

# Public Health Model for Prevention of Liver Cancer Among Asian Americans

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**Abstract** Asian Americans and Pacific Islanders (AAPIs) account for over half of the 1.3 million chronic hepatitis B cases and for over half of the deaths resulting from chronic hepatitis B infection in United States. There are very few studies published about hepatitis B virus (HBV) data in the Baltimore–Washington metropolitan area. In 2003, the Hepatitis B Initiative-DC (HBI-DC) worked closely with a large Korean church, located in Vienna, Virginia. Their partnership included a pilot-test of a faith-based HBV program, which educates, screens and vaccinates for the HBV. This pilot program was later expanded to include a total of nine Korean and Chinese American churches in this region, plus a Pastor's Conference targeting Asian American pastors from around the United States. During 2003–2006, a total of 1,775 persons were tested for HBV infection through the HBI-DC program. Of all the participants, 2% ( $n = 35$ ) were tested HBV positive (HbsAg+, HbsAb–), 37% ( $n = 651$ ) were HBV negative but protected (HbsAg–, HbsAb+), and 61% ( $n = 1089$ ) were unprotected (HbsAg–, HbsAb–). Most of these unprotected individuals ( $n = 924$ ) received the first vaccination. The proportion of the second vaccination was 88.8% ( $n = 824$ ). About 79% completed 3-shot vaccine series. Our study contributes to the literature by providing an overview of the hepatitis B unprotected rate among Asian American adults. It indicates that culturally integrated liver

cancer prevention program will reduce cancer health disparities in high risk immigrant populations.

**Keywords** Hepatitis B virus screening · Asian Americans · Health education · Vaccination · Faith-based

## Introduction

Worldwide, liver cancer is the fourth leading cause of cancer death in men, although uncommon in North America and Europe. Liver cancer is one of the top three causes of death by cancer in most of Asia, the Pacific, and sub-Saharan Africa [1]. In the United States, about 80% of liver cancer is etiologically associated with hepatitis B virus (HBV) infection. Asian Americans and Pacific Islanders (AAPIs) account for over half of the 1.3 million chronic hepatitis B cases and for half of the deaths resulting from chronic hepatitis B infection [1, 2]. These numbers are high considering that AAPIs are only about 4.6% of the U.S. population [3]. In 1999, AAPIs were 6 to 13 times more likely to die from HCC than Caucasians, with Vietnamese Americans at 13 times higher risk, Korean Americans at eight times, and Chinese Americans at six times [1, 2]. Hepatitis B infection can be prevented by effective screening and vaccination programs. Thus, there is a great need among Asian minority groups for sustainable vaccination programs in order to decrease their risk of getting HCC [4]. This excess risk can be attributed to high rates of HBV infection (particularly among first generation immigrants) combined with low levels of hepatitis B vaccination coverage due to cultural, linguistic, or financial barriers [5–8].

In recent studies, researchers reported the prevalence of HBV infection among Asian Americans. For example, in

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New York City data, a total of 1,836 were tested for HBV infection with a majority of Chinese (61.2%) and Korean (30.3%) participants; 56.6% of participants had never been tested for HBV before the study. Among the 925 newly screened participants, 14.8% had chronic HBV infection, 53.6% were protected, and 31.6% were susceptible to HBV infection [9]. Of the 116 Korean and Vietnamese Americans recruited in the free hepatitis B screening program in the Rocky Mountain area, 4.3% tested positive for serum hepatitis B surface antigen and 60% were positive for serum hepatitis B antibody [10]. These studies indicated that the prevalence of HBV infection among Asian Americans varied from 4 to 15%.

The northeastern and northwestern parts of the United States have published their survey results of HBV screening rates among Asian populations [11–13]. In a study of 256 Vietnamese Americans with low socioeconomic status in the Philadelphia and New Jersey areas, only 7.5% had been tested for HBV and 6.3% had been vaccinated [11]. A study in Seattle, Washington showed a trend: about a third to half of the sample had been tested for HBV (38–66%) among Cambodian and Vietnamese Americans [6, 12–14]. Very few articles have been published about HBV data in the Baltimore–Washington metro area, although we expected that it would be a similar rate as other areas in the United States.

