Prevention of Hepatitis B Transmission: 
The Hep B Moms Program at 
Charles B. Wang Community Health Center

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AAPCHO and WHAAPI Perinatal Webinar 
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HBV Vertical transmission

- Vertical transmission (VT) rates have declined with increased HBV screening and use of HBIG and HBV vaccines

- However, even with immunoprophylaxis, VT still occurs in 3-7% of infants (high maternal viral load, in utero tx)

- Other VT may be attributed to not receiving appropriate vaccination

Charles B. Wang Community Health Center (CBWCHC) serves a largely Chinese population in greater NYC
- ~45,000 patients in 2012
- High prevalence of HBV, 12% of all patients

~720 pregnancies a year
- ~15% with maternal HBsAg+

From 2007-2010, 5 infants at CBWCHC acquired HBV via Vertical transmission
- Cases of VT were examined to identify gaps in care
- Hep B Moms program was formed from the lessons learned
### Cases of HBV Infected Infants at CBWCHC (2007-10)

All mothers with lab data were HBeAg+. No infants were breastfed. All infants completed HBV vaccine series.

<table>
<thead>
<tr>
<th>Last recorded viral load before delivery (copies/mL)</th>
<th>Discussed antiviral tx</th>
<th>Antiviral Tx</th>
<th>Date &amp; Type of delivery</th>
<th>HBIG</th>
<th>Sent to China?</th>
<th>Initial HBSAg+ Test (infant)</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>118,000,000</td>
<td>N</td>
<td>N</td>
<td>3/08 CS</td>
<td>Y</td>
<td>Y</td>
<td>35 mo</td>
<td>No antiviral tx and VL $&gt;10^8$, infant went to China at 6 mos, late serology</td>
</tr>
<tr>
<td>1,422,000,000</td>
<td>Y</td>
<td>N</td>
<td>3/09 NSVD</td>
<td>N</td>
<td>N</td>
<td>8 mo</td>
<td>No HBIG given by hosp, no antiviral tx and VL $&gt;10^9$ copies/ml</td>
</tr>
<tr>
<td>911,000,000</td>
<td>Y</td>
<td>LAM for 6 wks</td>
<td>4/09 NSVD</td>
<td>Y</td>
<td>N</td>
<td>10 mo</td>
<td>Antiviral Tx prescribed, but VL still $&gt;10^8$ c/ml and HBV transmission in sibling</td>
</tr>
<tr>
<td>UN</td>
<td>UN</td>
<td>UN</td>
<td>10/09 NSVD</td>
<td>Y</td>
<td>N</td>
<td>9 mo</td>
<td>Mother was not CBWCHC pt.</td>
</tr>
<tr>
<td>UN</td>
<td>N</td>
<td>N</td>
<td>12/10 CS</td>
<td>Y</td>
<td>Y</td>
<td>9 mo</td>
<td>Mother was not CBWCHC pt., but was on antiviral before pregnancy and discontinued during pregnancy</td>
</tr>
</tbody>
</table>
Possible Contributors to Vertical Transmission

- High maternal HBV DNA (>10^8 copies/ml)
  - Anti-viral Tx not offered or pt did not take

- Failure to adhere to clinical recommendations of screening, vaccination and serology testing.
  - Hospital did not identify HBV+ patient due to hand-transcription error in chart, thus no HBIG given
  - Post-vaccination infant serology test done late
  - Mothers not engaged in HBV care plan for themselves or their infants
Identification of Pregnant CHB Women At Delivery Hospital

- **Challenges in identification of +HBV Women at Delivery Hospital**
  - Delivering hospital without OB records
  - Mother not identified as HBV+ by hospital

- **Misrelay of info b/w delivery room and nursery**
  - → Alternative method: patient carries their own pregnancy passport, self-reports diagnosis

- **Variable Hospital protocols for HBIG/HBVx for women HBsAg+ or status unknown**
  - % hospitals with a protocol

- **HBV birth dose recommended for all infants**
  - ACIP recommended in 1999
  - Birth dose coverage low (46%)
Hep B Moms Program Objectives

- To improve care by:
  - Providing HBV education to all pregnant HBV patients
  - Training providers
  - Coordinate care between obstetrics, internal medicine and pediatric departments
  - Ensuring close monitoring of HBV during pregnancy
  - Ensuring infant HBV vaccination & post-vaccination serology
Hep B Moms Program Protocol

