

Overseas Hepatitis B Vaccinations Among Newly Arrived Cubans in Texas—2010–2015

Deborah Lee¹ · Jessica Montour^{1,2} · Anna C. Fulton¹ · Stephen R. Benoit¹ · Noele P. Nelson³ · Yecai Liu¹

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Abstract We assessed hepatitis B virus (HBV) serologic results among newly arrived Cubans with vaccination documentation. We matched the post-arrival health assessment HBV serologic results of Cubans who arrived during 2010–2015 in Texas with their overseas hepatitis B (HepB) vaccination records in the CDC’s Electronic Disease Notification database and calculated the proportion of those immune due to HepB vaccinations. Among 2123 who had overseas HepB vaccination and serologic results, 1072 (50.5%) had three valid documented doses of HepB. Of these 1072, 441 (41.1%) were immune due to HepB vaccination, 24 (2.2%), immune due to natural infection, 599 (55.9%), susceptible to HBV, and 8 (0.7%), HBV infected. Stratified by age, 21 (87.5%) of 24 children <5 years of age showed protection, and the antibody to HepB surface antigen (anti-HBs) decreased as age increased. Our findings concurred with previous observations that anti-HBs serologic results wane over time. Many newly arrived Cubans with complete HepB vaccination records on the U.S. Department of State overseas

vaccination forms might be immune despite <10 mIU/mL anti-HBs response levels.

Keywords Cuban health · Refugee health · Hepatitis B antibody · Refugee vaccinations

Background

During 2014, Cuban refugees were the fifth largest group to resettle in the United States; Texas resettled the second largest number of Cuban refugees [1]. In addition, through the U.S. Cuban–Haitian Entrant Program, Cubans are allowed to enter the United States as parolees and are eligible for refugee benefits and services administered by the Office of Refugee Resettlement [2].

Upon arrival to the United States, refugees and parolees are recommended to undergo a post-arrival health assessment within the first 90 days [3]. CDC recommends that HepB vaccination be offered to all newly arrived refugees who are not infected and non-immune based on serologic testing, and considered at high risk for infection. In addition, if a partial vaccine series is documented despite antibody to HBsAg (anti-HBs) positivity, the vaccine series should be completed based on the Advisory Committee on Immunization Practices (ACIP)-recommended schedule [4].

In recent years, the Texas Department of State Health Services Refugee Health Program reported inconsistencies between the overseas HepB vaccination information and the HBV serologic testing results among newly arrived Cubans. Specifically, some persons, with a completed series of HepB vaccinations documented on the overseas records, had decreased response (i.e., anti-HBs <10 mIU/mL) to HBV according to serology results. In this evaluation, we assessed the overseas HepB vaccination documentation and

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of CDC.

✉ Deborah Lee
DLee1@cdc.gov

Jessica Montour
JMontour@uscritx.org

- ¹ Division of Global Migration and Quarantine, Centers for Disease Control and Prevention, 1600 Clifton Road, MS-E03, Atlanta, GA 30333, USA
- ² Texas Department of State Health Services, Austin, TX, USA
- ³ Division of Viral Hepatitis, Centers for Disease Control and Prevention, Atlanta, GA, USA

post arrival health assessment HBV serologic results to better understand the extent of these inconsistencies and potential public health risk.

Methods

We obtained retrospective post-arrival medical health assessment data, including HBV qualitative serologic test information, for Cuban refugees and parolees who arrived in Texas during January 2010 through September 2015. Data were collected by the Refugee Health Program of the Texas Department of State Health Services from seven public health entities—University Health System/Bexar County, Dallas County Health and Human Services, Harris County Public Health, City of Amarillo Public Health, Tarrant County Public Health, Taylor County Public Health District, and City of Austin Public Health.

We matched these HBV qualitative serologic test data with overseas HepB vaccination information available on the U.S. Department of State form (i.e., DS-3025: Vaccination Documentation Worksheet) in the Centers for Disease Control and Prevention's Electronic Diseases Notification (EDN) database [5]. Qualitative serologic HBV test results comprised of the HepB surface antigen (HBsAg) test, antibody to HepB core antigen (anti-HBc) and anti-HBs. Anti-HBs ≥ 10 mIU/mL is considered a correlate of vaccine-induced protection for persons who have completed an approved vaccination series [6]. Interpretation of the serologic tests [6] were as follows—(1) immune due to HepB vaccination: HBsAg and anti-HBc tests negative, and anti-HBsAg positive; (2) immune due to natural infection: anti-HBc and anti-HBsAg positive, and HBsAg negative; (3) susceptible to HBV infection: HBsAg, anti-HBc, and anti-HBsAg negative;

and (4) infected: HBsAg and anti-HBc positive and anti-HBsAg negative.

