Final Progress Report for Research Projects Funded by Health Research Grants

Instructions: Please complete all of the items as instructed. Do not delete instructions. Do not leave any items blank; responses must be provided for all items. If your response to an item is "None", please specify "None" as your response. "Not applicable" is not an acceptable response for any of the items. There is no limit to the length of your response to any question. Responses should be single-spaced, no smaller than 12-point type. The report **must be completed using MS Word**. Submitted reports must be Word documents; they should not be converted to pdf format. Questions? Contact Health Research Program staff at 717-783-2548.

1. **Grantee Institution: Hepatitis B Foundation**

2. **Reporting Period (start and end date of grant award period): 1/1/2011-12/31/2011**

3. **Grant Contact Person (First Name, M.I., Last Name, Degrees): Chari Cohen, MPH, DrPH(c)**

4. **Grant Contact Person's Telephone Number: 215-489-4930**

5. **Grant SAP Number: 4100054581**

6. **Project Number and Title of Research Project: Project 1, Determining Correlates of Hepatitis B Status Among High-Risk Asian and Pacific Islanders in Pennsylvania**

7. **Start and End Date of Research Project: 1/1/2011-12/31/2011**

8. **Name of Principal Investigator for the Research Project: Chari Cohen**

9. **Research Project Expenses**.

   9(A) Please provide the amount of health research grant funds spent on this project for the entire duration of the grant, including any interest earned that was spent:

   $ 859.78

   9(B) Provide the last names (include first initial if multiple individuals with the same last name are listed) of **all** persons who worked on this research project and were supported with health research funds. Include position titles (Principal Investigator, Graduate Assistant, Post-doctoral Fellow, etc.), percent of effort on project and total health research funds expended for the position. For multiple year projects, if percent of effort varied from year to year, report in the % of Effort column the effort by year 1, 2, 3, etc. of the project (x% Yr 1; z% Yr 2-3).

Last Name	Position Title	% of Effort on Project	Cost
Cohen	Project Director	5%	$689

9(C) Provide the names of **all** persons who worked on this research project, but who *were not* supported with health research funds. Include position titles (Research Assistant, Administrative Assistant, etc.) and percent of effort on project. For multiple year projects, if percent of effort varied from year to year, report in the % of Effort column the effort by year 1, 2, 3, etc. of the project (x% Yr 1; z% Yr 2-3).

Last Name	Position Title	% of Effort on Project
Evans	Research Methods Advisor	1%
Ariola	Research Assistant (Student Intern)	20%
Michael	Statistics Advisor	1%

9(D) Provide a list of **all** scientific equipment purchased as part of this research grant, a short description of the value (benefit) derived by the institution from this equipment, and the cost of the equipment.

Type of Scientific Equipment	Value Derived	Cost
None		

10. Co-funding of Research Project during Health Research Grant Award Period. Did this research project receive funding from any other source during the project period when it was supported by the health research grant?

Yes_____ No___x_____

If yes, please indicate the source and amount of other funds:

11. Leveraging of Additional Funds

11(A) As a result of the health research funds provided for this research project, were you able to apply for and/or obtain funding from other sources to continue or expand the research?

Yes____x_____ No_____

If yes, please list the applications submitted (column A), the funding agency (National Institutes of Health—NIH, or other source in column B), the month and year when the application was submitted (column C), and the amount of funds requested (column D). If you have received a notice that the grant will be funded, please indicate the amount of funds to be awarded (column E). If the grant was not funded, insert "not funded" in column E.

Do not include funding from your own institution or from CURE (tobacco settlement funds). Do not include grants submitted prior to the start date of the grant as shown in Question 2. If you list grants submitted within 1-6 months of the start date of this grant, add a statement below the table indicating how the data/results from this project were used to secure that grant.

A. Title of research project on grant application	B. Funding agency (check those that apply)	C. Month and Year Submitted	D. Amount of funds requested:	E. Amount of funds to be awarded:
Project Access: Eliminating Hepatitis B Disparities in Asians and Pacific Islanders in Philadelphia	☐NIH ☐ Other federal (specify:_____ _____) x Nonfederal source (specify: Barra Foundation)	August 2011	$125,000	$125,000
Project Access: Eliminating Hepatitis B Disparities in Asians and Pacific Islanders in Philadelphia	☐NIH ☐ Other federal (specify:_____ _____) x Nonfederal source (specify: _____)	February 2012	$20,000	$
	☐NIH ☐ Other federal (specify:_____ _____) ☐ Nonfederal source (specify: _____)		$	$

11(B) Are you planning to apply for additional funding in the future to continue or expand the research?

Yes___X_____ No_____

If yes, please describe your plans:

Additional funds will continue to be sought by private and possibly federal funding sources.

12. Future of Research Project. What are the future plans for this research project?

We plan to continue and expand this research to identify best practices for reducing the health disparities associated with chronic hepatitis B in the targeted groups. This will include additional prevalence studies and studies further assessing correlates of infection; research to clarify issues with self-report of vaccination history; and research to reduce barriers to screening and access to care.

13. New Investigator Training and Development. Did students participate in project supported internships or graduate or post-graduate training for at least one semester or one summer?

Yes___x_____ No_____

If yes, how many students? Please specify in the tables below:

	Undergraduate	Masters	Pre-doc	Post-doc
Male				
Female		1		
Unknown				
Total		**1**		

	Undergraduate	Masters	Pre-doc	Post-doc
Hispanic				
Non-Hispanic		1		
Unknown				
Total		**1**		

	Undergraduate	Masters	Pre-doc	Post-doc
White				
Black				
Asian		1		
Other				
Unknown				
Total		**1**		

14. **Recruitment of Out-of–State Researchers**. Did you bring researchers into Pennsylvania to carry out this research project?

Yes_____ No____x_____

If yes, please list the name and degree of each researcher and his/her previous affiliation:

15. **Impact on Research Capacity and Quality**. Did the health research project enhance the quality and/or capacity of research at your institution?

Yes____x_____ No_____

If yes, describe how improvements in infrastructure, the addition of new investigators, and other resources have led to more and better research.

The results from this research will enhance our future intervention and program planning. It also served as an important learning tool for project staff and the student involved in this study.

16. **Collaboration, business and community involvement.**

16(A) Did the health research funds lead to collaboration with research partners outside of your institution (e.g., entire university, entire hospital system)?

Yes____x_____ No_____

If yes, please describe the collaborations:

This study will help us to build partnerships with Asian and Pacific Islander community groups and researchers in Philadelphia.

16(B) Did the research project result in commercial development of any research products?

Yes_____ No___x_____

If yes, please describe commercial development activities that resulted from the research project:

16(C) Did the research lead to new involvement with the community?

Yes_____ No___x_____

If yes, please describe involvement with community groups that resulted from the research project:

17. Progress in Achieving Research Goals, Objectives and Aims.

List the project goals, objectives and specific aims (as contained in the grant application's strategic plan). Summarize the progress made in achieving these goals, objectives and aims for the period that the project was funded (i.e., from project start date through end date). Indicate whether or not each goal/objective/aim was achieved; if something was not achieved, note the reasons why. Describe the methods used. If changes were made to the research goals/objectives/aims, methods, design or timeline since the original grant application was submitted, please describe the changes. Provide detailed results of the project. Include evidence of the data that was generated and analyzed, and provide tables, graphs, and figures of the data. List published abstracts, poster presentations and scientific meeting presentations at the end of the summary of progress; peer-reviewed publications should be listed under item 20.

This response should be a DETAILED report of the methods and findings. It is not sufficient to state that the work was completed. Insufficient information may result in an unfavorable performance review, which may jeopardize future funding. If research findings are pending publication you must still include enough detail for the expert peer reviewers to evaluate the progress during the course of the project.

Health research grants funded under the Tobacco Settlement Act will be evaluated via a performance review by an expert panel of researchers and clinicians who will assess project work using this Final Progress Report, all project Annual Reports and the project's strategic plan. After the final performance review of each project is complete, approximately 12-16 months after the end of the grant, this Final Progress Report, as well as the Final Performance Review Report containing the comments of the expert review panel, and the grantee's written response to the Final Performance Review Report, will be posted on the CURE Web site.