HBV Screening at Initial Prenatal Visit

HBV+ patients enrolled in Hep B Mom’s Program

Maternal HBV Care
- Identify high-risk patients & offer anti-viral tx

Infant Delivery
- HBIG/HBV Vax 1

Pediatric Care
- HBV Vax 2 & 3
- Post-vax Serology

Care Manager (CM)
- Provides in-person counseling
- Confirms pt receives HBV care & follows recommendations
- Reviews delivery records
- Confirms pediatric immunization & serology
- Maintain CM database
- Collaborate w DOHMH
**IF YOU HAVE HEPATITIS B, PROTECT YOUR BABY**

**USE THIS CHART TO TRACK YOUR CARE AND YOUR BABY'S CARE**

If you have hepatitis B, the virus can be transmitted to your newborn through your blood at birth. The baby can then carry this serious disease for a lifetime. To prevent infection, make sure your baby is protected with immunizations. Also, see your doctor regularly to take care of your hepatitis B and avoid liver damage.

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**DURING PREGNANCY**

- Get blood tests.
  - Hep B Viral Load
  - Liver tests
  - Hep B e antigen
  - If you have hepatitis B, your doctor may talk to you about taking hepatitis B medication.
- Make sure your spouse and those living with you are tested for hepatitis B.
- See a doctor regularly for hepatitis B.

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**AT BIRTH**

- Tell the staff at the hospital you have hepatitis B.
- Baby must receive 2 shots within 12 hours of birth to protect from infection.
  - One shot of hepatitis B immunoglobulin (HBIG)
  - 1st shot of the hepatitis B vaccine
- Once baby gets the HBIG shot and hepatitis B vaccine, it is safe to breastfeed.
- Hospital staff will give you an immunization card to track your baby's shots.
- Bring this card to all of your baby's doctor visits.

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**AFTER DELIVERY**

- Make sure baby receives the 2nd shot of the hepatitis B vaccine.
- Make sure baby receives the 3rd shot of hepatitis B vaccine.
  - This shot should not be given before 6 months, or baby will not be protected.

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**9-15 MONTHS**

- Make sure baby gets a blood test to check if he or she is protected after the shots.
- This is special for babies born to mothers with hepatitis B.
  - HBsAg
  - HBsAb
- Check the test result:
  - Infected
  - Not Protected*
  - Protected
- *If baby is not fully protected from hepatitis B, the doctor will repeat the vaccine.

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**IF YOUR BABY IS CARED FOR IN CHINA**

- The caretaker must tell the new doctor that baby’s mother has hepatitis B. It is very important to make sure the baby gets the 2nd and 3rd dose of the vaccine.
- Your baby must get the 3rd shot at 6 months and not earlier.
- Ask the doctor to test your baby by 15 months to check if he or she is protected from hepatitis B. This is not done for all babies, so the caretaker should request it because it is important for your baby. Keep a copy of the results.
- When your child returns to the United States, bring your child’s vaccination records from China, and schedule a check up for your child. Immunization records are needed for children to enter to school.

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Gap in Care: Pediatrician unaware (or forgets) that infants mother is HBV+, and thus does not order post-vaccination serology to check for immunity*

The Bridge:
Affix “Hepatitis B Perinatal Exposure” sticker on immunization card for such infants.
- Documents HBIG administration (no designated space on vax records)
- Reminds that HBV serology should be done 9-18 mos sticker
- Indicates which tests and has place for results

- Sticker placed in Hospital Nursery (where HBIG/HBV vax#1 given)

*If infant is not immune, needs 2nd round of HBV vax series or should be evaluated for HBV infection

We would like to acknowledge to Stanford’s Asian Liver Center for the idea to develop the sticker.
Implementation of Hepatitis B Moms Program

- 181 patients enrolled in Hep B Mom’s Program from 2011-2012.
- All ethnic Asians- 82% born in Chinese province of Fujian
- All women followed by a care manager throughout pregnancy
- Infants followed until serology testing
- All CBWCHC internists received training on evaluation of HBV pregnant patients, & protocols were developed between obstetrics, internal medicine and pediatrics
## Characteristics of HBV+ Mothers