In the Baltimore–Washington metro area, the Korean, Vietnamese and Chinese Americans communities are among the top four ethnicities comprising the metropolitan area's 8% AAPI population [15]. The Hepatitis B Initiative, based on their experiences in Boston [16], and at the request of the National Taskforce on Hepatitis B: Focus on AAPIs, established a Washington, D.C. (HBI-DC) affiliate in 2002 to reduce health disparities. HBI-DC is the first hepatitis B organization in the D.C. area to mobilize Asian American, faith-based communities to adopt hepatitis B prevention campaigns through church ministries. HBI-DC serves the metropolitan area by (1) developing culturally and linguistically appropriate hepatitis B outreach materials, (2) forming collaborative partnerships and resources, and (3) providing technical assistance for community-based hepatitis B prevention campaigns. HBI-DC has reached a large number of Asian Americans successfully, providing access to free HBV screenings and vaccinations.

CDC and Task Force members recommended that HBI-DC focus on Korean Americans who are a difficult group to reach. Korean Americans are the most likely to be uninsured among AAPIs, and 34.4% of Korean Americans had no health insurance compared to 13.5% for the entire U.S. population [17]. About 6.5% of Korean Americans reside in the Baltimore–Washington metropolitan area, where Korean Americans are the third largest group of Asian Americans [3]. Historically, the Korean church is a

focal point for the Korean community. It not only offers health and social services but plays a large role in preserving, fostering, and shaping Korean American culture [18]. About 50–75% of Korean Americans attend church [19, 20]. Therefore, faith-based hepatitis B outreach would benefit a majority of Korean Americans in the United States.

Thus, in 2003–2004, HBI-DC, in partnership with the largest Korean American church in the metro DC area launched a pilot HBV program. This pilot program tested HBI-DC's model which included: (1) needs assessment (2) hepatitis B education through community empowerment and participatory learning development [21], (3) screening and vaccination events, and (4) evaluation. The success of HBI-DC's pilot program created a demand for technical assistance both locally and nationally. Many community leaders and organizations modeled HBI-DC's program. Eight Korean churches and one Chinese church shared their data with HBI-DC. HBI-DC's program not only demonstrates how urgently those individuals who did not benefit from the hepatitis B vaccination law require access to vaccines, but also the enormous cost savings for the medical system. It is estimated that medical and work loss costs for HBV-related conditions total \$300 million in direct costs and \$700 million in indirect costs per year in the United States [22].

The purpose of our study is to examine the prevalence of HBV infection and unprotected rate of HBV among Asian Americans living in these areas. Data used for this analysis include eight Korean faith-based organizations, one Chinese faith-based organization, and one national Korean American Pastors' Conference.

## Methods

### Recruitment of Churches

In 2003, HBI-DC worked closely with two Korean churches, in Virginia, to develop and pilot a faith-based hepatitis B program. Initially, the success of this program was shared through social support networks, via word-of-mouth. By 2004, a total of four Korean churches approached HBI-DC for technical assistance, in partnership with local community health programs.

The HBI-DC generated additional community support by publishing articles in local Asian ethnic media and by holding educational sessions for key AAPI community leaders. Two prominent luncheons were held to raise hepatitis B awareness among local Chinese community and Korean faith-based leaders. HBI-DC encouraged participants to self-identify their congregation's interest in implementing HBI-DC's prevention model. The criteria for

choosing partner churches were: (1) a commitment from the church leadership to support the campaign and (2) a designated clinical and administrative coordinator to manage the campaign. Following the luncheons, three churches qualified and began HBI-DC's training program in summer 2005.

#### Development of Culturally Integrated Educational Materials

Researchers have emphasized the importance of developing HBV testing and vaccination programs that are culturally and language relevant [16, 23–25]. Some elements in Asian culture may shed light on how to develop culturally integrated educational material to increase liver cancer awareness. Since 1997, the Hepatitis B Initiative, both in Boston and D.C., has worked closely with members of the Asian American community in various ways: (1) participatory learning programs, (2) focus groups, (3) educational seminars and, (4) volunteer surveys and questionnaires. Through these varied public health-based programs, HBI-DC has been able to elucidate some surprising cultural myths, such as: Chinese American focus group participants believe that they can contract hepatitis B from shared chopsticks or from infected restaurant workers (Focus group, February 2005). This validates other cultural myths found in the literature: Chinese immigrants do not consider vaccination to be a major means for hepatitis B prevention, and perceive that a healthy lifestyle will help to improve one's natural body defenses [25].

