screening card

Wisconsin Department of Health Services

29

Newborn Screening Cards



30

Infants weighing less than 2,000 grams

- Have lower seroconversion rate following birth dose of vaccine
- However, by chronological age of 1 month, all medically stable infants are likely to respond regardless of birth weight or gestational age

Therefore, birth dose does not count as part of 3-dose series:

Infant will receive 3 additional doses of vaccine beginning at 1 month of age or hospital discharge, whichever is sooner

Wisconsin Department of Health Services.

31

Unknown HBsAg status at time of hospital admission

1. Test mother as soon as possible
2. Administer Hep B vaccine within 12 hours of birth*
3. Obtain lab results

HBsAg-positive or unavailable: administer HBIG within 7 days or at time of hospital discharge

Negative: complete Hep B vaccine series per ACIP recommendations

*If birth weight is <2000 grams, also administer HBIG within 12 hours

Wisconsin Department of Health Services.

32

Child's Pediatrician or Primary Care Provider

- Ensure timely completion of Hep B vaccine series
- Order PVST (HBsAg and anti-HBs)
- Follow-up and/or refer child as needed per lab results

Wisconsin Department of Health Services.

33

Hepatitis B vaccines

- Safe and highly effective
- Single antigen and part of combination vaccine (Pediarix®)
  - only single antigen is used for birth to 6 weeks of age
- Brands are interchangeable
- If an infant receives Pediarix® , they may receive 4 total doses of Hep B vaccine
- OK to administer concurrently with other vaccines
- None contain thimerasol
- No booster or routine post-vaccination testing recommendation - a complete 3-dose vaccine series confers long-term protection

Wisconsin Department of Health Services

34

Post Vaccination Serologic Testing (PVST)

Wisconsin Department of Health Services

35

PVST – who?

ALL infants born to HBsAg-positive mothers

Wisconsin Department of Health Services

36

PVST – what?

HBsAg

and

anti-HBs

Wisconsin Department of Health Services

37

PVST – when?

9-12 months of age
(or 1-2 months following final dose of vaccine, if the series is delayed)

No sooner than 9 months of age to avoid detection of passive anti-HBs from HBIG and to detect late-onset infection

No maximum age
(if child is over 2 years of age, anti-HBc should also be tested to rule out resolved infection)

Update: Shortened Interval for Postvaccination Serologic Testing of Infants Born to Hepatitis B–Infected Mothers (MMWR, 2015)
http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6439a6.htm

Wisconsin Department of Health Services

38

PVST – where?

- Child's primary care provider
- Lab
- Some local health departments

Wisconsin Department of Health Services

39

PVST – why?

HBsAg – ensure child is not infected as a result of birth or continuous household exposure

anti-HBs (HBsAb) – ensure that child is immune as a result of vaccination

Wisconsin Department of Health Services

40

Why both tests?

- Ensure child is not infected
- Ensure child will receive care in a timely manner if they are infected
- Ensure child is immune following vaccination
- Ensure child receives timely re-vaccination if not immune
- Minimize the amount of time a child remains vulnerable to infection

Wisconsin Department of Health Services

41

PVST Results

HBsAg	anti-HBsAg	Interpretation	Action
+	-	Infected	Monitor and/or refer
-	+	Protected, not infected	None
-	-	Unprotected, susceptible	Re-immunize, repeat PVST
+	+	Unlikely	Repeat tests

Wisconsin Department of Health Services

42

Why is public health calling about these test results?

Ideally, PVST results will be:

HBsAg – negative

anti-HBs – positive

Neither are reportable results (labs will not submit results electronically)

Perinatal Case managers must collaborate with medical provider to obtain results

Wisconsin Department of Health Services

43

What happens if the child is infected?

- Child then becomes a case of perinatal Hepatitis B
- Monitor or referral to specialist if appropriate

Wisconsin Department of Health Services

44

What happens if not immune?

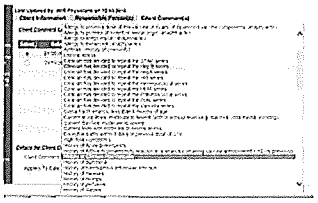
- Administer a second 3-dose vaccine series as soon as possible
  - no minimum interval between first and second series
- Repeat PVST 1-2 months following second vaccine series
- If still do not sero-convert, considered a non-responder
  - counsel on risk of transmission/exposure
  - receive HBIG if have a known exposure

Wisconsin Department of Health Services

45

Repeat Series in WIR

- The WIR functionality allows the client comment (on the Personal Information Window) "Repeat a Series"
- When the comment is entered with a date, the forecast will be repeated



Wisconsin Department of Health Services

46

Questions?

Wisconsin Department of Health Services

47

Resources

- WI Local Health Departments https://www.dhs.wisconsin.gov/lh-depts/counties.htm
- DPH Perinatal Hepatitis B Manual https://www.dhs.wisconsin.gov/publications/p4/p44502.pdf
- CDC resources http://www.cdc.gov/hepatitis/hbv/perinatalxmtn.htm

Wisconsin Department of Health Services

48

- http://www.cdc.gov/hepatitis/resources/professionals/training/serology/training.htm
- Give Birth to the End of Hep B http://www.immunize.org/protect-newborns/
- Pink Book https://www.cdc.gov/vaccines/pubs/pinkbook/downloads/hepb.pdf
- American Academy of Pediatrics [Hepatitis B.] In: Kimberlin DW, Brady MT, Jackson MA, Long SS, eds. *Red Book: 2015 Report of Committee on Infectious Diseases.* 30th ed. Elk Grove Village, IL; American Academy of Pediatrics; 2015 [400-423]
- Heymann, David L. (2015) *Control of Communicable Disease Manual.* Washington, DC.: APHA

Wisconsin
Department of Health Services

49