There is no limit to the length of your response. Responses must be single-spaced below, no smaller than 12-point type. If you cut and paste text from a publication, be sure symbols print properly, e.g., the Greek symbol for alpha (α) and beta (ß) should not print as boxes (□) and include the appropriate citation(s). DO NOT DELETE THESE INSTRUCTIONS.

Research Project 1: Project Title and Purpose

Determining Correlates of Hepatitis B Status Among High-Risk Asian and Pacific Islanders in Pennsylvania - The purpose of this project is to determine the sociocultural and demographic determinants associated with hepatitis B virus (HBV) infection or protection status among high-risk Asian and Pacific Islander (API) communities in Southeastern Pennsylvania. API communities have disproportionately high rates of chronic HBV infection and low rates of HBV vaccination. Using de-identified data collected from 650 individuals, we will use biostatistical methods to assess the factors associated with either chronic HBV infection or vaccination status. There is a current gap of knowledge surrounding chronic HBV infection patterns in this geographic area. The results of this study are a necessary step in developing population-based

interventions to reduce the significant health disparities associated with HBV among APIs in this region.

Specific Aims

Hypothesis 1: HBV infection or protection status will be correlated with age, country of origin, year of entry into the U.S., and English proficiency.

Specific Aim 1: To determine the sociocultural and demographic factors associated with hepatitis B virus (HBV) infection or protection status among high-risk Asian and Pacific Islander (API) communities in Southeastern Pennsylvania (SEPA).
Objective 1A: Using community hepatitis B screening data collected from 650 API individuals living in SEPA, conduct logistic regression analysis with SAS statistical software, using HBV status as the outcome of interest.

Hypothesis 2: Limited health care access will be correlated with age, country of origin, year of entry into the U.S., annual income, understanding of the U.S. health care system, and English proficiency.

Specific Aim 2: To determine the sociocultural and demographic factors associated with limited health care access among infected and non-infected foreign-born (API) individuals living in SEPA.
Objective 2A: Using community hepatitis B screening data collected from 650 API individuals living in SEPA, conduct logistic regression analysis with SAS statistical software, using the number of physician visits and the acquisition of a "medical home" as the outcomes of interest.

Summary of Research Completed

Data Source and Data Preparation: The source of subjects for this study is provided by a pre-existing database compiled by the Hepatitis B Foundation. The database contains the completed survey information and blood sample test results from 12 screening events conducted targeting the high–risk API immigrant population. The database provided for the study originally consisted of 691 participants. After the exclusion of those under 18 years of age (n=2) and those missing blood samples (n=4), the final cross-sectional study sample used for data analysis included 685 individuals. As this study only targeted API individuals, the data was then subset to those identified as Asian or Pacific Islander, excluding an additional 46 individuals. The final data set used for analysis consisted a total of n=639 subjects.

Variable Definitions: The variables included in the database were measured in one of two ways. They were either self-reported on the HBV Screening Survey or quantified by laboratory from the blood sample provided during screening.

Dependent Variables from Blood Sample

- Hepatitis B infection is a dichotomous variable determined by the presence of hepatitis B surface antigen (HBsAg) in the blood sample
- Hepatitis B immunity is a dichotomous variabledetermined by the presence of hepatitis B surface antibody (HBsAb) in the blood sample

Demographic Variables from HBV Self-Report Screening Survey

- Age: continuous variable calculated from birthdate provided on survey

    - Age Group (categorical variable): 18-39 40-49 , 50-59, and 60 or Greater
- Gender (categorical value) : Male or Female
- Education(categorical variables): Less than High School, High School, or Greater than High School
- Country of Birth, Mother's Country of Birth, Dad's Country of Birth, (categorical value): Korean, China, India, Vietnam, or *Other (Other= Lao, Cambodia, Indonesia, Malaysia Hong Kong)
- Years in the US (categorical): > 28 years, 28-17 years, and < 17 years
- English as primary language, Insurance, Healthcare Provider (dichotomous variable): yes or no

Living Situation and Family History Variables

- Number of People Living With(categorical): < 4 people, 4 or more people
- Living with Individual Infected with HBV, Family Member with Hepatitis B, and Family Member with Cancer (dichotomous) : yes or no

Data Analysis: Descriptive statistics were run on the final dataset. Univariate analysis was performed on both the continuous and categorical variables. The central tendency and dispersion of the continuous variables were determined and transformed into categorical variables grouped by quartiles. The frequency distributions of all categorical variables were identified. The general prevalence of HBV infection and HBV immunity was calculated.

Bivariate analysis was performed to identify any possible associations between the dependent variables (HBV infection and HBV immunity) and the previously described independent socio-cultural and demographic variables. These crude associations were explored using either a chi-square test or Fisher exact test.

Multivariate analysis was performed to simultaneously examine the effects of the independent demographic, socio-cultural, and knowledge of HBV variables on the two dependent outcome variables. The predictive variables of interest were country of origin, years in the United States, and family history of HBV or liver cancer.

During model development, covariates were selected for inclusion based on results from previously performed chi-square or fisher exact tests. Inclusion criteria for covariates were $p < .25$. The models were built using a point estimate technique. First, the models were built only with the predictor of interest along with age and gender, which are known confounders. Then, each suspected covariate determined from previous analysis was added one by one. Changes in the point estimates were observed after the addition of each covariate. If the point estimate did not change by more than 15%, the covariate was excluded from the final models. For covariates missing a significant amount of responses (20%), a dummy variable was created in order for their inclusion into the model. After, all covariates were determined the final model was built including the predictors of interest and significant covariates.A Hosmer- Lemeshow goodness of fit test was performed for the final models. If the p-value for the Hosmer-Lemeshow statistic was greater than .05, then the null was not rejected, signifying the model was a good fit. All data analysis was performed on SAS Statistical Software Version 9.1.3.

Results: The population consisted of self-identified Asians or Pacific Islanders (n=639), both immigrants and US-born, aged 18-85 years (Mean=51.5, SD=14.9) (Table 1). Over half of the participants were female (n=386 60.5%) while men (n=253) comprised 39.5% of the population. Most of the APIs were foreign-born immigrants from Korea (n=167, 27.2%), China (n=139,

22.6%), India (n=109, 17.8%), and Vietnam (n=71, 11.6%). The remaining 128 participants (20.9%) were born in the United States, Lao, Cambodia, Malaysia, Hong Kong, and Indonesia. Of the immigrants, 54.9% (n=337) had been in the U.S. for less than 17 years. English was not the primary language for 90.9% of participants (n=572). The screened population had an overall HBV infection prevalence of 5.8 % (n=40), and an HBV immunity prevalence of 52.6% (n=360).

HBV Infection: The prevalence of HBV varied across all demographic variables, except gender (Table 2). HBV prevalence was highest in the youngest age group of 18-39 years (n=18, 46.2%) and lowest in those aged 60 years or greater (n=5, 12.8%). Chinese immigrants had the highest HBV infection prevalence (n=25,65.8%), while immigrants from India had the lowest (n=109, 0%). The majority (71%) of those infected with HBV had been in the U.S. for less than 17 years.

HBV infection is summarized by living situation, family history, and HBV knowledge in Table 3. Within the study population, infection was more likely in households with 4 or more people (n=22, 56.4%). Most of those testing positive for HBV infection were not knowingly living with anyone with HBV nor were aware of any family member with HBV. Additionally, those with HBV infection were more likely to have been previously tested.

HBV Immunity: HBV immunity was highest in females (n=205, 59.8%), and in the ≥60 age group (n=136, 39.5%), but lowest in the 40-49 age group (n=62, 18%) (Table 4). HBV immunity was highest among Korean immigrants (n=135, 41.4%), among immigrants who had been in the U.S. for ≤17 years (n=150, 46%), and among those for whom English was not their primary language (n=312, 93.4%). No differences were found in HBV immunity by education or gender.

HBV immunity is summarized by living situation, family history, and knowledge of HBV in Table 5. Individuals living in smaller households of less than 4 were more likely to have HBV immunity (n=190, 55.2%). Similar to HBV infection, those with the highest rates of immunity were not living with anyone with HBV and were not aware of family members with HBV or liver cancer.

