16-ID-06

Committee: Infectious Disease

Title: Public Health Reporting and National Notification of Perinatal Hepatitis B Virus Infection

I. Statement of the Problem

The current case definition for the nationally notifiable condition: "Hepatitis B, Perinatal Infection" is identified as the 1995 case definition, adopted in March 1995 (1). This case definition requires updating and conversion to a more recent format. It should also reflect current practice in regard to perinatal hepatitis B prevention activities.

II. Background and Justification

Great progress has been made in identifying hepatitis B surface antigen (HBsAg)-positive pregnant women and immunizing their infants with Hepatitis B (HepB) vaccine and Hepatitis B immune globulin (HBIG) to prevent vertical infection, but there are still infants who acquire hepatitis B virus (HBV) infection. This is because either their mothers are not recognized as infected and the infant does not receive HBIG and the full Hep B vaccine series or the intervention does not prevent infection. Without post-exposure prophylaxis with HBIG and HepB vaccine, approximately 45% of infants born to HBV-infected mothers will become infected and up to 90% of those infected will develop chronic, life-long infection. Among infants who do develop infection, 25% will die prematurely of liver cirrhosis or cancer. It is estimated that 1,000 newborns are infected annually (2). Although, treatment of HBV infection is now possible and can attenuate the impact of infection, hepatitis B cannot yet be cured (3).

It is important to assure adequate immunity in infants of HBV-infected mothers and to determine if infection of the infant occurred with or without post-exposure prophylaxis. The Centers for Disease Control and Prevention (CDC) and the Advisory Committee on Immunization Practices (ACIP) recommend universal testing of pregnant women for HBsAg, post-exposure prophylaxis within 12 hours of birth with HBIG and the first dose of HepB vaccine for infants born to HBV-infected mothers, universal birth dose administration to all infants regardless of the mother's HBsAg status, completion of a valid three dose vaccine series in all infants, and post-vaccination serologic testing (PVST) for HBsAg and anti-HBs at 9-12 months for infants born to HBV-infected mothers or infants born in regions of high and intermediate HBV endemicity (4). The CDC Perinatal Hepatitis B Prevention Program helps promote these recommendations and provides case management of HBV-infected mothers and their infants. Evaluation of the program depends on the follow-up of exposed infants.

Since 1995, more laboratory tests for active HBV infection have become available and guidelines for assessment of immunization effectiveness with PVST have evolved. Surveillance of perinatal HBV infection is important for clinical and programmatic purposes and justifies national notifiability. The current case definition, "Hepatitis B, Perinatal Infection", adopted in March 1995, is based on the detection of HBsAg in the infant's blood (1). The characterization of perinatal HBV infection should include newer laboratory tests for infection.

III. Statement of the desired action(s) to be taken

1. Utilize standard sources (e.g. reporting*) for case ascertainment for Perinatal Hepatitis B Virus Infection. Surveillance for Perinatal Hepatitis B Virus Infection should use the following recommended sources of data to the extent of coverage presented in Table III.

Table III. Recommended sources of data and extent of coverage for ascertainment of cases of Perinatal Hepatitis B Virus Infection.

Source of data for case ascertainment	Coverage	
	Population-wide	Sentinel sites
Clinician reporting	X	
Laboratory reporting	X	
Reporting by other entities (e.g., hospitals, veterinarians, pharmacies, poison centers)	X	
Death certificates	X	
Hospital discharge or outpatient records	X	
Extracts from electronic medical records	X	
Telephone survey		
School-based survey		
Case reports of HBV infection in women of child-bearing age	X	
Immunization registry	X	
Newborn metabolic screening forms	X	
Birth certificates	X	
2016 Template		

2. Utilize standardized criteria for case identification and classification (Sections VI and VII) for Perinatal Hepatitis B Virus Infection and add Perinatal Hepatitis B Virus Infection to the *Nationally Notifiable Condition List.*

☐ 2a. Immediately notifiable, extremely urgent (within 4 hours)
☐ 2b. Immediately notifiable, urgent (within 24 hours)
☒ 2c. Routinely notifiable

CSTE recommends that all States and Territories enact laws (statue or rule/regulation as appropriate) to make this disease or condition reportable in their jurisdiction. Jurisdictions (e.g. States and Territories) conducting surveillance (according to these methods) should submit case notifications** to CDC.

