Eliminating Chronic Hepatitis B Disparities among Asian Pacific Islanders: A Model for Transforming Public Health in the Pacific

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Introduction

- Increasing Chronic Hep B virus (HBV) carriers in the U.S. is due to immigration from endemic regions
- 2 million chronic HBV in US: 50-70% are immigrants
- Hawaii has large Asian Pac Isld (API) population → immigrants from endemic areas: China, PI, Vietnam, & Pacific Islands.
- CDC recommend screening foreign born immigrants (2008)
- Community based public health program is conducted in effort to reduce health disparity of HBV in API
  - Public and private stake holders
  - Free HBV screening and vaccination
  - Hawaii 3-ForLife is created:
    • Model for healthy community, and
    • Transforming public health in Pacific
Hepatitis B Virus

- Hepadnaviridae family – Primarily infect liver cells
- Human are the only known host
- Double strain circular DNA vi
- 100 x more infective than HIV
- Retain infectivity $\geq 7$ days (room T)
- Numerous antigenic components
  - surface antigen: HBsAg
  - core antigens: HBcAg, HBeAg
  - DNA polymerase
- Clinically may cause
  - Acute hepatitis
  - Chronic hepatitis
  - Chronic carrier state
  - Hepatocellular carcinoma (HCC)
Epidemiology of HBV Infection

HBV infection is a global public health problem
- High Morbidity and Mortality
- Asia & Western Pacific are highly endemic countries

In US: High prevalence of HBV infection in API
- Immigration pattern affects prevalence
Disease Burden of Chronic HBV Infection

World Wide
- 2 out of 6 billion world pop. have been infected with HBV
- 350-400 million Chronic carriers WW → 15-40% develop cirrhosis, HCC, or end stage liver failure
- HBV is Human carcinogen 80% of HCC caused by HBV
- Chronic HBV cause 1.2 million death each year → 10th leading cause of death

United States
- 1.25 million carriers
- 2 million carrier if counted w/ immigrans → endemic areas immigrants, including API, impact the US pattern of dis.

Global Impact of Hepatitis B
- 2 billion with past/present HBV infection
- 15-40% develop cirrhosis, liver failure or HCC
- 350-400 million with chronic hepatitis B
- 1 million/year die from HBV-associated liver disease

World population 6 billion
1 million/year die from HBV-associated liver disease

Global Burden of Chronic HBV carriers

- 350 millions people infected WW
- 250 millions are in Asia Pacific
- South Pacific → highest carrier (prevalence in Kiribati = 31%)
- Developed countries → HBsAg prevalence is high among immigrants from high endemicity regions

(Source: WHO, 2000; Goldstein et al., 2005)
Geographic Distribution of HBV Infection

- **High >8%:**
  - 45% of global population
  - SE Asia, Pacific, Amazon basin, Subsahara Africa
  - Early childhood infection
  - Lifetime risk infection > 60%

- **Intermediate: 2-8%:**
  - 43% global population
  - Infection in all age group
  - Lifetime risk infection 20%-60%

- **Low <2%**
  - 12% of global population
  - North America, Europe, Australia
  - Adult risk group infection
  - Lifetime risk infection <20%

Transmission of HBV Infection

Concentration of HBV
High: blood & wound exudate
Moderate: semen, vaginal fluid, and saliva
Low: urine, feces, breast milk

HBV transmitted by:
1. Horizontal Transmission
   - Contaminated needle/equipment
   - Transfusion
   - Sexual
   - Direct contact with body fluid
   - Child to child (intra-familial)

2. Vertical Transmission
   - Perinatal → during child birth

Source: AASLD 2008 conference presentation, with references:
CDC Fact Sheet: http://www.cdc.gov/ncidod/diseases/hepatitis/b
Lee (1997); Lavanchy (2004)
The risk of becoming chronic HBV carrier decreased with increased age of acquisition.

- 90% infected infants become chronically infected (if not vaccination)
- 25%-30% infected in early childhood (<5 years)
- 6%-10% infected 5 years to adults

(Source: CDC; Goldstein et al., 2005; McMahon et al., 1985)
Management of HBV Infection

Prevention

- Prevent perinatal transmission → routine vaccination of all infants
- Vaccinate all children and adolescents
- Vaccinate all adults in high risk groups

Treatment

- Treatment not curing, but modify complication
- Reduce impact of adverse outcome
- Reduce risk of Hepatocellular Carcinoma
- Reduce cost of care in chronic carriers
Hepatitis B Problem in Hawaii

- Hawaii population (1.27 mil): API is largest ethnic group
  71% of HI pop. live in Honolulu: 46% Asian, 10% PI
- Many of API in HI are FB from endemic countries
- High rate of immigration from Asia & PI to HI
- Highest incidence and mortality rate of HBV assoc. liver disease impacted by migration from API
- No HBV screening and vaccination for immigrants d/t budget cut and closing of available clinic (LIVE Clinic – Lanakila Immigrants Vaccination & Evaluation)

