Hepatitis B in Asian Communities

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Community Dialogue Series
The Lao Cultural Center

What is Hepatitis?

- Hepatitis means inflammation of the liver
- Toxins, certain drugs, heavy alcohol use, bacterial and viral infection all can cause hepatitis
How many types of viral hepatitis?

- **Hepatitis A** (infectious hepatitis)
- **Hepatitis B** (serum hepatitis)
- **Hepatitis NANB** (Non-A Non-B)
  - **Hepatitis C**
  - **Hepatitis D** (co- or super-infection with HBV)
  - **Hepatitis E**
  - **Hepatitis F** (not proven)
  - **Hepatitis G**
  - **Hepatitis ?**

What causes hepatitis B?

- Infection with hepatitis B virus (HBV) causes hepatitis B
Discovery of HBV

- 1963 – Baruch Blumberg and Harvey Alter discover a protein particle in serum from an Australian aborigine. They named it as the Australian antigen (Au), later called hepatitis B surface antigen (HBsAg)
- 1967-68 – Blumberg et al reported Aa is involved in the development of Hepatitis B
- 1969 – Millman and Blumberg through Fox Chase Cancer Center receive a patent for using Aa to prepare a hepatitis B vaccine
- 1970 – D. S. Daniel discovered whole hepatitis B virus particles in blood samples with an electron microscope
- 1972 – Laws are passed in US requiring testing of donor blood for HBsAg

Nobel prize for discovery of HBV

- Due to the discovery of Au (or HBsAg), Dr. Baruch Blumberg was awarded the Nobel Prize for Physiology or Medicine in 1976
How does hepatitis B virus spread from one person to other?

- Hepatitis B is usually spread when blood, semen, or other body fluid from a person infected with the hepatitis B virus enters the body of someone who is not infected
  - From an infected mother to her baby during childbirth
  - Sex with an infected partner
  - Sharing needles, syringes, or other drug-injection equipment
  - Sharing items such as razors or toothbrushes with an infected person
  - Direct contact with the blood or open sores of an infected person
  - Direct contact with blood from needlesticks or other sharp instruments

Hepatitis B is NOT spread through the following means

- Not spread routinely through food or water
- Not spread by sharing eating utensils
- Not spread by breastfeeding
- Not spread by hugging, kissing or holding hands
- Not spread by coughing or sneezing
How many types of hepatitis B?

- Acute hepatitis B is a short-term illness that occurs within the first 6 months after someone is acquired the hepatitis B virus. Acute hepatitis B can, but not always lead to chronic infection.
- Chronic hepatitis B is a long-term illness that occurs when the hepatitis B virus remains in a person’s body. Chronic hepatitis B is a serious disease that can result in the long-term health problem and causes 15-25% premature death.

What are the symptoms of acute hepatitis B?

- Fever
- Fatigue
- Loss of appetite
- Nausea
- Vomiting
- Abdominal pain
- Dark urine
- Clay-colored bowel movements
- Joint pain
- Jaundice (yellow color in the skin or the eyes)
How soon the symptoms appear and how long the symptoms last for acute hepatitis B?

- Most people infected with HBV have no symptoms at all
- Among people who do have, symptoms appear, on average, 90 days (or 3 months) after someone acquires HBV. But the time interval could be as short as 45 days or as long as 180 days
- Symptoms usually last for a few weeks, but some people can be ill for as long as 6 months

What are the symptoms of chronic hepatitis B?

- Most people with chronic hepatitis B remain symptom free for as long as 20 to 30 years
- Even the liver becomes diseased or damaged, some people still do not have symptoms, although certain blood tests for liver function might show some abnormalities
- Some people have ongoing symptoms similar to acute hepatitis B
- About 20-25% of people with chronic hepatitis B develop serious liver conditions such as cirrhosis (scaring of the liver) or liver cancer, resulting in death
How does acute hepatitis B become chronic hepatitis B?

- We do not know for sure what factors cause a person from acute infection to become a chronic hepatitis B. But we know certain people who are at low immune response are more likely to develop chronic hepatitis B. For example, the infection occurs at birth, 9 out of 10 children would develop chronic hepatitis B.

### Outcome of Hepatitis B Virus Infection by Age at Infection

<table>
<thead>
<tr>
<th>Age at Infection</th>
<th>Chronic Infection (%)</th>
<th>Symptomatic Infection (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Birth</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>1-6 months</td>
<td>80</td>
<td>20</td>
</tr>
<tr>
<td>7-12 months</td>
<td>60</td>
<td>40</td>
</tr>
<tr>
<td>1-4 years</td>
<td>40</td>
<td>60</td>
</tr>
<tr>
<td>Older Children and Adults</td>
<td>20</td>
<td>80</td>
</tr>
</tbody>
</table>
How do I know if I have hepatitis B?