3. CDC should publish data on Perinatal Hepatitis B Virus Infection as appropriate in *MMWR* and other venues (see Section IX).

CSTE recommends that all jurisdictions (e.g. States or Territories) with legal authority to conduct public health surveillance follow the recommended methods as outlined above.

Terminology:
* Reporting: process of a healthcare provider or other entity submitting a report (case information) of a condition under public health surveillance TO local or state public health.
**Notification: process of a local or state public health authority submitting a report (case information) of a condition on the Nationally Notifiable Condition List TO CDC.

IV. Goals of Surveillance

The goals of surveillance for perinatal HBV infection are:

- Identification of HBsAg-positive/HBV-infected pregnant women
- Identification of infants born to HBV-infected women (exposed infants)
- Assurance of adequate post-natal follow-up of infants born to HBV-infected women to assess for infection and vaccine-induced protection through appropriate laboratory testing
- Identification of infants who do become infected with HBV (perinatal HBV infection)
- Use of perinatal HBV infection surveillance data for program evaluation and quality improvement

V. Methods for Surveillance: Surveillance for Perinatal Hepatitis B Virus Infection should use the recommended sources of data and the extent of coverage listed in Table III.

Surveillance for perinatal HBV infection applies to mothers and infants. It begins with the effective identification of all HBV-infected pregnant women through testing for HBsAg during each pregnancy. This allows for identification of infants at risk and for administration of recommended immunoprophylaxis and monitoring of infants for evidence of chronic infection. Universal screening of pregnant women is critical to the successful identification of infected women and their infants at risk for infection in the course of birth or thereafter.

PVST for infants born to HBV-infected women is necessary for identifying chronically infected infants. Testing for both HBsAg and anti-HBs is necessary to determine if an infant is infected, immune, or susceptible. At the minimum, laboratories should be required to report HBsAg positive test results to the local health jurisdiction where the patient resides at the time of testing. In addition, physician and laboratory reporting of PVST results for children ages <= 2 years, regardless of the results, supports health department surveillance programs in monitoring completeness of testing among infants born to HBV-infected mothers. Otherwise, health departments should request medical records and laboratory reports from providers or laboratories.

VI. Criteria for case identification

A. Narrative: A description of suggested criteria for case ascertainment of a specific condition.

For purposes of perinatal HBV surveillance, maternal and infant status should be ascertained.

Pregnant women: All pregnant women should be tested for HBsAg during each pregnancy as part of routine prenatal care. All HBV-infected women must be reported to the state or local public health authority as mandated by law or regulation.

Report pregnancy status along with test results for women to public health authorities who meet any of the following criteria:

Positive result for any one of the following three laboratory tests:

- hepatitis B surface antigen (HBsAg)
- hepatitis B e antigen (HBeAg)
- nucleic acid test for hepatitis B virus DNA (HBV-DNA) (including qualitative, quantitative and genotype testing)

Immediately determine HBsAg status on all pregnant women presenting for labor and delivery without documentation of HBsAg test results for current pregnancy and those with risk factors regardless of previous HBsAg test results.

Other recommended reporting procedures:

All cases of chronic hepatitis B should be reported.
All cases of hepatitis B should be reported with sex and age accurately documented and should include pregnancy status, if known.
Reporting should be ongoing and routine.

Infants:

Report all infants delivered to women who are HBsAg positive or HBsAg status unknown to the health authority.

