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Hepatitis B vaccination coverage among adults aged ≥ 18 years traveling to a country of high or intermediate endemicity, United States, 2015

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ABSTRACT

Background: Persons from the United States who travel to developing countries are at substantial risk for hepatitis B virus (HBV) infection. Hepatitis B vaccine has been recommended for adults at increased risk for infection, including travelers to high or intermediate hepatitis B endemic countries.
Purpose: To assess hepatitis B vaccination coverage among adults ≥ 18 years traveling to a country of high or intermediate endemicity from the United States.
Methods: Data from the 2015 National Health Interview Survey (NHIS) were analyzed to determine hepatitis B vaccination coverage (≥1 dose) and series completion (≥3 doses) among persons aged ≥ 18 years who reported traveling to a country of high or intermediate hepatitis B endemicity. Multivariable logistic regression and predictive marginal analyses were conducted to identify factors independently associated with hepatitis B vaccination.
Results: In 2015, hepatitis B vaccination coverage (≥1 dose) among adults aged ≥ 18 years who reported traveling to high or intermediate hepatitis B endemic countries was 38.6%, significantly higher compared with 25.9% among non-travelers. Series completion (≥3 doses) was 31.7% and 21.2%, respectively ($P < 0.05$). On multivariable analysis among all respondents, travel status was significantly associated with hepatitis B vaccination coverage and series completion. Other characteristics independently associated with vaccination (≥1 dose, and ≥ 3 doses) among travelers included age, race/ethnicity, educational level, duration of U.S. residence, number of physician contacts in the past year, status of ever being tested for HIV, and healthcare personnel status.
Conclusions: Although travel to a country of high or intermediate hepatitis B endemicity was associated with higher likelihood of hepatitis B vaccination, hepatitis B vaccination coverage was low among adult travelers to these areas. Healthcare providers should ask their patients about travel plans and recommend and offer travel related vaccinations to their patients or refer them to alternate sites for vaccination.

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1. Introduction

Hepatitis B is a vaccine-preventable infection caused by the hepatitis B virus (HBV) and has a worldwide distribution. It is estimated that more than 2 billion of the global population have been infected with HBV of whom, approximately 360 million are chronically infected [1]. Areas of high prevalence of hepatitis B (≥8% of the population hepatitis B surface antigen (HBsAg)-positive) include sub-Saharan Africa, South-East Asia, the Eastern Mediterranean countries, south and western Pacific islands, the interior of the Amazon basin and certain parts of the Caribbean. Areas of moderate prevalence of hepatitis B (≥2%–<8% of the population HBsAg-positive) include south-central and southwest Asia, eastern and southern Europe, Russia, and most of Central and South America. Areas of low prevalence of hepatitis (<2% of the population HBsAg-positive) include Australia, New Zealand, northern and western Europe, and North America [1].

HBV is transmitted through percutaneous or mucosal exposure to infectious blood or body fluids [1–8]. Approximately 5–10% of adults infected with HBV will develop chronic infection, and 15%

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of those adults will develop chronic liver disease, including cirrhosis, liver failure, and liver cancer. Hepatitis B is one of the leading causes of liver cancer in the United States [2–3]. In highly endemic areas, HBV is most commonly transmitted from mother to child at birth, or from person to person in early childhood. In countries with low HBV endemicity, sexual transmission and the use of contaminated needles, especially among injecting drug users, are the major routes of infection [1].

Persons from the United States who travel to high or intermediate HBV endemic countries are at risk for HBV infection [7,9]. Such persons include tourists, military personnel, missionaries, foreign-born persons who return to their country of origin to visit friends or relatives, and others who work or study abroad in countries with high or intermediate HBV endemicity [8]. Hepatitis B remains one of the most common vaccine-preventable diseases acquired during travel [10–12].

Hepatitis B vaccines have been available for use in the United States since the early 1980s. In 1982, the Advisory Committee on Immunization Practices (ACIP) recommended hepatitis B vaccination for infants born to HBsAg-positive mothers and certain high-risk adult populations [3]. Initial strategies for preventing HBV infection focused on 3-dose vaccination of high-risk groups: health care personnel, men who have sex with men (MSM), injection drug users (IDU) and recipients of certain blood products [3]. In 1991, the ACIP recommended that all infants be immunized with three doses of hepatitis B vaccine and the ACIP recommendation for high-risk adult populations was broadened to include international travelers to countries with high or intermediate HBV endemicity or persons working in countries with high or intermediate HBV endemicity [4]. In 2006, ACIP further expanded the adult hepatitis B vaccination recommendations to include universal vaccination of unvaccinated adults attending certain healthcare and treatment settings that serve high-risk adults including sexually transmitted disease (STD) clinics, human immunodeficiency virus (HIV) counseling and treatment centers, correctional facilities, drug-abuse treatment centers, and healthcare settings with services targeting MSM [7].