- Since many people with hepatitis B do not have any symptoms, doctors diagnose the disease by one or more blood tests

What are common blood tests available to diagnose hepatitis B?

- Hepatitis B surface antigen (HBsAg)
- Hepatitis B surface antibody (anti-HBs)
- Total hepatitis B core antibody (anti-HBc)
- IgM antibody to hepatitis B core antigen (IgM anti-HBc)
- Hepatitis B e antigen (HBeAg)
- Hepatitis B e antibody (anti-HBe)
- Hepatitis B viral DNA (HepB DNA)
What are the differences between antigens and antibodies?

- An antigen is a substance on the surface of a virus that cause a person’s immune system to recognize and respond to it.
- When exposed to an antigen, the body views it as foreign material and takes steps to neutralize the antigen by producing antibodies.
- An antibody is a substance found in the blood that the body produces in response to a virus. Antibodies protect the body from disease by attaching to the virus and destroying it.

What are the meanings of a positive blood test?

<table>
<thead>
<tr>
<th>Test</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>HBsAg</td>
<td>Acute or chronic hepatitis B virus infection</td>
</tr>
<tr>
<td>Anti-HBs</td>
<td>Protected or immune from getting the hepatitis B virus</td>
</tr>
<tr>
<td>Anti-HBc</td>
<td>Current or past infection with hepatitis B virus</td>
</tr>
<tr>
<td>IgM anti-HBc</td>
<td>Infected with hepatitis B virus within the last 6 months</td>
</tr>
<tr>
<td>HBeAg</td>
<td>High levels of virus in his/her blood, and easily spread the virus to others; used to monitor the effectiveness of treatment for chronic hepatitis B</td>
</tr>
<tr>
<td>Anti-HBe</td>
<td>A person has chronic hepatitis B virus infection but at lower risk of liver problem due to low levels of virus in his or her blood</td>
</tr>
<tr>
<td>HepB DNA</td>
<td>The virus is multiplying or producing in a person’s body and he or she is highly contagious and can pass the virus to others when the DNA levels are high</td>
</tr>
</tbody>
</table>
How many people are infected with hepatitis B virus?

- 350 million people worldwide are living with chronic hepatitis B virus infection, who are tested positive for HBsAg.
- Each year 650,000 people die prematurely from hepatitis B-related diseases, including liver cirrhosis, liver failure, and liver cancer.

Geographic Distribution of Chronic HBV Infection

**HBsAg Prevalence**
- ≥8% - High
- 2-7% - Intermediate
- <2% - Low
Global Patterns of Chronic HBV Infection

- High (>8%): 45% of global population
  - lifetime risk of infection >60%
  - early childhood infections common
- Intermediate (2%-7%): 43% of global population
  - lifetime risk of infection 20%-60%
  - infections occur in all age groups
- Low (<2%): 12% of global population
  - lifetime risk of infection <20%
  - most infections occur in adult risk groups

HBV Infection in Chinese within China

<table>
<thead>
<tr>
<th>Region</th>
<th>No. of people tested</th>
<th>HBsAg-positive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Southern Guangxi</td>
<td>250</td>
<td>35 (14%)</td>
</tr>
<tr>
<td>Shanghai</td>
<td>1087</td>
<td>104 (10%)</td>
</tr>
</tbody>
</table>

Nieters et al, 2005; Yuan et al, 2006
Hepatitis B in U.S.

- On average, hepatitis B rate in US is low (<1%)
- 800,000 to one million people in US are infected with hepatitis B
- However, given the high rate of hepatitis B in Asians in their original countries, Asian immigrants have much high rate of hepatitis B than whites in US
- Since hepatitis B virus can be transmitted from infected mother to baby during childbirth, children of Asian Americans are more likely to be infected with hepatitis B, and develop chronic hepatitis B

Hepatitis B in Asians in U.S.

- As many as 1 in 10 Asian Americans are believed to have hepatitis B
- Most were infected when they were children and were living in a part of the world where hepatitis B is prevalent
- Because of their high rate of infection, Asian Americans are 7 times more likely than whites to die from hepatitis B-related liver diseases
Serious consequences of chronic hepatitis B

- Because hepatitis B can be a “silent” disease that does not cause symptoms for years, people who have it often do not know they were infected.
- People who are infected do not realize how serious it can be
- Chronic hepatitis B can lead to liver cancer
- Liver cancer is a deadly disease, half of patients can only live 6 months after diagnosis of liver cancer