HBV Vaccination: HBV vaccination is summarized by demographic characteristics, living situation, and family history in Table 6. The 60 years or older age group (n=40, 37.7%) were most likely to be vaccinated and those aged 40-49 (16.0%) were least likely to be vaccinated. Almost half of those vaccinated were Korean immigrants (n=47, 45.2%). 99% of those vaccinated spoke English as their secondary language 61% had insurance, 63.5% had a regular health care provider.

Additionally, those reporting vaccination were also tested for HBV immunity by demographic variables. This information is summarized in Table 7. Only 62.7% of males vaccinated and 64.3% of women vaccinated show HBV immunity. The discrepancy between HBV vaccination and HBV immunity is greater when looking at the various countries of origin. Those vaccinated from Korea were 85.5% HBV immune while only 7% of those from India that reported vaccination were positive for anti-HBs. Overall, across demographics of the vaccinated population, susceptibility to HBV infection ranged from 22%-83%.

Multivariate Logistic Regression: Table 8 summarized the predictor for HBV infection. Those originally from China were 5.5 times more likely to be infected. Vietnam was the second most predictive of HBV infection, where those from Vietnam were 2.2 times more likely to be

infected. Those in the US < 27 years were 1.2 times at risk for infection. An individual living with someone with HBV was at 2 times at risk for HBV infection.

Table 9 summarizes the predictors of HBV immunity. Those from Korea were 3.3 times more likely to have HBV immunity. Those from India were least likely with an odds ratio of 0.6.

Table 10 summarizes the predictors of HBV vaccination. Those from Korea were 3.2 times more to have been vaccinated for HBV while those from India were the least. Those in the 28-17 year in US group were 2.2 times more likely to be vaccinated.

Table 1 : Study Population Characteristics

Characteristics	n (%)
HBV Infection	**40 (5.8)**
HBV Immunity	**360 (52.6)**
HBV Vaccination	**110 (16.0)**
Gender	
Male	252 (39.5)
Female	386 (60.5)
Age (Mean, SD)	**51.5,14.9**
18-39	144 (22.5)
40-49	125 (19.6)
50-59	158 (24.7)
60 +	212 (33.2)
Years in US (Mean, SD)	**(17.2,10.9)**
< 17 yrs	337 (54.9)
17-28 yrs	146 (23.8)
> 28 yrs	131 (21.3)
English Primary Language	
Yes	57 (9.1)
No	572 (90.9)
Country of Birth	
Korea	167 (27.2)
China	139 (22.6)
India	109 (11.6)
Vietnam	71 (6.51)
Other	128 (32.1)
Mother's Country of Birth	
Korea	178 (28.2)
China	186 (29.5)
India	110 (17.4)
Vietnam	58 (9.2)
Other	99 (15.7)
Father's Country of Birth	
Korea	178 (28.2)
China	195 (30.9)
India	110 (17.4)
Vietnam	54 (8.6)
Other	94 (14.9)
Education Level	
< High School	168 (30.3)
High School	165 (29.7)
>High School	222 (40)
Insurance	
Yes	317 (50.2)
No	314 (49.8)
Regular Doctor	
Yes	317 (50.2)
No	314 (49.8)

Table 2 : Demographics by HBV Infection (+/-)

Characteristics	HBV Infection n (%)	No HBV Infection n (%)	p-value
Gender			0.0585
Male	21 (53.9)	231 (38.6)	
Female	18 (46.1)	368 (61.4)	
Total (%)	39 (100)	599 (100)	
Age (Mean, SD)			0.0012
18-39	18 (46.2)	126 (21.0)	
40-49	6 (15.4)	119 (19.8)	
50-59	10 (25.6)	148 (24.7)	
60 +	5 (12.8)	207 (34.5)	
Total (%)	39 (100)	600 (100)	
Years in US (Mean, SD)			0.0016
≤ 17 yrs	27 (71.0)	310 (53.8)	
18-28 yrs	8 (21.1)	138 (24.0)	
> 28 yrs	3 (7.9)	128 (22.2)	
Total (%)	38 (100)	576 (100)	
English Primary Language			0.0218
Yes	0 (0)	57 (9.7)	
No	39 (100)	533 (90.3)	
Total (%)	39 (100)	590 (100)	
Country of Birth			<.0001
Korea	2 (5.3)	165 (28.7)	
China	25 (65.8)	114 (19.8)	
India	0 (0)	109 (18.9)	
Vietnam	4 (10.5)	67 (11.6)	
Other	7 (18.4)	121(21.0)	
Total (%)	38 (100)	576 (100)	
Mother's Country of Birth			<.0001
Korea	2 (5.3)	176 (29.7)	
China	26 (68.4)	160 (26.9)	
India	0 (0)	110 (18.6)	
Vietnam	4 (10.5)	54 (9.1)	
Other	6 (15.8)	93 (15.7)	
Total (%)	38 (100)	593 (100)	
Father's Country of Birth			<.0001
Korea	2(5.3)	176 (29.7)	
China	29 (76.3)	166 (27.9)	
India	0 (0)	110 (18.6)	
Vietnam	2 (5.3)	52 (8.8)	
Other	5 (13.1)	89 (15.0)	
Total (%)	38 (100)	593 (100)	
Education Level			0.0002
< High School	21 (58.3)	147 (28.3)	
High School	10 (27.8)	155 (29.9)	
>High School	5 (13.9)	217 (41.8)	
Total (%)	36 (100)	519 (100)	
Insurance			0.0003
Yes	8 (21.6)	309 (52.0)	
No	29 (78.4)	285 (48.0)	
Total (%)	37 (100)	594 (100)	
Regular Doctor			0.0023
Yes	10 (26.3)	307 (51.8)	
No	28 (73.7)	286 (49.2)	
Total (%)	38 (100)	593 (100)	

Table 3 : Living Situation, Family History, and HBV Knowledge by Infection

Characteristics	HBV Infection n (%)	No HBV Infection n (%)	p-value
How Many People Do You Live With?*			0.1606
< 4	15 (38.5)	311 (51.8)	
≥ 4	22 (56.4)	245 (91.7)	
No Response	2 (5.1)	44 (7.3)	
Total (%)	39 (100)	600 (100)	
Living With Anyone with HBV?			0.0074
Yes	7 (17.9)	33 (5.5)	
No	29 (74.4)	500 (83.3)	
No Response	3 (7.7)	67 (11.2)	
Total (%)	39 (100)	600 (100)	
Family Members With HBV?			0.011
Yes	7 (18.0)	53 (8.8)	
No	19 (48.7)	427 (71.2)	
No Response	13 (33.3)	120 (20.0)	
Total (%)	39 (100)	600 (100)	
Family Members with Liver Cancer?			0.7019
Yes	2 (5.1)	19 (3.2)	
No	13 (33.3)	204 (34.0)	
No Response	24 (61.5)	377 (62.8)	
Total (%)	39 (100)	600 (100)	
Reason for Screening			0.5827
Saw an Ad	5 (12.8)	82 (13.7)	
Recruited at Location	5 (12.8)	102 (17.0)	
Received Letter	3 (7.7)	27 (4.5)	
Other	1 (2.6)	48 (8.0)	
No Response	25 (64.1)	341 (56.8)	
Total (%)	39 (100)	600 (100)	
Previously Tested for HBV?			< .0001
Yes	20 (51.3)	114 (19.0)	
No	14 (35.9)	372 (62.0)	
No Response	5 (12.8)	114 (19.0)	
Total (%)	39 (100)	600 (100)	
If Yes, Results?			< .0001
Yes	10 (25.6)	14 2.3)	
No	1 (2.6)	40 (6.7)	
No Response	28 (71.8)	546 (91.0)	
Total (%)	39 (100)	600 (100)	
Prior HBV Treatment?			0.0052
Yes	3 (7.7)	5 (0.8)	
No	27 (69.2)	378 (63.0)	
No Response	9 (23.1)	217 (36.2)	
Total (%)	39 (100)	600 (100)	

Table 4 : Demographics by Immunity (+/-)