HBI-DC found out by working closely with the Korean American community that they firmly believed that existing booklets targeting Asian American communities did not pertain to them. In one particular instance, they thought the artwork “looked too Chinese” and, thus, “the brochure doesn't apply to Koreans” (Focus group 2003). In addition, the brochures in English are often separated from their in-language counterparts. Due to these complaints, HBI-DC facilitated participatory learning focus groups where the community created their own bi-lingual Korean/English HBV booklet. Unlike other booklets which are translated and then back-translated to English, separate focus groups were conducted in Korean and in English so that each part of the brochure was written in the language of the target population. It was these valuable insights provided by the community that created culturally relevant materials for the Asian American communities with which HBI-DC partnered. It is very important to integrate traditional beliefs of Asian Americans in order to develop a culturally tailored hepatitis B educational program which may be helpful to increase liver cancer awareness among high-risk immigrant populations [25, 26].

#### HBI-DC Training Process

Three HBI-DC training sessions were given by staff members to the volunteer coordinators of each church. The training sessions were held once a month and lasted approximately 3 h. Two volunteer coordinators—a *clinical* and an *administrative* coordinator—from each of the three churches attended these training sessions. The first training session focused on education and raising awareness of hepatitis B in an Asian American faith-based community. Volunteer coordinators were provided with a draft of HBI-DC's guidebook which includes educational materials designed through participatory learning development and reviewed by national experts, such as the HBI-DC's bilingual booklets (the first English–Korean booklet produced for hepatitis B), hepatitis B awareness slides, and DVDs (one for leaders and one for congregation members). The guidebook also provides step-by-step instructions on how to set-up education, screening, and vaccination programs, as well as forms like volunteer pre and post-test questionnaires, participant registration, waiver, supply lists, how to store vaccines, and instructions for volunteers.

The main goal of the first training session was to educate the coordinators about the importance of raising awareness of the dangers of hepatitis B in their communities. Volunteer questionnaires with identical questions were passed out before the session and after the session to evaluate basic knowledge about hepatitis B. The second training session focused on the nuts-and-bolts of coordinating a screening event at their churches. Partner organizations spoke about the potential problems volunteer coordinators may encounter when scheduling a screening event. Clinical coordinators were trained on which local lab companies would be able to provide phlebotomists and screening supplies. The third and final training session focused on the specifics of organizing a vaccination event and the challenges of following through with a 3-shot series of the hepatitis B vaccine. Another purpose of these training sessions was to evaluate the guidebook and gather feedback on how to improve it. The prototype guidebook was also shared nationally at the Pastor's Conference and an online version was made available for pastors to review and provide comments.

#### Recruitment of Screening and Vaccination Participants

Partner churches recruited participants using the educational tools provided in the HBI-DC guidebook. These educational tools included a DVD for leaders, DVD for congregations, bilingual booklets and testimonials from families affected by hepatitis B. Using HBI-DC's suggested timeline, churches scheduled screening and vaccinations events in the autumn through spring to minimize attrition.

A main strategy for recruitment was engaging community leaders to emphasize the importance of hepatitis B screenings and vaccinations during church or community meetings. Churches reported better attendance at screening and vaccination events when pastors incorporated hepatitis B into their sermons and announcements at various meetings. One church founded a Hepatitis B Ministry and integrated HBI-DC programs into volunteer fairs, small group meetings and newsletters. Since churches in the AAPI community are often divided into the English Ministry and the non-English Ministry, partner churches focused campaigns on the English Ministry first. English Ministries provided outreach to the non-English Ministries, and assisted them with their hepatitis B programs. To ensure participants completed the 3-shot vaccination series, churches relied heavily on the administrative coordinator to follow up with individuals after Sunday services and at home before an upcoming vaccination event.

In 2006, HBI-DC's faith-based hepatitis B model was shared with Asian American pastors from around the nation, convening for an annual conference in Washington, D.C. HBI-DC provided an educational seminar with materials the pastors could take back to their congregations and offered hepatitis B screenings during their free time, of which 67 pastors out of 100 opted to get screened.

#### Data Collection

HBI-DC provided partner communities an English and Korean participant registration form and an Access database tool to collect basic measures: dates of intervention, demographic data (including country of birth and primary language), and how participants heard about the program. During 2003 to 2006, a total of 1,775 persons were tested for HBV infection through HBI-DC. Unfortunately, not all nine of the churches were able to yield a complete data set. Thus, a total of 1,382 persons provided the completed demographic information.