<table>
<thead>
<tr>
<th></th>
<th>Cases (%)</th>
<th>Controls (%)</th>
<th>Odds Ratio (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Guangxi</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HBsAg (-)</td>
<td>45 (18)</td>
<td>215 (86)</td>
<td>1.0</td>
</tr>
<tr>
<td>HBsAg (+)</td>
<td>205 (82)*</td>
<td>35 (14)</td>
<td>43.5 (16.1, 117.2)</td>
</tr>
<tr>
<td><strong>Shanghai</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HBsAg (-)</td>
<td>81 (39)</td>
<td>961 (90)</td>
<td>1.0</td>
</tr>
<tr>
<td>HBsAg (+)</td>
<td>128 (61)*</td>
<td>101 (10)</td>
<td>15.1 (10.2, 22.4)</td>
</tr>
<tr>
<td><strong>Los Angeles</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HBV (-)</td>
<td>159 (65)</td>
<td>195 (89)</td>
<td>1.0</td>
</tr>
<tr>
<td>HBV (+)*</td>
<td>86 (35)*</td>
<td>25 (11)</td>
<td>3.6 (2.1, 6.0)</td>
</tr>
<tr>
<td>Anti-HBc (+) only</td>
<td>72 (29)</td>
<td>25 (11)</td>
<td>2.9 (1.7, 5.0)</td>
</tr>
<tr>
<td>HBsAg (+)</td>
<td>14 (6)</td>
<td>0 (0)</td>
<td>– (5.0, −)</td>
</tr>
</tbody>
</table>

† HBsAg(+) and/or anti-HBc(+).

Incidence Rate of Primary Liver Cancer by Sex and Race in Los Angeles County, California 1992-1997

![Graph showing incidence rates by sex and race.](image)

*Chinese:Non-Hispanic whites = 3.2~4.1*


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### Aflatoxin

- Aflatoxin is a substance produced by fungi.
- Human exposure to aflatoxin is through ingestion of moldy foods, peanuts and its products, corn and its products, and other grains, that is contaminated with fungi.
- Aflatoxin have been proved to cause liver cancer in animals, and is directly linked to the development of liver cancer in humans.
### Aflatoxin B₁ Contents in Selected Market Foods in Shanghai in 1988-1989

<table>
<thead>
<tr>
<th>Food</th>
<th>N</th>
<th>% positive</th>
<th>Mean (μg AFB₁/kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peanut</td>
<td>62</td>
<td>69.4</td>
<td>39.60</td>
</tr>
<tr>
<td>Soy sauce</td>
<td>56</td>
<td>57.1</td>
<td>16.60</td>
</tr>
<tr>
<td>Dried red beans</td>
<td>20</td>
<td>30.0</td>
<td>9.93</td>
</tr>
<tr>
<td>Peanut butter</td>
<td>62</td>
<td>64.5</td>
<td>7.10</td>
</tr>
<tr>
<td>Rapeseed oil</td>
<td>70</td>
<td>22.9</td>
<td>1.53</td>
</tr>
<tr>
<td>Yellow rice wine</td>
<td>56</td>
<td>3.6</td>
<td>7.50</td>
</tr>
<tr>
<td>Corn</td>
<td>39</td>
<td>69.2</td>
<td>1.14</td>
</tr>
<tr>
<td>Fermented bean cured</td>
<td>45</td>
<td>33.3</td>
<td>1.10</td>
</tr>
<tr>
<td>Soy bean oil</td>
<td>73</td>
<td>30.1</td>
<td>1.10</td>
</tr>
<tr>
<td>Wheat flour</td>
<td>60</td>
<td>31.7</td>
<td>0.64</td>
</tr>
<tr>
<td>Rice</td>
<td>60</td>
<td>30.0</td>
<td>0.28</td>
</tr>
<tr>
<td>Milk powder (AFM1)</td>
<td>15</td>
<td>26.7</td>
<td>0.20</td>
</tr>
<tr>
<td>Milk (AFM1)</td>
<td>57</td>
<td>73.7</td>
<td>0.08</td>
</tr>
<tr>
<td>Dried soybeans</td>
<td>8</td>
<td>0.0</td>
<td>0.00</td>
</tr>
<tr>
<td>Dried green beans</td>
<td>10</td>
<td>0.0</td>
<td>0.00</td>
</tr>
<tr>
<td>Fruit wine, beer</td>
<td>70</td>
<td>0.0</td>
<td>0.00</td>
</tr>
</tbody>
</table>


### Dietary Aflatoxin Intake and Liver Cancer Risk

- Ecological studies found a positive association between dietary aflatoxin intake and liver cancer mortality
**Dietary Aflatoxin B₁ and Prevalence of HBsAg In Relation to Mortality Rate of Liver Cancer in Southern Guangxi, China 1982-86**