<table>
<thead>
<tr>
<th></th>
<th>2007-10 (N= 465)</th>
<th>2011-12 (N= 181)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean age (yrs) of mother (SD)</td>
<td>24.13 (±4.3)</td>
<td>28.9 (±4.7)</td>
<td></td>
</tr>
<tr>
<td>HBeAg+</td>
<td>122 (26.2%)</td>
<td>44 (24.3%)</td>
<td>p=0.001*</td>
</tr>
<tr>
<td>HBV DNA</td>
<td>N=233</td>
<td>N=141</td>
<td></td>
</tr>
<tr>
<td>&gt; 10^8 copies/ml</td>
<td>34 (14.6%)</td>
<td>31 (22.0%)</td>
<td>p=0.146</td>
</tr>
<tr>
<td>10^6-10^8 copies/ml</td>
<td>27 (11.6%)</td>
<td>8 (5.7%)</td>
<td></td>
</tr>
<tr>
<td>10^4-10^6 copies/ml</td>
<td>17 (7.3%)</td>
<td>30 (21.3%)</td>
<td></td>
</tr>
<tr>
<td>&lt; 10^4 copies/ml</td>
<td>155 (66.5%)</td>
<td>72 (51.1%)</td>
<td></td>
</tr>
<tr>
<td>Mean ALT</td>
<td>29</td>
<td>25</td>
<td>P=0.047*</td>
</tr>
<tr>
<td>Received antiviral medication in 3rd trimester</td>
<td>37 (8%)</td>
<td>27 (14.9%)</td>
<td>p=0.008*</td>
</tr>
<tr>
<td>Continued antiviral initiated before pregnancy</td>
<td>2 (0.4%)</td>
<td>3 (1.7%)</td>
<td></td>
</tr>
</tbody>
</table>
### Antiviral Medication by Year

<table>
<thead>
<tr>
<th>Year</th>
<th>Lamivudine</th>
<th>Telbivudine</th>
<th>Tenofovir</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>4</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>2008</td>
<td>3</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>2009</td>
<td>9</td>
<td>1</td>
<td>9</td>
</tr>
<tr>
<td>2010</td>
<td>6</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>2011</td>
<td>2</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>2012</td>
<td>16</td>
<td>1</td>
<td>16</td>
</tr>
</tbody>
</table>

#### Notes:
- **Lamivudine**: 80% in 2007, 30% in 2008, 10% in 2009, 14% in 2010, 20% in 2011, 6% in 2012.
- **Telbivudine**: 20% in 2007, 40% in 2008, 90% in 2009, 86% in 2010, 80% in 2011, 94% in 2012.
- **Tenofovir**: 0% in 2007, 4% in 2008, 1% in 2009, 6% in 2010, 8% in 2011, 16% in 2012.
Infant Follow-Up: Vaccine Completion and Serology

- Birth
  - HBIG: 307 (98.7%)
  - HBV #1: 89 (100%)
- HBV #2: 82 (100%)
  - HBV #3: 152 (89.8%)
  - Serology: 118 completed (85.8%), 113 HBsAg neg (95.8%), 5 HBsAg pos (4.2%)

- Transferred out:
  - 2007-10: 337
  - 2011-12: 133
  - 2007-10: transferred out, 26 (7.3%)
  - 2011-12: transferred out, 44 (33.1%)
  - 2011-12: transferred out, 44 (14.1%)
  - 2011-12: transferred out, 50 (14.3%)
  - 2011-12: transferred out, 16 (9.5%)

- Returned from China:
  - 2011-12: +2 (3.3%)
Conclusions & Recommendations

- Comprehensive management of HBV+ pregnancies involves coordination between obstetrics, HBV provider, delivery hospital, pediatrics and local department of health

- Accurate information exchange amongst all providers is crucial (EMR, RHIO)

- Ideally, coordinate data exchange w DOH HBV perinatal program, clinical laboratories
  - Maternal labs
  - Vaccine completion and post vax serology

- A higher percentage in 2011-12 were treated with antiviral medication in the 3rd trimester. There was no statistically significant difference in duration of treatment or decrease in viral load.
Conclusions & Recommendations

• Changing trends of antiviral treatment in pregnancy were observed (higher usage, more use of TDF) (Tenofovir approved in 2008 and category B)

• Culturally relevant patient education can engage mothers and help ensure recommendations are followed

  • Follow-up of infants was difficult due to family moves, change of pediatricians & the common practice of infants relocating to China to be cared for by family while parents remain in US to work

  • Care management may improve infant retention, we observed an increase in infants completing vaccine series