Characteristics	HBV Immunity n (%)	No HBV Immunity n (%)	p-value
Gender			0.6822
Male	138 (40.2)	114 (38.6)	
Female	205 (59.8)	181 (61.4)	
Total (%)	343 (100)	295 (100)	
Age (Mean, SD)			0.003
18-39	72 (20.9)	72 (24.4)	
40-49	62 (18.0)	63 (21.4)	
50-59	74 (21.5)	84 (28.5)	
60 +	136 (39.5)	76 (25.8)	
Total (%)	344 (100)	295 (100)	
Years in US (Mean, SD)			< .0001
≤ 17 yrs	150 (46.0)	187 (64.9)	
18-28 yrs	89 (27.3)	57 (19.8)	
> 28 yrs	87 (26.7)	44 (15.3)	
Total (%)	326 (100)	288 (100)	
English Primary Language			0.0214
Yes	22 (6.6)	35 (11.9)	
No	312 (93.4)	260 (88.1)	
Total (%)	334 (100)	295 (100)	
Country of Birth			< .0001
Korea	135 (41.4)	32 (11.1)	
China	79 (24.2)	60 (20.8)	
India	4 (1.2)	105 (36.5)	
Vietnam	48 (14.7)	23 (8.0)	
Other	60 (18.4)	68 (23.6)	
Total (%)	326 (100)	288 (100)	
Mother's Country of Birth			< .0001
Korea	145 (42.8)	33 (11.3)	
China	111 (32.7)	75 (25.7)	
India	4 (1.2)	106 (36.3)	
Vietnam	37 (10.9)	21 (7.2)	
Other	42 (12.4)	57 (19.5)	
Total (%)	339 (100)	292 (100)	
Father's Country of Birth			< .0001
Korea	145 (42.8)	33 (11.3)	
China	110 (32.5)	85 (29.1)	
India	4 (1.2)	106 (36.3)	
Vietnam	37 (10.9)	17 (5.8)	
Other	43 (12.7)	51 (17.5)	
Total (%)	339 (100)	292 (100)	
Education Level			0.9182
< High School	80 (30.4)	88 (30.1)	
High School	80 (30.4)	85 (29.1)	
> High School	103 (39.2)	119 (40.8)	
Total (%)	263 (100)	292 (100)	
Insurance			0.0004
Yes	192 (56.8)	125 (42.7)	
No	146 (43.2)	168 (57.3)	
Total (%)	338 (100)	293 (100)	
Regular Doctor			0.0153
Yes	185 (54.7)	132 (45.1)	
No	153 (45.3)	161 (54.9)	
Total (%)	338 (100)	293 (100)	

Table 5 : Living Situation, Family History, and HBV Knowledge by Immunity

Characteristics	HBV Immunity n (%)	No HBV Immunity n (%)	p-value
How Many People Do You Live With?*			<.0001
< 4	190 (55.2)	136 (46.1)	
≥ 4	117 (34.0)	150 (50.9)	
No Response	37 (10.8)	9 (3.0)	
Total (%)	344 (100)	295 (100)	
Living With Anyone with HBV?			0.0003
Yes	26 (7.6)	14 (35.0)	
No	266 (77.3)	263 (49.7)	
No Response	52 (15.1)	18 (25.7)	
Total (%)	344 (100)	295 (100)	
Family Members With HBV?			0.0578
Yes	41 (11.9)	19 (6.4)	
No	235 (68.3)	211 (71.5)	
No Response	68 (19.8)	65 (22.0)	
Total (%)	344 (100)	295 (100)	
Family Members with Liver Cancer?			< .0001
Yes	13 (3.8)	8 (2.7)	
No	74 (21.5)	143 (48.5)	
No Response	257 (74.7)	144 (48.8)	
Total (%)	344 (100)	295 (100)	
Reason for Screening			0.6137
Saw an Ad	39 (14.2)	38 (12.9)	
Recruited at Location	64 (18.6)	43 (14.6)	
Received Letter	15 (4.4)	15 (5.0)	
Other	27 (7.9)	22 (7.5)	
No Response	189 (54.9)	177 (60.0)	
Total (%)	344 (100)	295 (100)	
Previously Tested for HBV?			0.0008
Yes	89 (25.9)	45 (15.3)	
No	186 (54.1)	200 (67.8)	
No Response	69 (20.0)	50 (16.9)	
Total (%)	344 (100)	295 (100)	
If Yes, Results?			0.0151
Yes	13 (3.8)	11 (3.7)	
No	31 (9.0)	10 (3.4)	
No Response	300 (87.2)	274 (92.9)	
Total (%)	344 (100)	295 (100)	
Prior HBV Treatment?			0.5261
Yes	3 (0.9)	5 (1.7)	
No	215 (62.5)	190 (64.4)	
No Response	126 (36.6)	100 (33.9)	
Total (%)	344 (100)	295 (100)	

Table 6 : Vaccination Status by Demographics, Living Situation, HBV Knowledge

Characteristics	Vaccination n (%)	No Vaccination n (%)	p-value
How Many People Do You Live With?*			0.9483
< 4	55 (57.3)	207 (57.7)	
≥ 4	41 (42.7)	152 (42.3)	
Total (%)	96 (100)	359 (100)	
Living With Anyone with HBV?			0.0779
Yes	9 (9.9)	17 (5.0)	
No	82 (90.1)	326 (95.0)	
Total (%)	91 (100)	343 (100)	
Family Members With HBV?			0.0017
Yes	17 (18.1)	25 (7.3)	
No	77 (81.9)	317 (92.7)	
Total (%)	94 (100)	342 (100)	
Family Members with Liver Cancer?			0.0167
Yes	7(18.4)	10 (6.3)	
No	31 (81.6)	149 (93.7)	
Total (%)	38 (100)	159 (100)	
Reason for Screening			0.4784
Saw an Ad	13 (22.4)	57 (31.8)	
Recruited at Location	24 (41.4)	69 (38.6)	
Received Letter	7 (12.1)	22 (12.3)	
Other	14 (24.1)	31 (17.3)	
Total (%)	58 (100)	179 (100)	
Previously Tested for HBV?			< .0001
Yes	51 (52.0)	59 (16.7)	
No	47 (48)	294 (83.3)	
Total (%)	98 (100)	353 (100)	
If Yes, Results?			0.1882
Yes	8 (28.6)	14 (45.2)	
No	20 (71.4)	17 (54.8)	
Total (%)	28 (100)	31 (100)	
Prior HBV Treatment?			0.3331
Yes	2 (2.5)	3 (1.2)	
No	78 (97.5)	259 (98.8)	
Total (%)	80 (100)	262 (100)	