<table>
<thead>
<tr>
<th>Village</th>
<th>No. of subjects</th>
<th>Mean AFB₁ (mg/person/yr)</th>
<th>HBsAg (%)</th>
<th>Mortality rate* of liver cancer</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1070</td>
<td>51.8</td>
<td>23.1</td>
<td>613.5</td>
</tr>
<tr>
<td>B</td>
<td>1417</td>
<td>18.0</td>
<td>24.7</td>
<td>288.5</td>
</tr>
<tr>
<td>C</td>
<td>953</td>
<td>2.3</td>
<td>24.8</td>
<td>182.2</td>
</tr>
<tr>
<td>D</td>
<td>1915</td>
<td>0.3</td>
<td>21.6</td>
<td>175.4</td>
</tr>
<tr>
<td>E</td>
<td>2562</td>
<td>_</td>
<td>19.5</td>
<td>145.1</td>
</tr>
</tbody>
</table>

* Age-adjusted rate per 100,000 person-years.

_Yeh et al., Cancer Res 49:2506-9, 1989._

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**Dietary Aflatoxin B₁ intake and Mortality Rate of Liver Cancer in Southern Guangxi, China 1982-86**

![Graph showing the relationship between dietary aflatoxin B₁ intake and mortality rate per 100,000](image)

_Yeh et al., Cancer Res 49:2506-9, 1989._
Urinary Biomarkers for Dietary Aflatoxin Exposure

- Assays developed in Dr. Wogen’s Lab at MIT in early 1980s.
- Urinary aflatoxin biomarkers – AFB₁, its metabolites, and DNA adducts.

Shanghai Cohort: Nested Case-Control Study
Presence of Urinary Aflatoxin Metabolites and HCC Risk

<table>
<thead>
<tr>
<th>Cases/Controls (50/267)*</th>
<th>Odds Ratio† (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Biomarker</td>
<td>14/158</td>
</tr>
<tr>
<td>Any Biomarker</td>
<td>36/109</td>
</tr>
<tr>
<td>Aflatoxin B₁ (+)</td>
<td>15/56</td>
</tr>
<tr>
<td>Aflatoxin M₁ (+)</td>
<td>18/49</td>
</tr>
<tr>
<td>Aflatoxin P₁ (+)</td>
<td>14/39</td>
</tr>
<tr>
<td>AFB₁-N⁷-GUA (Adduct)</td>
<td>18/31</td>
</tr>
</tbody>
</table>

* Measured on first 50 cases and their matched controls only.
† Adjusted for HBsAg positivity and cigarette smoking.

Interaction between HBsAg x Aflatoxin on Liver cancer risk

<table>
<thead>
<tr>
<th></th>
<th>Aflatoxin (−)</th>
<th>Aflatoxin (+)†</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Ca/Co</td>
<td>OR</td>
</tr>
<tr>
<td>HBsAg (−)</td>
<td>5/134</td>
<td>1.0</td>
</tr>
<tr>
<td>HBsAg (+)</td>
<td>9/24</td>
<td>7.3*</td>
</tr>
</tbody>
</table>

* 2-sided P<0.05.
† Presence of any aflatoxin metabolites in urine.


What should I do if I am infected with hepatitis B virus?

- Change lifestyles – quit smoking, avoid alcohol drinking, avoid foods contaminated with aflatoxin such as moldy peanuts, corn or their products, etc
- Talk to health professionals about anti-viral treatment – there are several anti-viral drugs approved by FDA. They are effective to suppress the viral replication, and reduce the liver damage
Early detection for liver cancer

- Since liver cancer at early stage is effectively treated by surgery, early diagnosis of liver cancer can reduce the likelihood of death
- B-ultrasound, CT, and MRI can show the possible liver cancer at an early stage
- Routine follow-up visit to your physician once every 6 or 12 months

How to eliminate hepatitis B transmission?

- Hepatitis B vaccine
Development of HBV vaccine

- 1980-81 – Subunit hepatitis B virus vaccine derived from serum proved to be effective and licensed for general use
- 1983-86 – subunit hepatitis B virus vaccine derived from yeast and approved for use.
- 1991 – routine vaccination of children in US was recommended

Who should receive vaccine?

- All infants, beginning at birth
- All children aged younger than 19 years who have not been vaccinated previously
- Vaccination of adults in high-risk groups
  - Sexually active and have more than one sex partner
  - Sexually transmitted disease or HIV patients
  - Men who have sex with me
  - Injection drug users
  - Household members of a chronic hepatitis B patient
  - Having end-stage renal disease for dialysis
How effective is the vaccine?

The rate of new hepatitis B virus infection in U.S.

Additional Information

- Centers for Disease Control and Prevention (CDC), DHHS
  http://www.cdc.gov/hepatitis/index.htm

- Vaccine Information
  http://www.vaccineinformation.org/hep b/gandadis.asp