This study uses data from the 2011–2015 National Health Interview Survey (NHIS) to examine the most recent hepatitis B vaccination coverage and coverage trends among adults aged ≥ 18 years who reported travel to a country of high or intermediate HBV endemicity and factors associated with hepatitis B vaccination.

2. Methods

We analyzed data from the 2015 NHIS to determine hepatitis B vaccination coverage (≥1 dose) and series completion (≥3 doses) among adult travelers aged ≥ 18 years to high or intermediate HBV endemic countries. The NHIS is an annual household survey conducted by the National Center for Health Statistics of the Centers for Disease Control and Prevention [13]. The NHIS provides estimates on health indicators, health care utilization and access, and health-related behaviors for the U.S. non-institutionalized, civilian population. The NHIS sample is selected through the use of complex sampling design involving stratification, clustering, and multistage sampling with a nonzero probability of selection for each person. Face to face interviews were conducted each week throughout the year in a probability sample of households. In the sample adult core, one adult per sampled family was randomly selected and asked to complete the sample adult questionnaire. In 2015, the final response rate for the sample adult core was 55.2% [13].

Hepatitis B vaccination coverage was determined using the following sample adult core survey question: "Have you ever received hepatitis B vaccine?" An affirmative answer to this question prompted a second question concerning how many doses respondents received: "Did you receive three doses of the hepatitis B vaccine or less than three doses?" To determine travel status, respondents were asked "Have you ever traveled outside of the United States to countries other than Europe, Japan, Australia, New Zealand or Canada, since 1995?" For the purposes of this study we will refer to travelers to high or intermediate HBV endemic areas as "travelers". Since adults aged 18–26 years might not be able to recall accurately vaccines received as infants or adolescents, sensitivity analyses were conducted to assess whether association between vaccination coverage and travel status or other factors changed when those aged 18–26 years were excluded from the analyses.

Vaccination coverage and series completion were stratified by travel status (travel to a country of high or intermediate HBV endemicity), demographic and other characteristics (Table 1). Since persons from low HBV endemic countries who travel to high or intermediate HBV endemic countries are at increased risk for acquiring hepatitis B compared to those not traveling [4], we considered persons who traveled outside the United States to countries other than Europe, Japan, Australia, New Zealand, or Canada as having traveled to countries with high or intermediate HBV endemicity. All variables listed above in the bi-variable analysis were also included in the multivariable model. Additionally, we examined 1- and 3-dose coverage by travel status from 2011 to 2015 to assess coverage trends over years.

We used SUDAAN statistical software (Research Triangle Institute, Research Triangle Park, NC) to calculate point estimates and 95% confidence intervals (CIs) of vaccine coverage and series completion [14]. All analyses were weighted to reflect the age, sex, and race/ethnicity of the U.S. non-institutionalized, civilian population. Bi-variable analysis was conducted using Chi-square to test population distributions between travelers and non-travelers. We used t-tests to test the difference in vaccination coverage and series completion by travel status and within each demographic and other characteristic category. Logistic regression was used to determine adjusted prevalence ratios (controlling for the all of covariates listed in the table) associated with different characteristics among adult travelers. A separate logistic regression model was conducted among all persons aged ≥ 18 years including travel status as an independent variable to determine if travel status was an independent predictor of vaccination.

3. Results

Of the 32,954 respondents in the 2015 NHIS sample adult core, 35.8% (11,079) reported traveling to a country of high or intermediate HBV endemicity. Demographic characteristics of the study population are given in Table 1. Overall, 28.8% travelers aged ≥ 18 years were not born in the United States (Table 1). The distribution of travelers and non-travelers differed by all sociodemographic and access to care characteristics except having a usual place for health care, having ever lived with a hepatitis patient, and having a chronic liver disease (Table 1).

In bivariate analysis, hepatitis B vaccination coverage (≥1 dose) is shown in Table 2. Overall, 38.6% of adult travelers received ≥1 dose of vaccine compared with 25.9% among non-travelers ($p < 0.05$). Series completion (≥3 doses) was also higher among travelers at 31.7% compared with 21.2% among non-travelers ($p < 0.05$) (Table 2). Overall, hepatitis B vaccination coverage (≥1 dose) among travelers was significantly higher compared with those who were non-travelers across all socio-demographic, medical, and access-to-care characteristics except being without health insurance. Hepatitis B coverage (≥3 dose) among travelers was significantly higher compared with those who were non-travelers

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