Table 7 : Characteristics of Vaccinated Population by HBV Immunity Status

Characteristics	Total (%)	Vaccination+Immunity n (%)	Vaccination-Immunity n (%)	p-value
Gender				0.7993
Male	110 (100)	69 (62.7)	41 (37.3)	
Female	140 (100)	90 (64.3)	50 (35.7)	
Age (Mean 49, SD 15)				0.3149
18-39	69 (100)	42 (60.9)	27 (39.1)	
40-49	61 (100)	36 (59.0)	25 (41.0)	
50-59	51 (100)	31 (60.8)	20 (39.2)	
60 +	70 (100)	51 (72.9)	19 (27.1)	
Years in US (Mean, SD)				0.0116
< 17 yrs	132 (100)	73 (55.3)	59 (44.7)	
17-28 yrs	65 (100)	46 (70.8)	19 (29.2)	
> 28 yrs	44 (100)	34 (77.3)	10 (22.7)	
English Primary Language				0.0018
Yes	20 (100)	6 (30.0)	14 (70.0)	
No	222 (100)	145 (65.3)	77 (34.7)	
Country of Birth				< .0001
Korea	81 (100)	69 (85.2)	12 (14.8)	
China	74 (100)	48 (64.9)	26 (35.1)	
India	29 (100)	2 (7.0)	27 (93.0)	
Vietnam	24 (100)	15 (62.5)	9 (37.5)	
Other	35 (100)	20 (57.1)	15 (42.9)	
Mother's Country of Birth				< .0001
Korea	83 (100)	71 (85.5)	12 (14.5)	
China	89 (100)	57 (64.0)	32 (36.0)	
India	29 (100)	2 (7.0)	27 (93.0)	
Vietnam	19 (100)	11 (57.9)	8 (42.1)	
Other	26 (100)	15 (57.7)	11 (42.3)	
Father's Country of Birth				< .0001
Korea	83 (100)	71 (85.5)	12 (14.5)	
China	92 (100)	56 (60.9)	36 (39.1)	
India	29 (100)	2 (6.9)	27 (93.1)	
Vietnam	16 (100)	11 (68.8)	5 (31.2)	
Other	26 (100)	16 (61.5)	10 (38.5)	
Education Level				0.7508
< High School	62 (100)	33 (53.2)	29 (46.8)	
High School	56 (100)	31 (55.4)	25 (44.6)	
> High School	86 (100)	51 (59.3)	35 (40.7)	
Insurance				0.0251
Yes	121 (100)	85 (70.3)	36 (29.7)	
No	124 (100)	70 (56.5)	54 (43.5)	
Regular Doctor				0.0975
Yes	121 (100)	85 (68.6)	39 (31.4)	
No	124 (100)	70 (56.5)	54 (43.5)	
Live With?*				0.0261
< 4	119 (100)	82 (68.9)	37 (31.1)	
≥ 4	115 (100)	63 (54.8)	52 (45.2)	
HBV?				0.4535
Yes	23 (100)	16 (69.6)	7 (30.4)	
No	203 (100)	125 (61.6)	78 (38.4)	
Family Members With HBV?				0.6828
Yes	35 (100)	24 (68.6)	11 (31.4)	
No	129 (100)	93 (72.1)	36 (27.9)	
Cancer?				0.3282
Yes	11 (100)	8 (72.7)	3 (27.3)	
No	68 (100)	35 (51.5)	33 (48.5)	
Reason for Screening				0.1719
Saw an Ad	30 (100)	21 (70.0)	9 (30.0)	
Recruited at Location	38 (100)	25 (65.8)	13 (34.2)	
Received Letter	8 (100)	5 (62.5)	3 (37.5)	
Other	18 (100)	7 (38.9)	11 (61.1)	
Previously Tested for HBV?				0.0440
Yes	75 (100)	54 (72.0)	21 (28.0)	
No	92 (100)	54 (58.7)	38 (41.3)	
If Yes, Results?				0.3951
Yes	10 (100)	6 (60.0)	4 (40.0)	
No	24 (100)	19 (79.2)	5 (20.8)	
Prior HBV Treatment?				0.3271
Yes	5 (100)	2 (40.0)	3 (60.0)	
No	146 (100)	101 (69.2)	45 (30.8)	

Table 8 : Multivariate Model - HBV Infection Predictors, Adjusted for Age & Gender

Characteristic (n=638)	Odds Ratio	95% CI	Hosmer and Lemeshow Goodness of Fit Test p-value
Country of Birth			0.1104
India	NA	NA	
Korea	0.3	0.1, 1.6	
China	5.1	2.0, 13.1	
Vietnam	2.2	0.6, 8.6	
Other*	1		
Years in US			
≥ 17 yrs	1		
< 17 yrs	1.2	0.5, 2.8	
Living With Anyone with HBV?			
No	1		
Yes	2	0.5, 8.2	
Missing	1.9	0.5, 7.6	
Family Members With HBV?			
No	1		
Yes	0.7	0.2, 3.1	
Missing	2.2	0.9, 5.4	
Family Members with Liver Cancer?			
No	1		
Yes	1.2	0.2, 8.5	
Missing	0.5	0.2, 1.2	

Table 9 : Multivariate Model: HBV Immunity Predictors, Adjusted for Age & Gender

Characteristic(n=638)	Odds Ratio	95% CI	Hosmer and Lemeshow Goodness of Fit Test p-value
Country of Birth			0.3015
India	0.04	0.01, 0.1	
Korea	3.3	1.9, 5.8	
China	1.3	0.8, 2.1	
Vietnam	1.8	1.0, 3.4	
Other*	1		
Years in US			
> 28 yrs	1		
28 - 17 yrs	1	0.6, 1.8	
< 17 yrs	0.8	0.5, 1.3	
Living With Anyone with HBV?			
No	1		
Yes	0.9	0.4, 2.2	
Missing	1.1	0.6, 2.1	
Family Members With HBV?			
No	1		
Yes	1.3	0.6, 2.8	
Missing	0.8	0.5, 1.2	
Family Members with Liver Cancer?			
No	1		
Yes	1.4	0.4, 4.9	
Missing	1.4	0.9, 2.2	

Table 10 : Multivariate Model - HBV Vaccination Predictors, Adjusted

Characteristic (n=493)	Odds Ratio	95% CI	Hosmer and Lemeshow Goodness of Fit Test p-value
Country of Birth			0.687
India	0.7	0.3, 1.8	
Korea	3.2	1.6, 6.4	
China	0.8	0.4, 1.8	
Vietnam	1.7	0.8, 4.0	
Other^	1		
Years in US (Mean, SD)			
> 28 yrs	1		
28 - 17 yrs	2.2	1.1, 4.6	
< 17 yrs	1.9	1.0, 3.7	
Age (Mean 49, SD 15)			
18-39	1		
40-49	0.8	0.4, 1.6	
50-59	0.5	0.3, 1.1	
60 +	0.7	0.4, 1.4	

Discussion: Overall, the prevalence of HBV infection within the study population was 5.8%. Country of origin had a significant association with HBV infection. HBV prevalence varied by country of origin and those from China accounted for 65.8% of the total HBV antigen positivity. Looking at those emigrating from China alone (n=139), 25 were positive for HBV resulting in a prevalence of 17.9%. This rate of HBV infection is greater than previously found in a cross-sectional study conducted in New York within the Chinese population (Ma et al, 2008). Relatively high rates of HBV infection were also found in those from Vietnam. This is consistent with previous literature suggesting Vietnamese immigrants have high rates of HBV infection. Although, the prevalence of infection was less than the 9.3% HBV infection prevalence found in a study conducted within the Vietnamese population in West Virginia (Kallman, et al 2011). As the logistic regression model from this study suggests, country of origin can predict higher rates of infection compared to other groups within the population. Since those from India had 0 prevalence of HBV infection, this country of origin was excluded from the model.

With regards to years in the U.S., higher rates of infection were found among those in the U.S. for shorter periods of time. Also, being in the US for less than 17 years was found to be predictive of HBV infection compared to those in the US for longer periods of time. The higher rates of infection can possibly be attributed to recent emigration from endemic areas, where access to HBV prevention is limited.

The predictive nature of living with someone with HBV and family history on HBV infection is difficult to establish due to the significant amount of missing responses for those risk factors. Lack of awareness within the API population regarding HBV infection contributes to the limited responses for these possible risk factors. Additionally, social stigma attached to HBV infection can result in lack of desirability in disclosing such information. For those that did provide a response, living with someone with HBV was predictive of infection. This is consistent with the infectious nature of HBV, which is easily transmitted through close household contact, such as sharing razors or toothbrushes.

Examining HBV immunity in the population, 52.6% were immune to HBV, but from this study it is impossible to determine if the presence of anti-HBs is due to natural infection or vaccination. The rate of immunity was highest in those from Korea while those from China, in addition to having the highest rates of infection also had the second highest rate of immunity. Overall, the rate of HBV immunity in the screened population is similar to the HBV immunity found in a study conducted in San Francisco, where approximately half of the screened API population was serologically tested positive for HBV immunity (Bailey et al, 2010).

Predictors of HBV immunity were found in this study. Similar to HBV infection, country of origin was found to be predictive of HBV immunity, but to a lesser degree. The odds ratios found for immunity were fairly close between the different countries, with the only exception found in those from Korea. The high rate of immunity found within those from Korea corresponds to the high rates of vaccination found in this subpopulation.

Also, HBV immunity was predicted to be less likely for those in the US for less than 17 years. This is consistent with the previous speculation regarding the high rates of infection in those in the U.S. for shorter periods of time, where the lack of access to HBV prevention such as vaccination is limited in countries of emigration. Additionally, knowledge of a family member with HBV did predict immunity. Knowledge of infection can serve as a cue to action for individuals to seek out HBV vaccination.