Valid documented overseas doses were assessed based on the ACIP recommended schedule [4] and defined as—(1) the second dose at a minimum of 4 weeks after the first dose; (2) the third dose at least 8 weeks after the second dose and 16 weeks after the first dose; and (3) the third and final dose administered no earlier than 24 weeks of age.

We categorized persons into five age groups (<5, 5–18, 19–39, 40–59, and ≥ 60 years), and classified overseas documented doses as: (1) no dose, (2) 1–2 doses, and (3) 3 doses or more. We calculated the number and proportion of people in each of the four serologic testing categories by overseas doses and by age category.

This assessment was determined non-research by the CDC's Human Subject Advisors. The Refugee Health Program of the Texas Department of State Health Services approved the use of these data for analysis.

Results

Of 10,937 newly arrived Cubans in Texas, 8814 (80.6%) were excluded from the analysis because there were no corresponding overseas HepB vaccination records. Of the 8814 excluded, 8650 (98%) were Cubans determined to be a parolee at the U.S. port of entry [7] and did not have any overseas vaccination records. Of the remaining 2123 persons with an overseas HepB vaccination record and domestic HBV serologic test, 1085 (51.2%) were female, 591 (27.8%) were children <19 years of age, and 1022 (48.1%) had a parolee visa type prior to arrival in the US (Table 1). Of the 2123 people with vaccination records, 711 (33.5%) had no documented HepB doses, 340 (16%) had 1–2 doses, and 1072 (50.5%) had 3 doses (Table 1). Of those with no

Table 1 Results of hepatitis B virus (HBV) testing during post arrival health assessment among newly arrived Cubans in Texas, stratified by their overseas hepatitis B (HepB) vaccine doses, 2010–2015

Overseas HBV vaccination ^a	Immune due to HBV vaccination ^b		Immune due to natural infection ^c		Susceptible ^d		Infected ^e		Total n
	n	(%) ^f	n	(%) ^f	n	(%) ^f	n	(%) ^f	
Total	771	(36.3)	40	(1.9)	1292	(60.8)	20	(1.0)	2123
No dose	189	(26.6)	11	(1.5)	503	(70.7)	8	(1.1)	711
1–2 doses	141	(41.5)	5	(1.5)	190	(55.9)	4	(1.2)	340
3 doses	441	(41.1)	24	(2.2)	599	(55.9)	8	(0.7)	1072

^aWe only considered the overseas hepatitis B (HepB) vaccination that were documented on the U.S. Department of State Vaccination Documentation Worksheet (DS-3025)

^bImmune due to HepB vaccination is defined as HBsAg and anti-HBc tests negative, and anti-HBsAg positive

^cImmune due to natural infection is defined as anti-HBc and anti-HBsAg positive, and negative HBsAg

^dSusceptible to HBV infection is defined as HBsAg, anti-HBc, and anti-HBsAg negative

^eInfected with HBV is defined as HBsAg and anti-HBc positive, and anti-HBsAg negative

^fRow percent are presented

documented HepB doses, 8 (1.1%) were infected, and of those with 1–2 HepB doses, 4 (1.2%) were infected. There was no overseas documentation of more than three doses. The specific Hep B vaccine administered overseas was not available.

Among the 1072 who received three overseas HepB doses, 441 (41.1%) were immune due to HepB vaccination, 24 (2.2%) were immune due to natural infection, 599 (55.9%) were susceptible to HBV, and 8 (0.7%) were HBV infected (Table 1). Immunity for those with three overseas HepB doses were greatest for those <5 years (87.5%), but decreased with age (51.2% for those 40–59 years and 10.6% for those ≥60 years) (Table 2).

Discussion

Our findings confirm reports of no or low anti-HBs serologic results among newly arrived Cubans in Texas. HBV protection has been reported >90% after three intramuscular doses of the HepB vaccine and serologic response decreases with age; seroprotection is achieved in approximately 95% of healthy infants, approximately 92% of health-care personnel aged <40 years, and approximately 84% of health-care personnel aged ≥40 years [8]. The newly arrived Cubans in our assessment were last vaccinated on average 11.4 (95% CI 10.9–11.9) years prior to arrival in the U.S. (data not shown). When we analyzed those with three documented doses with last vaccination date prior to arrival, there was no significant difference in immunity due to HBV vaccination between those who were last vaccinated between 0 and 5 years and >20 years prior to arrival, 37% (95% CI 31.6–42.9) and 37.4% (95% CI 29.1–46.5) respectively. Lastly, the children who were more recently vaccinated prior to arrival showed greater response.