Report all infants with evidence of HBV infection as evidenced by the following laboratory tests: HBsAg, hepatitis B nucleic acid (HBV DNA), or hepatitis B e antigen (HBeAg)

B. Table of criteria to determine whether a case should be reported to public health authorities

Table VI-B. Table of criteria to determine whether a case should be reported to public health authorities.

Criterion	Maternal	Maternal	Infant/Child	Infant/Child	Infant
Clinical Evidence					
Diagnosis of hepatitis B infection		N		O	
Pregnant	N	N			
Born to a woman with evidence of hepatitis B infection (HBsAg, HBeAg, or HBV DNA positive or diagnosis of hepatitis B infection)					O
Maternal HBsAg status unknown at time of hospital discharge					O
Laboratory Evidence					
HBsAg positive	O		O		
HBeAg positive	O		O		
HBV DNA positive	O		O		
Demographic					
24 months of age or younger			N	N	
Newborn					N

Notes:
S = This criterion alone is Sufficient to report a case.
N = All "N" criteria in the same column are Necessary to report a case.
O = At least one of these "O" (One or more) criteria in each category (e.g., clinical evidence and laboratory evidence) in the same column—in conjunction with all "N" criteria in the same column—is required to report a case.
* A requisition or order for any of the "S" laboratory tests is sufficient to meet the reporting criteria.

C. Disease-specific data elements

Maternal:

Country of birth
Race
Ethnicity
Date of birth
HBsAg – result, date
HBeAg result, date
HBV DNA (or genotype), result, date
Alanine aminotransferase (ALT)
Maternal antiviral therapy, if any (Yes/No/Unknown)
Coinfection with human immunodeficiency virus or hepatitis C virus
State/Territory of residence at time of infant's diagnosis

Infant:

HBsAg, HBeAg and HBV DNA test results and date of test performance
Anti-HBs test results and date of test performance
HBIG administration -time and date
Hepatitis B vaccine birth dose time and date, dates of other valid HepB vaccine doses
Birthweight
Date of birth
Time of birth (military time)
State/Territory of birth
State/Territory of residence at time of diagnosis

VII. Case Definition for Case Classification

A. Narrative: Description of criteria to determine how a case should be classified.

Clinical Criteria

Perinatal HBV infection in a child ≤ 24 months of age may range from asymptomatic to fulminant hepatitis.

Laboratory Criteria

Laboratory evidence of HBV infection in a child consists of one or more of the following:

- positive HBsAg test (only if at least 4 weeks after last dose of Hep B vaccine)
- positive HBeAg test, or
- detectable HBV DNA

Epidemiologic Linkage

Born to a HBV-infected mother.

Case Classification:

Confirmed:

Child born in the US to a HBV-infected mother and 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.

Probable:

Child born in the US and 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).

Comment

Infants born to HBV-infected mothers should receive HBIG and the first dose of HepB vaccine within 12 hours of birth, followed by the second and third doses of HepB vaccine at 1 and 6 months of age, respectively. PVST for HBsAg and anti-HBsAg is recommended 1 to 2 months following completion of the vaccine series, but not earlier than 9 months of age.

If mother known to not be infected with HBV, refer to the case definition for acute Hepatitis B.

B. Classification Tables

Table VII-B. Criteria for defining a case of Perinatal Hepatitis B Virus Infection in a Child.

Criterion	Probable			Confirmed		
Demographic						
Age ≥ 1 and < 9 months	O			O		
Age ≥ 9 and ≤ 24 months	O	N	N	O	N	N
Born in the United States	N	N	N	N	N	N
Laboratory evidence						
HBsAg positive	N			N		
HBeAg positive		N			N	
Detectable HBV DNA			N			N
≥ 4 weeks since last dose of HepB vaccine	N			N		
Epidemiologic evidence						
Maternal HBV infection				N	N	N
HBV status of mother unknown	N	N	N			

Notes:
N = All "N" criteria in the same column are Necessary to classify a case. A number following an "N" indicates that this criterion is only required for a specific disease/condition subtype (see below). If the absence of a criterion (i.e., criterion NOT present) is required for the case to meet the classification criteria, list the Absence of criterion as a Necessary component.
O = At least one of these "O" (One or more) criteria in each category (e.g., clinical evidence and laboratory evidence) in the same column—in conjunction with all "N" criteria in the same column—is required to classify a case. (These "O" criteria are alternatives, which means that a single column will have either no O criteria or multiple O criteria; no column should have only one O.) A number following an "O" indicates that this criterion is only required for a specific disease/condition subtype.