The self-reported vaccination rate of 16.8% in this population did compare to those previously stated in literature. The study conducted within the API population of San Francisco reported 18% vaccination (Bailey et al, 2010). Another study in California found only 12% were vaccinated (Lin et al, 2007). Looking at the different countries of origin separately, those from Vietnam reported a higher rate of vaccination compared to other studies (Ma et al, 2007). Conversely, those from China showed a lower rate of vaccination compared to similar studies conducted with this ethnic group (Ma et al, 2008). Additionally, those reporting vaccination were mostly women similar other studies (Bailey, 2011). Increased rates of vaccination in women are possibly due to prenatal screening for HBV within this group.

Unfortunately, a significant limitation of this study is that vaccination was self-reported within the screened population. It is possible vaccination can be misrepresented. In order to confirm immunity and assess vaccination status, those that reported vaccination were examined for HBV immunity by demographics. Across most demographics, reported vaccination was not reflective of the presence of anti-HBs. By age, years in the US, and country of birth, 30% of those who reported that they had been vaccinated were still susceptibility to HBV infection.

While HBV vaccination should result in HBV immunity, this finding is not uncommon among the API population. Previous studies have also found HBV infection in those that reported receiving HBV vaccination (Bailey et al, 2010). Out of all the 251 reporting HBV vaccination, 91 people or 36.3% did not have HBV immunity. The discrepancy between HBV vaccination and HBV immunity is greater in this study population compared to 20.3% found in California (Lin et al, 2007). One possible reason for this discrepancy is that individuals often misunderstand the medical services they receive. It is possible that in the study population, this misunderstanding of HBV vaccination led to rates of vaccination that were inaccurately over-reported. These results indicate that more education directed at the API population regarding HBV vaccination is likely necessary. Since the over-reporting of vaccination is a consistent finding in API screening studies, the true vaccination rate of APIs is thought to be quite lower than recognized. Since this study suggests HBV vaccination is inaccurately reported in this study, the logistic regression model for HBV vaccination might not also be useful in identifying predictor of HBV vaccination. Therefore, the high-risk API population must be targeted as a whole for vaccination and not limited to specific subgroups since predictors are difficult to identify.

Study Limitations/Strengths

One limitation of the study is the cross-sectional design itself as with this design, it is not possible to determine causality. In addition to the cross-sectional design, utilizing the data from screening events also has its own limitations. Using data from screening events is susceptible to selection bias. As reflected in the study, the majority of participants were from younger age groups and had been in the US for less than 17 years. Their motivations for attending a screening event might be different from the general population, limiting the external validity of this study. Also, those participating in screening events generally differ in that they desire to know their status and are more likely aware of their risks for infection. Alternatively, those who are older do not attend screening events are already aware of their HBV status and choose not to seek further testing. In this study, HBV infection decreased with age, which is contrary to the understanding of chronic disease. The self-selection of screening participation can produce inaccurate measures of HBV infection, HBV immunity, and HBV vaccination prevalence for the general API population.

While this study does have limitations, it also has strengths. A major strength of this study is that it examined HBV infection, HBV immunity, and HBV vaccination by a wide variety of factors, both demographic and socio-cultural. Also, rather than limiting the study to a subgroup within the API population, APIs were analyzed as a whole. By looking at the API population as a whole, an overall prevalence of HBV infection, HBV immunity, and HBV vaccination were obtained, and was then broken down into subgroups of interest.

Conclusion: HBV is a significant threat to API communities within Philadelphia. This study was able to find associations between HBV infection, HBV immunity, and HBV vaccination by demographic and socio-cultural variables. HBV infection varies by country of origin and is more common in those more recently immigrating into the US. Country of origin did predict HBV immunity, yet some countries of origin had very similar immunity outcomes. Not surprisingly, while HBV infection is associated with less years in the U.S., so is HBV immunity. This study provides a starting point for future HBV interventions. It gives an idea of subgroups with higher pockets of HBV infection and suggests those in greater need of intervention. HBV interventions need to target not only the younger API age groups, but also those within the older age groups, yet we have learned that screening events are not the most effective and efficient way to target the older high-risk population, so future studies need to address this issue. In addition, it is clear that a greater emphasis on health education and HBV awareness is necessary in high-risk API communities. Since the API population is one of the fastest growing populations in the US, effective ways to address the public health threat of chronic HBV within this population is necessary.

Literature Cited

Bailey, M., Shiau, R., Zola, J., Fernyak, S., Fang, T., So, D. & Chang, E. (2010). "San Francisco Hep B Free: A Grassroots Community Coalition to Prevent Hepatitis B and Liver Cancer". *Journal of Community Health*.

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Ma, G., Shive,S., Fang,C. , et al (2007). "Knowledge, Attitudes, and Behaviors of Hepatitis B Screening and Vaccination and Liver Cancer Risks Among Vietnamese American". Journal of Health Care for the Poor and Underserved. 18,62-72

Ma. G., Fang, C., Shive, S., Toubbeh, J. Tan, Y., &Siu, S. (2007). "Risk Perception and Barriers to Hepatitis B Screening and Vaccination among Vietnamese Immigrant".Journal of Immigrant Minority Health".9, 213-220.

18. Extent of Clinical Activities Initiated and Completed. Items 18(A) and 18(B) should be completed for all research projects. If the project was restricted to secondary analysis of clinical data or data analysis of clinical research, then responses to 18(A) and 18(B) should be "No."

18(A) Did you initiate a study that involved the testing of treatment, prevention or diagnostic procedures on human subjects?

_____Yes
___x___No

18(B) Did you complete a study that involved the testing of treatment, prevention or diagnostic procedures on human subjects?

_____Yes
___x___No

If "Yes" to either 18(A) or 18(B), items 18(C) – (F) must also be completed. (Do NOT complete 18(C-F) if 18(A) and 18(B) are both "No.")

18(C) How many hospital and health care professionals were involved in the research project?

_____Number of hospital and health care professionals involved in the research project

18(D) How many subjects were included in the study compared to targeted goals?

_____Number of subjects originally targeted to be included in the study
_____Number of subjects enrolled in the study

Note: Studies that fall dramatically short on recruitment are encouraged to provide the details of their recruitment efforts in Item 17, Progress in Achieving Research Goals, Objectives and Aims. For example, the number of eligible subjects approached, the number that refused to participate and the reasons for refusal. Without this information it is difficult to discern whether eligibility criteria were too restrictive or the study simply did not appeal to subjects.

18(E) How many subjects were enrolled in the study by gender, ethnicity and race?

Gender:
_____Males
_____Females
_____Unknown

Ethnicity:
_____Latinos or Hispanics
_____Not Latinos or Hispanics
_____Unknown

Race:
_____American Indian or Alaska Native

_____Asian
_____Blacks or African American
_____Native Hawaiian or Other Pacific Islander
_____White
_____Other, specify:_____
_____Unknown

18(F) Where was the research study conducted? (List the county where the research study was conducted. If the treatment, prevention and diagnostic tests were offered in more than one county, list all of the counties where the research study was conducted.)

19. Human Embryonic Stem Cell Research. Item 19(A) should be completed for all research projects. If the research project involved human embryonic stem cells, items 19(B) and 19(C) must also be completed.

19(A) Did this project involve, in any capacity, human embryonic stem cells?
_____Yes
___x___ No

19(B) Were these stem cell lines NIH-approved lines that were derived outside of Pennsylvania?
_____Yes
_____ No

19(C) Please describe how this project involved human embryonic stem cells:

20. Articles Submitted to Peer-Reviewed Publications.

20(A) Identify all publications that resulted from the research performed during the funding period and that have been submitted to peer-reviewed publications. Do not list journal abstracts or presentations at professional meetings; abstract and meeting presentations should be listed at the end of item 17. **Include only those publications that acknowledge the Pennsylvania Department of Health as a funding source** (as required in the grant agreement). List the title of the journal article, the authors, the name of the peer-reviewed publication, the month and year when it was submitted, and the status of publication (submitted for publication, accepted for publication or published.). Submit an electronic copy of each publication or paper submitted for publication, listed in the table, in a PDF version 5.0.5 (or greater) format, 1,200 dpi. Filenames for each publication should include the number of the research project, the last name of the PI, the number of the publication and an abbreviated research project title. For example, if you submit two publications for PI Smith for the "Cognition and MRI in Older Adults" research project (Project 1), and two publications for PI Zhang for the "Lung Cancer" research project (Project 3), the filenames should be:

Project 1 – Smith – Publication 1 – Cognition and MRI
Project 1 – Smith – Publication 2 – Cognition and MRI

Project 3 – Zhang – Publication 1 – Lung Cancer
Project 3 – Zhang – Publication 2 – Lung Cancer

If the publication is not available electronically, provide 5 paper copies of the publication.

