Cost-Effectiveness of Active-Passive Prophylaxis and Antiviral Prophylaxis during Pregnancy to Prevent Perinatal Hepatitis B Virus Infection
Shortened Interval for Post-Vaccination Serologic Testing of Infants Born to Hepatitis B-Infected Mothers

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Viral Hepatitis Prevention Board
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Cost-Effectiveness of Active-Passive Prophylaxis and Antiviral Prophylaxis during Pregnancy to Prevent Perinatal Hepatitis B Virus Infection

## Number of Infants with Complications from Perinatal Hepatitis B

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Chronic HBV infection</th>
<th>HCC</th>
<th>DCC</th>
<th>Liver transplant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Universal HepB vaccination</td>
<td>1,985</td>
<td>338</td>
<td>316</td>
<td>66</td>
</tr>
<tr>
<td>Universal HepB vaccination + HBIG for infants born to HBsAg-positive mothers “current strategy”</td>
<td>979</td>
<td>90</td>
<td>4</td>
<td>32</td>
</tr>
<tr>
<td>Universal HepB vaccination + HBIG for infants born to HBsAg-positive mothers; anti-viral prophylaxis for women with HBV DNA ≥10^6 copies/mL</td>
<td>490</td>
<td>45</td>
<td>2</td>
<td>16</td>
</tr>
</tbody>
</table>

Fan et al. Hepatology 2016
### Cost-Effectiveness Results

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Total cost (million)</th>
<th>Incremental cost (million)</th>
<th>Total QALY (life-years)</th>
<th>Incremental QALY</th>
<th>ICER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Universal HepB vaccination</td>
<td>499.6</td>
<td>-4.6</td>
<td>190,017,200</td>
<td>-13,600</td>
<td>6,957</td>
</tr>
<tr>
<td>Universal HepB vaccination + HBIG for infants born to HBsAg-positive mothers “current strategy”</td>
<td>594.2</td>
<td>--</td>
<td>190,030,800</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Universal HepB vaccination + HBIG for infants born to HBsAg-positive mothers; anti-viral prophylaxis for women with HBV DNA ≥10⁶ copies/mL</td>
<td>591.4</td>
<td>-2.8</td>
<td>190,031,600</td>
<td>800</td>
<td>Domin.</td>
</tr>
</tbody>
</table>

Fan et al. Hepatology 2016
Cost-effectiveness of Current Strategy and Anti-viral Prophylaxis

- Compared to universal HepB vaccination, the current strategy:
  - Prevented 1,006 chronic HBV infections
  - Saved 13,600 QALYs (ICER: $6,957/QALY saved)

- Antiviral prophylaxis dominated the current strategy
  - Prevents additional 489 chronic infections
  - Saves 800 QALYs and $2.8 million

- Results robust over wide range of assumptions
Shortened Interval for Post-Vaccination Serologic Testing of Infants Born to Hepatitis B-Infected Mothers

Advisory Committee on Immunization Practices (ACIP) Recommendations for Post-Vaccination Serologic Testing (PVST)

- Persons recommended for PVST
  - Infants born to HBsAg-positive mothers
  - Healthcare personnel
  - Chronic hemodialysis patients, HIV-infected persons, and other immunocompromised persons
  - Sex partners of HBV-infected persons

Mast et al. MMWR 2005, 2006
PVST for Infants Born to HBsAg-positive Mothers

- Testing for both anti-HBs and HBsAg is necessary to confirm whether the infant is immune or infected
  - Alone, an anti-HBs result $\geq 10$ mIU/mL does not confirm that the infant is uninfected and protected; anti-HBs can become positive with recovery from infection
  - A negative HBsAg test result by itself does not indicate whether the infant is protected or susceptible

Schillie et al. MMWR 2015
Timing of Infant PVST

- Recommended at age 9-12 months
- PVST occurring at an increasing interval after the final dose of vaccine misclassifies some infants as non-responders
  - Results in unnecessary revaccination
- PVST should not occur before 9 months of age in order to:
  - Detect HBV infections following a longer incubation period, which might occur after receipt of HBIG
  - Avoid detection of passive anti-HBs from HBIG administered at birth

Schillie et al. MMWR 2015
Update: Shortened Interval for Post-Vaccination Serologic Testing of Infants Born to HBsAg-Positive Mothers

Schillie et al. MMWR 2015
Anti-HBs Decline over Time

Proportion of Infants with anti-HBs ≥10 mIU/mL

Months after Final Hepatitis B Vaccine Dose

Schillie et al. MMWR 2015
<table>
<thead>
<tr>
<th>Interval from final vaccine dose to postvaccination serologic testing</th>
<th>Odds of lower anti-HBs</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 to &lt;4 months</td>
<td>ref</td>
</tr>
<tr>
<td>4 to &lt;8 months</td>
<td>1.8 (1.2-2.8)</td>
</tr>
<tr>
<td>8 to &lt;12 months</td>
<td>4.4 (1.3-14.5)</td>
</tr>
</tbody>
</table>

Euler et al. PIDJ 2003
American Academy of Pediatrics: Ages for Recommended Preventive Health Care

<table>
<thead>
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<th>Recommended interval for PVST</th>
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<tr>
<td>Pre-natal</td>
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Hepatitis B series completed  
(single antigen and Pediarix)
Advantages of a Shortened Interval

- Avoids unnecessary revaccination
- Reduction in the time that non-responder infants are at risk for transmission from household contacts with Hepatitis B
- Earlier PVST enables prompt revaccination for those infants needing a second series
- Conserves public health resources involved in providing case management services
For more information, contact CDC
1-800-CDC-INFO (232-4636)

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.