Solution of the problem:
- Hepatitis B community based public health intervention for Screening and vaccination ➔ Hawaii 3ForLife program
- HI-3FL fill a gap for HBV study in HI adult population
- Implement CDC recommendation for screening and vaccination
# CDC Recommendations for Routine Testing and Follow-up for Chronic Hepatitis B Virus Infection

<table>
<thead>
<tr>
<th>Population</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Testing</strong></td>
<td><strong>Vaccination/Follow up</strong></td>
</tr>
<tr>
<td>Person born in regions of high and intermediate HBV endemicity (HBsAg prev ≥ 2%)</td>
<td>Test for HBsAg, regardless of vaccination status in their country of origin, including – immigrants – refugees – asylum seekers – internationally adopted children</td>
</tr>
<tr>
<td>US born persons not vaccinated as infants whose parents were born in regions with high HBV endemicity (8%)</td>
<td>Test for HBsAg regardless of maternal HBsAg status if not vaccinated as infants in the United States.</td>
</tr>
</tbody>
</table>

Adapted from: CDC. Recommendations for Identification and Public Health Management of Persons with Chronic HBV Infection. MMWR 2008; 57 (No. RR-8).
Hawaii 3ForLife Program

- Community mobilization for hepatitis B awareness, prevention, and intervention in Honolulu

- Provided free hepatitis B screening and vaccination for Hawaii adult population, particularly for API community

- Program partners include:
  - Hawaii Jade Ribbon Campaign
  - Asian Liver Center – Standford University
  - Hawaii Department of Health
  - Kalihi Palama Community Health Center (KPHC)
  - Gilead Pharmaceutical
  - Clinical Lab of Hawaii and Diagnostic Lab
  - Community volunteers

- 1 year Pilot program from Sept 2006 to Sept 2007

- Screening conducted at various health fairs & cultural organization events

- Vaccination conducted at KPHC

- Vaccine provided by HI-DOH
Screening/Vacc Procedure at HI-3FL:

Blood Test

Screening

Results

- HBsAg + Anti-HBs – (HBV Infection)
  - Refer to DOH/MD
  - Inform fam/friend
  - Screen/vacc fam

- HBsAg – Anti-HBs + (Immune)
  - Inform fam/friend
  - Screen/vacc fam

- HBsAg – Anti-HBs – (Susceptible)
  - Get vaccine
  - Inform fam/friend
  - Screen/vacc fam

Recommendation
Purpose of the study

- Analysis of dataset from HI 3FL program
  - Describe point prevalence of HBV infection
  - Describe point prevalence of HBV susceptibility
  - Describe point prevalence of HBV immunity

- Compare the prevalence rates according to
  - Race/ethnicity
  - Country of birth (Foreign Born/U.S. Born)

- Evaluate compliance among susceptible participants in obtaining hepatitis B vaccine
Demographic characteristics of the screening samples (N=1511)

- Age ranged from 18 to 102 years (median=54 years)
- 62.8% female
- 18 ethnicities represented
  - Chinese (73.5%)
  - Filipino (9.4%)
  - Korean (3.7%)
  - Pac Isl (3.6)
  - Japanese (2.5%)
  - Hawaiian (2.3%)
  - Caucasian (2.1)
  - Other Asian (0.6)
- 89% Foreign born (Represented 26 foreign countries)
  - 96% Asian
  - 4% Pac Islander
Prevalence of HBV

- Total prevalence of HBV infection: 5.8%
  - By ethnicity, ranged from 2.8% (Filipino) to 14.5% (Pacific Islander)

- Total prevalence of HBV susceptibility: 52.2%
  - By ethnicity, ranged from 38.7% (Taiwanese) to 85.3% (Hawaiian)

- Total prevalence of HBV immunity: 42%
  - By ethnicity, ranged from 14.7% (Hawaiian) to 48.8% (Taiwanese)
Prevalence of HBV serologic status among ethnic subgroups of the HI 3FL participants (N = 1501)

- Total (n=1501)
- Chinese (n=1025)
- Taiwanese (n=80)
- Japanese (n=38)
- Filipino (n=142)
- Korean (n=56)
- Pac Islander (n=55)
- Hawaiian (n=34)
- Vietnamese (n=30)
- Other Asian (n=9)
- Caucasian (n=32)

