



Revaccination for Infants Born to Hepatitis B Virus (HBV)-Infected Mothers

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Revaccination for Infants Born to HBV-Infected Mothers

■ Current recommendation:

- Providers should order postvaccination serologic testing (PVST), consisting of hepatitis B surface antigen [HBsAg] and antibody to HBsAg [anti-HBs], for infants born to HBsAg-positive mothers at age 9–12 months (or 1–2 months after the final dose of the vaccine series, if the series is delayed)¹
- HBsAg-negative infants with anti-HBs levels ≥ 10 mIU/ml* are protected and need no further medical management²
- HBsAg-negative infants with anti-HBs levels < 10 mIU/mL* should be revaccinated with a second 3-dose series and retested 1–2 months after the final dose of vaccine²

¹Schillie S, et. al. MMWR Morb Mortal Wkly Rep. 2015 Oct 9;64(39):1118-20.

²Mast EE, MMWR Recomm Rep. 2005 Dec 23;54(RR-16):1-31.

*Anti-HBs ≥ 10 mIU/mL, when following a complete Hepatitis B vaccine series, is serologic correlate of protection (Jack et al., J Infect Dis 1999)

Revaccination for Infants Born to HBV-Infected Mothers, cont.

■ Considerations

- Some infants may need only a single dose to achieve protective anti-HBs levels
- Single dose revaccination may conserve public health resources by shortening the duration of case management
 - For some infants, providing case management services through completion of a 2nd hepatitis B (HepB) vaccine series is difficult (e.g., infant moves out of the country)

Permissive Single Dose Revaccination

Existing Language

- HBsAg-negative infants with anti-HBs levels <10 mIU/mL should be revaccinated with a second 3-dose series and retested 1–2 months after the final dose of vaccine.^{1,2}

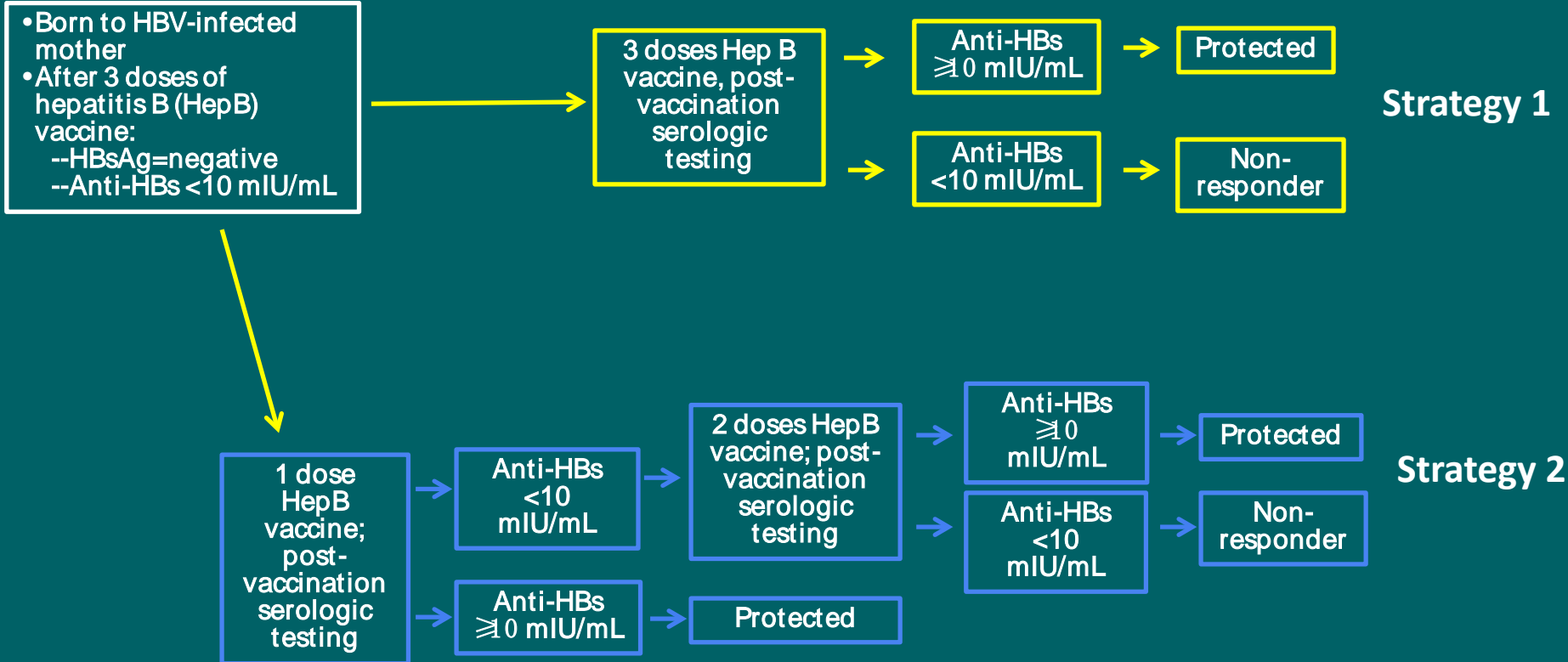
Revised Language (Proposed)

- HBsAg-negative infants with anti-HBs levels <10 mIU/mL should be revaccinated with a second three-dose HepB series and **postvaccination serologic testing (PVST)** performed 1-2 months after the final dose of vaccine.
- **Alternatively, these infants may be re-vaccinated with a single dose of HepB vaccine and retested 1-2 months later. Infants whose anti-HBs remains <10 mIU/mL following single dose revaccination should receive two additional doses of HepB vaccine, followed by testing 1-2 months later.**
- Available data do not suggest a benefit from administering additional HepB vaccine doses to infants who have not attained anti-HBs ≥10 mIU/mL following receipt of two complete HepB vaccine series.