Note: The grant agreement requires that recipients acknowledge the Pennsylvania Department of Health funding in all publications. Please ensure that all publications listed acknowledge the Department of Health funding. If a publication does not acknowledge the funding from the Commonwealth, do not list the publication.

Title of Journal Article:	Authors:	Name of Peer-reviewed Publication:	Month and Year Submitted:	Publication Status (check appropriate box below):
1. None				☐Submitted ☐Accepted ☐Published
2.				☐Submitted ☐Accepted ☐Published
3.				☐Submitted ☐Accepted ☐Published

20(B) Based on this project, are you planning to submit articles to peer-reviewed publications in the future?

Yes____x_____ No_____

If yes, please describe your plans:

At this time, we are currently in the process of submitting a publication to the Journal of the American Public Health Association focusing on the vaccine self-report findings. Anticipated date of submission is March 1, 2012.

21. Changes in Outcome, Impact and Effectiveness Attributable to the Research Project. Describe the outcome, impact, and effectiveness of the research project by summarizing its impact on the incidence of disease, death from disease, stage of disease at time of diagnosis, or other relevant measures of outcome, impact or effectiveness of the research project. If there were no changes, insert "None"; do not use "Not applicable." Responses must be single-spaced below, and no smaller than 12-point type. DO NOT DELETE THESE INSTRUCTIONS. There is no limit to the length of your response.

The results from this study add important disease-related data to the body of hepatitis B knowledge. It is anticipated that these results will play an important role in the development

of interventions and research projects that will ultimately eliminate hepatitis B-related incidence, prevalence and outcomes-related disparities.

22. Major Discoveries, New Drugs, and New Approaches for Prevention Diagnosis and Treatment. Describe major discoveries, new drugs, and new approaches for prevention, diagnosis and treatment that are attributable to the completed research project. If there were no major discoveries, drugs or approaches, insert "None"; do not use "Not applicable." Responses must be single-spaced below, and no smaller than 12-point type. DO NOT DELETE THESE INSTRUCTIONS. There is no limit to the length of your response.

None

23. Inventions, Patents and Commercial Development Opportunities.

23(A) Were any inventions, which may be patentable or otherwise protectable under Title 35 of the United States Code, conceived or first actually reduced to practice in the performance of work under this health research grant? Yes_____ No___x_____

If "Yes" to 23(A), complete items a – g below for each invention. (Do NOT complete items a - g if 23(A) is "No.")

a. Title of Invention:

b. Name of Inventor(s):

c. Technical Description of Invention (describe nature, purpose, operation and physical, chemical, biological or electrical characteristics of the invention):

d. Was a patent filed for the invention conceived or first actually reduced to practice in the performance of work under this health research grant?
Yes_____ No____

If yes, indicate date patent was filed:

e. Was a patent issued for the invention conceived or first actually reduced to practice in the performance of work under this health research grant?
Yes_____ No____
If yes, indicate number of patent, title and date issued:
Patent number:
Title of patent:
Date issued:

f. Were any licenses granted for the patent obtained as a result of work performed under this health research grant? Yes_____ No____

If yes, how many licenses were granted?_____

g. Were any commercial development activities taken to develop the invention into a commercial product or service for manufacture or sale? Yes___ No____

If yes, describe the commercial development activities:

23(B) Based on the results of this project, are you planning to file for any licenses or patents, or undertake any commercial development opportunities in the future?

Yes_____ No____x_____

If yes, please describe your plans:

24. Key Investigator Qualifications. Briefly describe the education, research interests and experience and professional commitments of the Principal Investigator and all other key investigators. In place of narrative you may insert the NIH biosketch form here; however, please limit each biosketch to 1-2 pages. *For Nonformula grants only – include information for only those key investigators whose biosketches were not included in the original grant application.*

BIOGRAPHICAL SKETCH

Provide the following information for the Senior/key personnel and other significant contributors.
Follow this format for each person. **DO NOT EXCEED FOUR PAGES.**

NAME	POSITION TITLE
Chari Cohen	Associate Director of Public Health
eRA COMMONS USER NAME (credential, e.g., agency login)	
CHARICOHEN	

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	MM/YY	FIELD OF STUDY
Lafayette College	BS	1996	Biology
Temple University	MPH	2001	Community Health Ed.
Drexel University	DrPH	attending	Comm. Health & Prev.

A. Personal Statement

I serve as the Associate Director of Public Health for the Hepatitis B Foundation (HBF), in Doylestown, PA. For the past 10 years, I have worked with the HBF public health team to plan, implement and evaluate community programs and research projects focusing on hepatitis B and liver cancer. Currently, my research focuses on reducing HBV and liver cancer health disparities, and developing models for improved health care access and management for chronic HBV infection, including the early detection and prevention of liver cancer. I direct *Hep B Free Philadelphia*, a campaign to increase testing and vaccination to fight hepatitis B and liver cancer. I serve as Vice-Chair of the *National Task Force on Hepatitis B: Focus on Asians and Pacific Islander Americans*, and am also actively involved in national advocacy efforts, working with organizations around the U.S. to help them become HBV advocates and

learn how to implement HBV-related projects using best practices. I received my MPH in Community Health Education from Temple University in 2001 and am currently a doctoral candidate at Drexel University School of Public Health.

B. **Positions and Honors**

1996-1997	Research Intern: National Cancer Institute, Pediatric Branch
1997-1998	Teacher: Curtis High School, Department of Nursing
1999-2000	Assistant Project Coordinator: Temple U. Dept. of Health Studies, *Health Promotion & Wellness Among Women with Physical Disabilities*, an NIH research project
1999-2001	Teaching Assistant: Temple U. Dept. of Health Studies
2001	Project Coordinator: Women's Health and Environmental Network
2001-2007	Program Coordinator: Hepatitis B Foundation
2007-2009	Senior Research Associate: Hepatitis B Foundation
2006-2008	Adjunct Faculty: Temple University, Department of Health Studies
2009-present	Associate Director of Public Health: Hepatitis B Foundation

Memberships& Honors

2007-Present	Member, Office of Minority Health, Expert Task Force on Hepatitis B (Advisory & Planning Committee)
2001- present	Vice-Chair/Grant Writer, *National Task Force on Hepatitis B: Focus on Asians and Pacific Islanders*
2000-2001	Temple University Teaching Assistant Scholar
1994	Gorsuch Memorial Scholar, Lafayette College
1992	Edward R. Mann Scholar, IBEW Electrical Union, NYC

C. Peer-reviewed publications or manuscripts in press (in chronological order)

Cohen C, Holmberg SD, McMahon BJ, Block JM, Brosgart CL, Gish RG, London WT, Block TM. (2011). Is chronic hepatitis B being undertreated in the United States? *Journal of Viral Hepatitis*;18(6):377-83.

McHugh JA, Cullison A, Apuzzio J, Block JM, **Cohen C**, Leong SL, London WT, McNellis RJ, Neubauer RL, Perrillo R, Squires R, Tarrant D, McMahon BJ. (2011). Chronic hepatitis B infection: A workshop consensus statement and algorithm. *J Fam Pract*;60(9):E1-8.

Cohen C, Chen G, Block J, Evans AA, Siu P, Duan L, London WT. Chronic hepatitis B in Chinese immigrants: assessing barriers to health care access. (2009). *Journal of the American Public Health Association*. Presentation abstract for the 2009 Annual Meeting.