VIII. Period of Surveillance

Surveillance for perinatal hepatitis B should be ongoing.

IX. Data sharing/release and print criteria

- It is recommended that states notify CDC of confirmed cases of maternal and infant hepatitis B.
- It is recommended that states transmit reports of hepatitis B to CDC to be analyzed weekly by CDC.
- CDC will summarize perinatal hepatitis B reports annually in the MMWR.
- CDC will conduct an extensive analysis for publication annually as a surveillance summary.
- CDC will send reports of cases to states, for quality control and reconciliation.
- There is no current plan to rerelease case data. CDC will make aggregate reports publicly available and states will maintain confidential surveillance databases.

X. Revision History

A position statement prior to the March 1995 date of national notifiability is not available.

Position Statement ID	Section of Document	Revision Description
16-ID-06	Case definitions for infectious conditions under public health surveillance. Centers for Disease Control and Prevention. MMWR Recomm Rep. 1997 May 2; 46(RR-10):1-55.	Updated to 2016 format template. Also incorporated new practices and recommendations regarding testing and timeframes

XI. References

1. http://wwwn.cdc.gov/nndss/conditions/hepatitis-b-perinatal-infection/case-definition/1995/ (accessed 18 January 2016)
2. Ko SC, Fan L, Smith EA, Fenlon N, Koneru AK, Murphy TV. Estimated Annual Perinatal Hepatitis B Virus Infections in the United States, 2000–2009. Journal of the Pediatric Infectious Diseases Society. 2014 Dec 18:piu115.
3. Terrault NA, Bzowej NH, Chang K-M, et al. AASLD Guidelines for Treatment of Chronic Hepatitis B. http://www.aasld.org/sites/default/files/guideline_documents/hep28156.pdf (accessed 18 January 2016)
4. Mast EE, Margolis HS, Fiore AE, Brink EW, Goldstein ST, Wang SA, Moyer LA, Bell BP, Alter MJ; Advisory Committee on Immunization Practices (ACIP). A comprehensive immunization strategy to eliminate transmission of hepatitis B virus infection in the United States: recommendations of the Advisory Committee on Immunization Practices (ACIP) part 1: immunization of infants, children, and adolescents. MMWR Recomm Rep. 2005 Dec 23;54(RR-16):1-31.

XII. Coordination

Agencies for Response

(1) Thomas R. Frieden, MD, MPH
Director, Centers for Disease Control and Prevention
1600 Clifton Road, NE
Atlanta, GA 30333
404-639-7000
txf2@cdc.gov

XIII. Submitting Author:

(1) ☒Active Member ☐Associate Member

Genny Grilli, MPH
Perinatal Hepatitis B Prevention Coordinator
Minnesota Department of Health
625 Robert St N
PO Box 64975
St. Paul, MN 55164
651-201-5557
genny.grilli@state.mn.us

Co-Author:

(1) ☒Active Member ☐Associate Member

Alfred DeMaria, Jr., M.D.
State Epidemiologist
Massachusetts Department of Public Health
William A. Hinton State Laboratory Institute
305 South Street, Jamaica Plain, Massachusetts 02130
617-983-6550, Fax: 617-983-6925
Alfred.DeMaria@state.ma.us

(2) ☒Active Member ☐Associate Member

Danica E. Kuncio
Viral Hepatitis Epidemiologist
Philadelphia Department of Public Health
500 S. Broad Street
Philadelphia, PA 19146
215-685-6493
danica.kuncio@phila.gov