- Infected FB
- Susceptible FB
- Susceptible USB
- Immune FB
- Immune USB

<table>
<thead>
<tr>
<th>Subgroup</th>
<th>Infected FB</th>
<th>Susceptible FB</th>
<th>Susceptible USB</th>
<th>Immune FB</th>
<th>Immune USB</th>
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</thead>
<tbody>
<tr>
<td>Total (n=1501)</td>
<td>2.3</td>
<td>1.1</td>
<td>0</td>
<td>4.3</td>
<td>3.6</td>
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<tr>
<td>Chinese (n=1025)</td>
<td>39.7</td>
<td>42.9</td>
<td>5.3</td>
<td>38.7</td>
<td>41</td>
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<tr>
<td>Taiwanese (n=80)</td>
<td>48.8</td>
<td>5.3</td>
<td>5.3</td>
<td>4.3</td>
<td>8.4</td>
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<tr>
<td>Japanese (n=38)</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<tr>
<td>Filipino (n=142)</td>
<td>52.6</td>
<td>8.4</td>
<td>8.9</td>
<td>45.8</td>
<td>42.9</td>
</tr>
<tr>
<td>Korean (n=56)</td>
<td>5.3</td>
<td>8.4</td>
<td>49.1</td>
<td>42.9</td>
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<tr>
<td>Pac Islander (n=55)</td>
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<td>Hawaiian (n=34)</td>
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<td>85.3</td>
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<td>Vietnamese (n=30)</td>
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<tr>
<td>Other Asian (n=9)</td>
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<tr>
<td>Caucasian (n=32)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
Prevalence of HBV by Birth Status

- **Prevalence of HBV infection**
  - FB: 6.5% (87)
  - USB: 0% (0)

- **Prevalence of HBV susceptibility**
  - FB: 48.8% (651)
  - USB: 79% (132)

- **Prevalence of HBV immunity**
  - FB: 44.7% (596)
  - USB: 21% (35)
Hepatitis B vaccination compliance $(N=783)$

- Overall: 40% completed 3 dose series

- Compliance rate by birth status
  - FB: 36% $(N=282)$
  - USB: 4.1% $(N=32)$

- Compliance rate by ethnicity
  - Highest (34%, $N=266$): Chinese
  - Lowest (.1%, $N=1$): Pacific Islander

- Compliance rate by age group
  - Highest (20%, $N=152$): 50 – 69 years
  - Lowest (1.4%, $N=11$): 18 – 29 years

- Compliance rate by gender
  - Females (25%, $N=199$)
  - Males (15%, $N=115$)
Inferential Analyses

**H01:** In each racial and ethnic subgroup, there is no difference in the prevalence rate of HBV infection among participants who are FB or USB
- FB more likely to be infected ($\chi^2 (1) = 11.7, p < .001$).
- All HBV infection are FB, no comparison test for each ethnicity
- $H01$ rejected

**H02:** In each racial and ethnic subgroup, there is no difference in the prevalence rate of HBV susceptibility among participants who are FB or USB
- FB more susceptible than USB ($\chi^2 (1) = 57.59, p < .001$).
- Chinese: FB more susceptible than USB
- Caucasian: USB more susceptible than FB*
- $H02$ rejected

**H03:** In each racial and ethnic subgroup of susceptible participants, there is no difference in the compliance for obtaining complete three dose series of hepatitis B vaccine among participants who are FB or USB
- FB more compliant than USB ($\chi^2 (1) = 18.04, p < .001$).
- Caucasian: FB more compliance than USB*
- $H03$ rejected

(* Note: small number of FB Caucasians might affect this result. Susceptible FB/USB: 25/3)
Summary of findings

- HBV infection prevalence: 5.8%
  - General USB population: 0.4%
  - FB API in other states: 4.3% - 16%
  - Highest prevalence in Pacific Islander (14.5%): mirrored home countries

- HBV susceptibility prevalence: 52.2%
  - High susceptibility for both FB (50%) and USB (80%)
  - Low coverage of Hepatitis B vaccination in adults
  - Adult vaccination not supported by federal program

- Hepatitis B vaccination compliance: 40%
  - Non-compliance recognized for certain ethnic (Pac Isld)
  - Perceive lack of awareness and knowledge
  - Healthcare seeking behavior of migrants
Model for Social Change

Impact on Society
- Hepatitis B factual knowledge is important for Hawaii population
- API population and immigrants from endemic countries
- Increase awareness $\rightarrow$ positive behavior change for screening & vaccination

Public Health Program Development
- Community involvement for PH intervention program
- Implement CDC recommendation for screening & vaccination
- Culturally sensitive program that served different ethnic populations

Greatest importance of social change
- support effort to reduce health disparity among API-Americans
Recommendations

Recommendations for action
- Promote increased awareness for hepatitis B in at-risk populations and health providers
- Collaborating of key stakeholders with state and federal agencies for PH intervention program for hepatitis B screening and vaccination
- Finding resource to fund the continuation of the program

Recommendations for future study
- Expand screening and vaccination program to increase coverage in ethnic subgroups with low numbers of participants
- Expand screening and vaccination program to include other islands in Hawaii
Conclusion

- A health disparity exists in hepatitis B for API in Hawaii

- Screening to identify HBV infected individual is crucial for disease management

- Hepatitis B is preventable with vaccination

- Increasing vaccination coverage will decrease the incidence and reducing the disease burden caused by HBV

- Federal and state supports are needed for continuation of:
  - screening and vaccination program
  - referral for medical management
  - improve surveillance

- HI-3ForLife program has been effective public health intervention for:
  - Hepatitis B screening of 1511 participants
  - Referral of 87 hepatitis B positive individual to HI-DOH and physicians
  - Provided complete hepatitis B vaccination series to 314 participants
Thank You