#### Procedure

Blood samples were drawn for each individual's screening test to detect the presence of hepatitis B antibodies or

antigens. Hepatitis B surface antigen (HbsAg) marks infectivity of hepatitis B and a positive result represents HBV infection. For negative results, the screening exam needs to be combined with hepatitis B surface antibody (HbsAb) to determine if an individual needs to be vaccinated or not. A result of HbsAg negative and HbsAb positive indicates an immune response to HBV infection and no need for further vaccination. People who are unprotected and need to be vaccinated are those with a blood test result of negative in both HbsAg and HbsAb.

## Results

### Hepatitis B Screening

Table 1 shows the HBV screening program from all ten sites of the Baltimore–Washington metropolitan area during the 2003–2006 period. There were 1,775 participants screened for HBV. Of all the participants, 2% ( $n = 35$ ) were tested HBV positive (HbsAG+, HbsAb–), 37% ( $n = 651$ ) were HBV negative but protected (HbsAg–, HbsAb+), and 61% ( $n = 1089$ ) were unprotected (HbsAg–, HbsAb–), meaning that they have never been exposed to hepatitis B and would be protected for life from hepatitis B through vaccination.

### Hepatitis B Vaccination

Of nine community-based organizations (CBOs) and a pastor conference, three institutions were not included in this analysis due to no vaccination program or incomplete vaccination data. Table 2 shows three series of vaccinations among 984 unprotected participants. Most unprotected participants ( $n = 924$ ) received the first vaccination. The proportion of the second vaccination was 88.8% ( $n = 824$ ). About 79% completed the 3-shot vaccine series.

Among 1,382 participants (two CBOs did not provide information on demographic information), one fifth (21.4%) of those in the 40–49 years of age group participated in screening followed by age group 30–39 (17.9%) and age group 20–29 (16.6%); about half were males; about 82% were born in Korea and 8.5% were U.S. born (Table 3).

**Table 1** Results for HBV screening, Baltimore–Washington metropolitan area, 2003–2006

Place	No. of CBOs*	Chronic carriers	Require vaccination	Protected	Total screenings
Korean faith-based organizations	8	33	1,030	605	1,668
Chinese faith-based organizations	1	1	19	20	40
English Ministry Pastors' Conference	1	1	39	27	67
Total	10	35 (2.0%)	1,089 (61.3%)	651 (36.7%)	1,775

\* CBOs, Community based organizations

**Table 2** Results for HBV vaccination among unprotected participants (n = 986), 2003–2006

Place	Name of the FBOs	Unprotected	Vaccine 1	Vaccine 2	Vaccine 3
Korean faith-based organizations	A	680	680	598	507
	B	129	129	127	122
	C	24	23	21	20
	D	53	53	51	51
	E	23	21	18	13
Chinese faith-based organizations	F	19	18	18	16
Total	6	928	924 (99.6%)	824 (88.8%)	729 (78.6%)

Note: Three organizations were not included in this analysis due to no vaccination program or no available data

**Table 3** Sample characteristics (n = 1382)

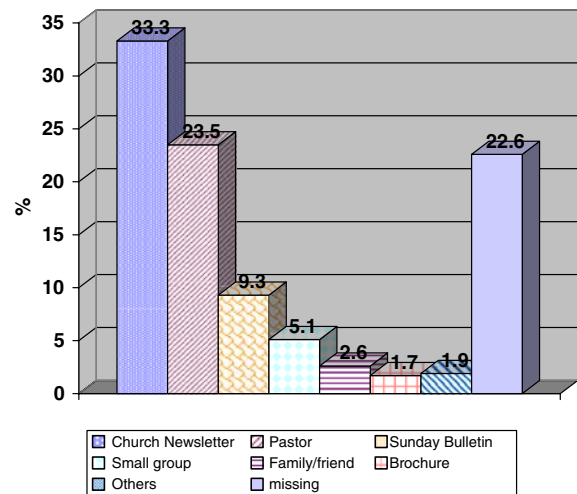
	n	%
<b>Age</b>		
<10 years	5	0.4
10–19	102	7.4
20–29	229	16.6
30–39	247	17.9
40–49	296	21.4
50–59	205	14.8
60–69	109	7.9
70+ years	42	3.0
Missing	147	10.6
<b>Gender</b>		
Male	649	47.0
Female	729	52.7
Missing	4	0.3
<b>Country of birth</b>		
Korea	1,129	81.7
USA	118	8.5
China/Taiwan/Hong Kong	29	2.1
Vietnam	14	1.0
Mongolia	21	1.5
Other	12	0.9
Missing	59	4.3