¹Schillie S, et. al. MMWR Morb Mortal Wkly Rep. 2015 Oct 9;64(39):1118-20.

²Mast EE, MMWR Recomm Rep. 2005 Dec 23;54(RR-16):1-31.

Options for Revaccination of Infants Born to HBV-Infected Mothers



Perinatal Hepatitis B Prevention Program: Background

- **Established in 1990**
- **Funded in CDC Immunization Cooperative Agreements (Section 317 funding)**
- **Programs in 64 jurisdictions (50 states, 6 cities, 5 territories & 3 freely associated island nations)**
- **Program works collaboratively with other CDC centers (NCHHSTP/DVH)**
- **Program Required Objectives are based upon selected ACIP recommendations**

Outcomes from Perinatal Hepatitis B Prevention Program, 2014

- Number of infants enrolled: 11157 (expected: LL 18,807, PE 26,236)
- Percent of infants with PEP within 1 calendar day of birth: 97%
- Percent with HBIG and series complete by 8 months: 74%
- Percent of all enrolled infants with PVST results: 64%
- Percent of all enrolled infants with HBsAg-positive results: 0.4%
- **Percent of all enrolled infants with protective levels: 95%**
- **Percent of all enrolled infants that need revaccination: 2%**
- **Percent of infants with indeterminate results: 2%**

Background

- **What proportion of infants are protected after the initial vaccination series?**
 - Seroprotection and vaccine response for infants born to HBsAg-positive mothers*:
 - Ko et al., Hepatitis B vaccine response using data from the Enhanced Perinatal B Prevention Hepatitis B Prevention Program (EPHBPP)
 - 94.7%¹ response rate among infants who completed a 3- or 4-dose hepatitis B vaccine series
 - Barbosa et al., Efficacy of vaccine and HBIG by time of administration and completion of vaccination series
 - 92.0% (83.0-97.0)^{2,3} efficacy for infants who received HBIG + Hep1Vacc ≤ 24 hours and remaining doses on time
 - Schillie et al., EPHBPP data, factors associated with infection status among infants born to HBsAg-positive mothers
 - 99.0%⁴ of infants were HBsAg-negative after receipt of ≥3 vaccine doses

*HBIG = hepatitis B immune globulin; Hep1Vacc = hepatitis B vaccine birth dose

¹Ko et al., *Vaccine* 2014; 32(18): 2127-33; ²Barbosa et al., *Pediatrics* 2014; 133(2): 243-53; ³Lee et al. *Cochrane Database Syst Rev.* 2006; 2006(2):CD004790; ⁴Schillie et al., *Pediatrics* 2015; 135(5): e1141-7

Background, cont.

- **What proportion of individuals who do not respond to the initial hepatitis B vaccine series are seroprotected after one additional dose?**
 - Lolekha et al., healthy newborn infants (birth weight $\geq 2000\text{g}$) born to HBsAg-positive/hepatitis B e-antigen (HBeAg)-positive mothers, no HBIG, open, randomized to schedule, HBsAg and anti-HBs evaluated at 4 time points
 - Schedule A: birth, 1, 6 months
 - 91.9% response at 9 months, 88.6% response at 13 months*
 - Schedule B: birth, 1, 2, 12 months
 - 86.5% response* at 9 months, 94.4% response at 13 months*

*Anti-HBs responses (≥ 10 mIU/mL) in uninfected infants

Lolekha S, et al., *Vaccine* 2002; 20(31-32): 3739-43

Background, cont.

- **What proportion of individuals who do not respond to the initial hepatitis B vaccine series are seroprotected after one additional dose?**
 - Assateerawatt et al., Healthy newborn infants (birth weight $\geq 2500\text{g}$) born to HBsAg-positive/hepatitis B e-antigen (HBeAg)-positive mothers, randomized to 2 groups; tested for HBsAg, anti-HBs, and anti-HBc at 5 time points
 - Group A: HBIG + vaccine at 0; vaccine at 1, 2 and 12 months
 - 96% seroconversion rate at 12 months; 100% at 13 months
 - Group B: vaccine at 0, 1, 2 and 12 months
 - 95.2% seroconversion rate at 12 months; 95.7% at 13 months

Background, cont.

- **What percent of infants who do not respond to the initial hepatitis B vaccine series are protected after a complete second vaccine series?**
 - Ko et al., Hepatitis B vaccine response using data from the EPHBPP
 - Of non-responder infants who completed a second vaccination series at the time of analysis 94.8% demonstrated a response after the second series

Data Limitations

- **Studies not designed specifically to evaluate response to single dose revaccination in initial infant non-responders**
- **Variability among the studies with regard to maternal HBsAg status, HBIG administration, schedule, HBeAg status, infant birth weight (<2000g vs. ≥2000g)**
- **Limited data are available**

Response to Single-dose Vaccination Among Infants Enrolled in Perinatal Hepatitis B Prevention Program

- **Infants born to HBsAg-positive mothers from 2012-2016* in Georgia, Michigan, and New York City**
- **Received 3 doses hepatitis B vaccine and PVST with anti-HBs <10mIU/mL, followed by single dose revaccination with anti-HBs measurement**
 - 14/15 (93.3%) with anti-HBs ≥ 10 mIU/mL after single dose revaccination

*Initial year of range 2011 for one jurisdiction; final year of range 2015 for one jurisdiction

For more information, contact CDC
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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.