The waning of anti-HBs has been reported previously. Leuridan et al. [9] provide several reviews of studies showing long-term protection is present despite a decrease in anti-HBs over time. A 30-year follow-up study and response to a challenge dose among Alaskan Native adults and children found 51% with positive anti-HBs response, and among those with negative anti-HBs response, 88% expressed an anti-HBs response 30 days after a challenge dose [10].

We found that the newly arrived Cubans showed low HBV infection rates (0.7%) among those vaccinated which is comparable to previous studies. The prevalence of HBsAg positive among Cubans who arrived during 2006–2008 was 1% (95% CI 0.8–1.1) [11] and 0.9% (95% CI 0.6–1.1) among Cuban-born living in the U.S. [12]. Also, when we assessed all available domestic HBV serologic results among all newly arrived Cubans in Texas (N = 10,937), of which most were adults (86.6%), the HBV infection rates of the Cuban cohort was similar to the U.S. population based on National Health and Nutrition Examination Survey (NHANES) 2012 analysis [13]—0.5% (95% CI 0.4–0.6) versus 0.3% (95% CI 0.2–0.4), respectively. Also, the Cuban cohort had a greater population immunity from HepB vaccination than the U.S. data used in the NHANES analysis—39.3% (95% CI 38.4–40.2) versus 25.1% (95% CI 24.1–26.1), respectively [13].

In summary, our findings concur with previous observations that anti-HBs serologic results wane over time. Although an additional HepB vaccine dose for newly arrived Cubans with completed documented doses on the U.S. Department of States forms can be given, these individuals might be protected, if consistent with previous studies showing long lasting cellular immunity in healthy persons despite waning anti-HBs levels.

Table 2 Results of hepatitis B virus (HBV) testing during post arrival health assessment among newly arrived Cubans in Texas among those with documented three overseas doses of hepatitis B (HepB) vaccine, 2010–2015

Age at U.S. arrival (years)	Immune due to HBV vaccination ^a		Immune due to natural infection ^b		Susceptible ^c		Infected ^d		Total n
	n	(%) ^e	n	(%) ^e	n	(%) ^e	n	(%) ^e	
Total	441	(41.1)	24	(2.2)	599	(55.9)	8	(0.7)	1072
<5	21	(87.5)	0	0.0	2	(8.3)	1	(4.2)	24
5–18	166	(51.2)	1	(0.3)	155	(47.8)	2	(0.6)	324
19–39	191	(48.3)	6	(1.6)	187	(48.3)	3	(0.8)	387
40–59	58	(20.0)	15	(5.2)	215	(74.1)	2	(0.7)	290
≥60	5	(10.6)	2	(4.3)	40	(85.1)	0	0.0	47

^aImmune due to HepB vaccination is defined as HBsAg and anti-HBc tests negative, and anti-HBsAg positive

^bImmune due to natural infection is defined as anti-HBc and anti-HBsAg positive, and negative HBsAg

^cSusceptible to HBV infection is defined as HBsAg, anti-HBc, and anti-HBsAg negative

^dInfected with HBV is defined as HBsAg and anti-HBc positive, and anti-HBsAg negative

^eRow percent are presented

New Contribution to the Literature

The immunologic HBV protection among Cubans has not been described previously. There is evidence of waning anti-HBs levels among vaccinated Cuban refugees in Texas, as is known to occur among healthy persons after a receipt of a complete HepB vaccine series. Many newly arrived Cubans with complete HBV vaccination records on the U.S. Department of State overseas vaccination forms might be immune despite anti-HBs <10 mIU/mL. Further evaluation of the need for additional HepB vaccination in refugees with vaccine series documentation and low risk of exposure could be considered.

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Compliance with Ethical Standards

Conflict of interest All authors declare that they have no conflict of interest.

Ethical Approval This assessment was determined non-research by CDC's NCEZID Human Subjects Advisor. This article does not contain any studies with human participants or animals performed by any of the authors.

Informed Consent Informed consent was not applicable for this assessment.

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