Note: Two organizations were not included in this analysis due to no available data

Figure 1 shows how the participants heard about the HBV screening and vaccination programs. About one third of participants (33.3%) heard about the upcoming HBV screening and vaccination program from their own church newsletter; one fourth (23.5%) learned from the pastors. Church bulletins were another important source of information (9.3%).

**Discussion**

This study is the largest community-based hepatitis B screening and vaccination program for Asian Americans in



**Fig. 1** How participants heard about the program. Note: Two organizations were not included in this analysis due to no available data (n = 1382)

the Baltimore–Washington metropolitan area. HBI has been providing HBV screening, education, and vaccination programs since 1997. In Boston, participants are recruited to health clinics for hepatitis B services. In the Baltimore–Washington metropolitan area, participants are recruited at the locations they routinely gather. HBI-DC’s ability to bring services to locations that community’s gather resulted in providing service to approximately the same amount of people in 3 years, compared to HBI-Boston’s method of recruiting communities to a clinic in 10 years. Therefore, HBI-DC proved that bringing health care services to locations where the community gathers is by far more successful.

Less than 10% of the study participants were under 19 years of age. HBI-DC did not want to duplicate existing school vaccination programs. A large amount of effort for hepatitis B immunization has already focused on Asian American children [27–31]. However, hepatitis B trends among adult Asian Americans, especially immigrants, are still understudied. Our study contributes to the literature by providing an overview of the hepatitis B unprotected rate among adult Asian Americans, largely Korean immigrants, in the Baltimore–Washington metro area.

Three-fifths (61.3%) of our participants tested HbsAg and HbsAb negative, which means that they have never been exposed to hepatitis B. HBI-DC was able to protect these participants who received the hepatitis B vaccine for life, thereby also protecting them from liver cancer. Most of these participants had no other means of receiving the hepatitis B vaccination except through our program. Members of the Hepatitis B Taskforce agree that our results are significant. This number is much higher than the New York data, which reports an HBV infection susceptibility rate of 32% [9]. The results demonstrate the importance of advocating for universal hepatitis B immunization as suggested by the National Viral Hepatitis Roundtable Strategic Plan, Eliminating hepatitis: a call to action [22]. In addition, the results support the Congressional Asian Pacific American Caucus recommendations for hepatitis B vaccinations for all high-risk populations, including AAPIs.

HBI-DC has provided significant data to support policymakers in advocating for universal hepatitis B immunization. Programs like HBI-DC's free hepatitis B screenings and vaccinations are hard to maintain without funding. And yet, in many communities HBI and programs like it are the only access point for these life-saving vaccines.

In the future, HBI-DC would like to determine why church attendees did not attend our programs. Perhaps, people who are certain that they had been immunized or already know that they are hepatitis B carriers did not attend the program. This probably also accounts for the comparably lower percentage of HBV chronic carriers. We do not know whether the 2% chronic carriers in our sample were aware of their hepatitis B status prior to the program.

Another main limitation of this study is that we were not able to collect data from three out of nine study organizations. This was due to partners being primarily interested in providing religious services and not data collection. Data reporting was volunteer rather than mandatory. Volunteers who handled registration did not always ensure that all fields were completed on the registration form. Sometimes a participant would use a different name each time he or she registered. Participants cited that lack of time and adequate computer-knowledgeable volunteers were also contributing barriers. There is also a lack of computer-knowledge among volunteers and lack of time for screening administrators to finish recording data while assessing the tests. HBI-DC intended to implement an online database to address a lot of these data collection issues.

In conclusion, these data suggest that we need continued efforts to develop and implement culturally tailored educational campaign to reduce the burden of chronic hepatitis B infection among high risk subgroups of Asian Americans. Furthermore, HBI-DC hopes to expand this model program to other ethnicities, all the while tailoring each program to that communities needs. For example,

Chinese schools might be the best community gathering location for Chinese communities. HBI-DC would tailor a program as such, so that health care services can always be brought to places where the community gathers.

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