Cohen C, Chen G, Block J, Evans AA, London WT. Hepatitis B and reduced health care access in Asian immigrant communities in Philadelphia. (2009). Presentation abstract for the 2009 Office of Minority Health Summit.

Cohen C, Chen G, Block J, Evans AA, London WT. Reducing the health disparities of hepatitis B and liver cancer in Asians. (2008). Presentation abstract for the 2008 NIH Summit on Health Disparities.

Cohen C, Evans A, London WT, Block J, Conti M, Block T. (2008). Underestimation of chronic hepatitis B virus infection in the United States of America. *J Viral Hepatitis;*15(1):12–13.

Jessop AB, **Cohen C,** Burke M, Conti M, Black M. Hepatitis support groups: meeting the information and support needs of hepatitis patients. (2004). *Gastroenterology Nursing;* 27(4):163-169.

Cohen C, Jessop AB, Conti M, Block J. (2002). Public use of an Internet-based support group for chronic hepatitis B carriers: answering some basic questions. Journal of the American Public Health Association. Presentation abstract for the 2002 Annual Meeting.

Jessop AB, Burke M, **Cohen C,** Taylor L. (2002). Meeting the information and emotional needs of hepatitis support group members. Journal of the American Public Health Association. Presentation abstract for the 2002 Annual Meeting.

Chari Cohen, MPH, Molli Conti*, and Joan M. Block, RN, BSN. (2001). Using Electronic Media For Global HBV Outreach: A Model For Success. Presentation at the CDC Hepatitis Coordinator's Conference.

Cohen, C. Assessing an Internet-based support group for chronic hepatitis B patients: exchanging information and support online. (2001). Presentation abstract at Pennsylvania Public Health Association Regional Meeting.

Bachman, C., Bills, D., & Majumdar, S.K. (June 1998). Evidence of p53-induced apoptosis in cancer cells exposed to taxol. *In Vitro Cell Dev Biol Anim*. 34 (6): 434-5.

NAME: Alison A. Evans **DATE**: November 2011

PROFESSIONAL ADDRESS: Pennsylvania Biotechnology Center
3805 Old Easton Road
Doylestown, PA 18902

E-MAIL ADDRESS: Alison.Evans@drexel.edu

EDUCATION

University of Chicago, Chicago, IL	A.B. (Biological Science)	1981
Harvard School of Public Health, Boston, MA	Sc.D. (Epidemiology)	1991
Thesis: *The Seroepidemiology of Hepatitis C:*		

CURRENT APPOINTMENTS

Assistant Professor of Epidemiology and Biostatistics, Drexel School of Public Health, Philadelphia, PA	2006 - present
Director, Public Health Research, Hepatitis B Foundation, Doylestown, PA	2007 - present

PREVIOUS APPOINTMENTS

Projects Assistant, Illinois Cancer Council, Chicago, IL	1981-1982
Project Coordinator, Logan Gastrointestinal Clinical Research Center, University of Chicago Medical Center, Chicago, IL	1982-1986
Research Assistant, General Pediatric Research Unit, Massachusetts General Hospital, Boston, MA	1987-1989
Statistical Consultant, Quality of Care Measurement, Harvard Community Health Plan, Brookline, MA	1989-1991
Teaching Consultant, Harvard School of Public Health	1989-1991
Instructor, Harvard Extension School, Cambridge, MA Course: *Introduction to Epidemiology* (NSCI-E161)	1991
Postdoctoral Associate, Fox Chase Cancer Center, Philadelphia, PA	1991-1992

Instructor, La Salle University Graduate Nursing Program, 1993
Philadelphia, PA
Course: *Introduction to Epidemiology*
Assistant Member, Fox Chase Cancer Center, Philadelphia, PA 1993-1998
Associate Member, Fox Chase Cancer Center, Philadelphia, PA 1998-2006
Adjunct Associate Member, Fox Chase Cancer Center, Philadelphia, PA 2006 – 2008

MEMBERSHIP IN PROFESSIONAL SOCIETIES

American Society of Preventive Oncology
American Association for Cancer Research
American Public Health Association

GRANT SUPPORT (current)

Liver Cancer and the Role of Protein Hyper-Fucosylation (NIH R01) 5/09-4/14
(PI: Timothy Block, Drexel School of Medicine)
Role: Co-Investigator

Urine Biomarker Discovery for the Early Detection of Liver Cancer (NIH R01)
PI: Ying-Hsiu Su, PhD, Drexel College of Medicine
Role: Co-Investigator 12/07-11/10

PUBLICATIONS (selections from 2007 to present)

Welzel TM, Katki HA, Sakoda LC, Evans AA, London WT, Chen G, O'Broin S, Shen FM, Lin WY, McGlynn KA. Blood folate levels and risk of liver damage and hepatocellular carcinoma in a prospective high-risk cohort. Cancer Epidemiology, Biomarkers, and Prevention 2007 16:1279-82.

Cohen C, Evans AA, London WT, Block J, Conti M, Block T. Underestimation of chronic hepatitis B virus infection in the United States of America. Journal of Viral Hepatitis 2008 15:12-3.

Khan S, Evans AA, Rorke-Adams L, Orjuela MA, Maher TS, Bunin GR. Head injury, diagnostic x-rays, and risk of medulloblastoma and primitive neuroectodermal tumor (PNET): A Children's Oncology Group study. . Cancer Causes and Control, 2010 Jul;21(7):1017-23

Signs RJ, Darcey VL, Carney TA, Evans AA, Quinlan JJ. Retail food safety risks for populations of different races, ethnicities, and income levels. J Food Prot. 2011 Oct;74(10):1717-23.

Evans AA, Cohen C, London WT. Hepatitis B virus in the United States [letter].Ann Intern Med. 2011 Aug 2;155(3):205

Nie H, Evans AA, London WT, Block TM, Ren XD. Quantification of complex precore mutations of hepatitis B virus by SimpleProbe real time PCR and dual melting analysis. J Clin Virol. 2011 Aug;51(4):234-40.

Nie H, Evans AA, London WT, Block TM, Ren XD. Ultrasensitive quantification of hepatitis B virus A1762T/G1764A mutant by a SimpleProbe PCR using a wild-type-selective PCR blocker and a primer-blocker-probe partial-overlap approach. J Clin Microbiol. 2011 Jul;49(7):2440-8.

Jain S, Chang TT, Hamilton JP, Lin SY, Lin YJ, Evans AA, Selaru FM, Lin PW, Chen SH, Block TM, Hu CT, Song W, Meltzer SJ, Su YH. Methylation of the CpG Sites Only on the Sense Strand of the APC Gene Is Specific for Hepatocellular Carcinoma. PLoS ONE. 2011;6(11):e26799. Epub 2011 Nov 2.

Nie H, Evans AA, London WT, Block TM, Ren XD. Quantitative dynamics of hepatitis B basal core promoter and precore mutants before and after HBeAg seroconversion. Journal of Hepatology 2011;6(11):e26799. Epub 2011 Nov 2.

Persson EC, Graubard BI, Evans AA, London WT, Weber JP, LeBlanc A, Chen G, Lin WY, McGlynn KA. Dichlorodiphenyltrichloroethane (DDT) and risk of hepatocellular carcinoma. International Journal of Cancer. 2012 Jan 30. doi: 10.1002/ijc.27459. [Epub ahead of print].

Persson EC, Sewram V, Evans AA, Thomas London W, Volkwyn Y, Shen YJ, Van Zyl JA, Chen G, Lin W, Shephard GS, Taylor PR, Fan JH, Dawsey SM, Qiao YL, McGlynn KA, Abnet CC. Fumonisin B(1) and risk of hepatocellular carcinoma in two Chinese cohorts. Food and Chemcial Toxicology. 2011 Nov 29;50(3-4):679-683. [Epub ahead of print]

Ambroggio L, Taylor JA, Tabb LP, Newschaffer CJ, Evans AA, Shah SS. Comparative effectiveness of beta-lactam monotherapy and beta-lactammacrolide combination therapy in children hospitalized with community-acquired pneumonia. In review.

Evans AA, London WT, Gish RG, Cohen C, Block TM. Chronic HBV infection outside treatment guidelines: Is treatment needed? In review.