

Adult Vaccination Disparities Among Foreign-Born Populations in the U.S., 2012

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Background: Foreign-born persons are considered at higher risk of undervaccination and exposure to many vaccine-preventable diseases. Information on vaccination coverage among foreign-born populations is limited.

Purpose: To assess adult vaccination coverage disparities among foreign-born populations in the U.S.

Methods: Data from the 2012 National Health Interview Survey were analyzed in 2013. For non-influenza vaccines, the weighted proportion vaccinated was calculated. For influenza vaccination, Kaplan–Meier survival analysis was used to assess coverage among individuals interviewed during September 2011–June 2012 and vaccinated in August 2011–May 2012.

Results: Overall, unadjusted vaccination coverage among U.S.-born respondents was significantly higher than that of foreign-born respondents: influenza, age ≥ 18 years (40.4% vs 33.8%); pneumococcal polysaccharide vaccine (PPV), 18–64 years with high-risk conditions (20.8% vs 13.7%); PPV, ≥ 65 years (62.6% vs 40.5%); tetanus vaccination, ≥ 18 years (65.0% vs 50.6%); tetanus, diphtheria, and acellular pertussis (Tdap), ≥ 18 years (15.5% vs 9.3%); hepatitis B, 18–49 years (37.2% vs 28.4%); shingles, ≥ 60 years (21.3% vs 12.0%); and human papilloma virus (HPV), women 18–26 years (38.7% vs 14.7%). Among the foreign born, vaccination coverage was generally lower for non-U.S. citizens, recent immigrants, and those interviewed in a language other than English. Foreign-born individuals were less likely than U.S.-born people to be vaccinated for pneumococcal (≥ 65 years), tetanus, Tdap, and HPV (women) after adjusting for confounders.

Conclusions: Vaccination coverage is lower among foreign-born adults than those born in the U.S. It is important to consider foreign birth and immigration status when assessing vaccination disparities and planning interventions.

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Introduction

Overall, in 2011, an estimated 40 million foreign-born people (13% of the U.S. population) were living in the U.S., an increase compared with 1970 (5%).^{1–3} The foreign born are individuals born outside of the U.S., Puerto Rico, and other U.S.-affiliated areas, such as

Guam and the Marshall Islands who were not U.S. citizens at birth.¹ Although foreign-born populations are distributed throughout the U.S., in 2011, more than 25% lived in California and an additional 30% collectively lived in New York, Texas, and Florida. The foreign born from Latin America was the largest region-of-birth group, accounting for 53% of all foreign-born individuals, followed by 29% from Asia, 12% from Europe, and 7% from other regions. Most (65%) of the foreign born arrived in the U.S. before 2000.¹

Prevalence of most vaccine-preventable diseases (VPDs) in the U.S. are at or near record lows, but VPDs remain endemic in other world regions. Foreign-born persons from endemic countries and their family members in the U.S. are at greater risk of exposure for some VPDs (e.g., hepatitis A and B, congenital rubella) either pre-migration or during return trips to visit friends and family.^{4–6}

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Foreign-born individuals, particularly those from Mexico, have been shown to have lower evidence of protective antibodies for some VPDs, possibly because of lack of vaccination, lower exposure, and waning immunity over time (e.g., tetanus, hepatitis B, varicella).^{5,7–10} The Advisory Committee on Immunization Practices (ACIP) recommends vaccinations for adults in the U.S. to prevent VPDs and their sequelae.¹¹ Influenza vaccination is recommended for adults of all ages each year; other vaccines target different populations based on age, high-risk medical conditions, behavioral risk factors (e.g., injection drug use), occupation, travel, and other indications.^{12,13} Most foreign-born individuals originate from countries with different vaccination schedules and practices than the U.S. Despite significant improvements in global vaccination coverage in recent years, coverage remains low in many regions.¹⁴ Even in the U.S., adult vaccination coverage remains low for most routinely recommended vaccines and well below Healthy People 2020 targets.^{12,13,15}

Analysis of two U.S. national surveys comparing vaccination coverage between foreign-born children and children of foreign-born mothers versus U.S.-born children and children of U.S.-born mothers, respectively, found disparities in vaccination levels of the foreign born for some vaccines (e.g., hepatitis B and *Haemophilus influenzae* type b) and advantages for others (e.g., pneumococcal conjugate vaccine and meningococcal conjugate vaccine).^{6–9,16} Vaccination coverage disparities for foreign-born compared to native populations have been reported from Canada and several countries in Europe, Africa, and Asia.^{17–23} A few studies in the U.S. have reported disparities in some vaccinations among foreign-born adults at national, state, or local levels.^{8,24–27} However, comprehensive information on vaccination coverage on this population is limited. The purpose of this study is to examine coverage for certain routinely recommended adult vaccinations among the foreign born compared with U.S.-born individuals, by selected demographic characteristics, to help guide development of strategies for improving vaccination coverage among foreign-born populations. Coverage for influenza; pneumococcal polysaccharide vaccine [PPV]; tetanus toxoid-containing vaccines, including tetanus and diphtheria toxoid [Td] and tetanus, diphtheria, and acellular pertussis [Tdap]; hepatitis A [HepA]; hepatitis B [HepB]; herpes zoster [shingles]; and human papillomavirus [HPV] vaccines were assessed.

Methods

Data from the 2012 National Health Interview Survey (NHIS) were analyzed in 2013. The NHIS is an annual household survey conducted by the National Center for Health Statistics, CDC, which collects health information on the U.S. civilian, non-

institutionalized population.²⁸ Detailed methods for the NHIS are described in other publications.^{14,28} In 2012, the final response rate for the sample adult core was 61.2%.²⁸ The NHIS has routinely collected influenza and PPV vaccination information since 1989. Starting in 2000, HepB vaccination information was collected. Starting in 2008, other vaccination information such as HepA, HPV, shingles, and Td/Tdap was collected.

Vaccination coverage by foreign-born status for influenza, PPV, tetanus toxoid-containing vaccines (Td, Tdap, or unknown type) in the past 10 years, HepA, HepB, shingles, and HPV vaccines were assessed from coded survey questions on receipt of these vaccines.

Covariates from coded survey questions to measure associations among vaccination coverage were selected: U.S.-born status, time in the U.S., language spoken during interview, world region of birth, racial/ethnic status, nativity, and citizenship status. HepA vaccination was assessed among those traveling to countries of high or intermediate endemicity. Persons with high-risk conditions for pneumococcal vaccination were determined by questions in the NHIS and defined as persons with asthma, diabetes, cardiovascular disease, liver diseases, kidney diseases, chronic obstructive pulmonary disease, emphysema, chronic bronchitis, cancer, and current smokers. Poverty status was defined using 2012 poverty thresholds published by the U.S. Census Bureau, with below poverty defined as a total family income of <\$23,492 for a family of four.²⁹

Multivariable logistic regression and predictive marginals were conducted to assess vaccination coverage among U.S.- and foreign-born individuals adjusted for age, gender, race/ethnicity, marital status, education, employment status, poverty level, health insurance, number of doctor visits in the past year, whether the respondent had a usual place of health care, self-reported health status, and region of residence. Adjusted prevalence ratios were calculated comparing the U.S. and foreign born.

SUDAAN statistical software was used to calculate point estimates and 95% CIs of vaccination coverage.³⁰ SUDAAN generated asymmetric CIs based on a logit transformation were used. For the non-influenza adult vaccination coverage estimates, weighted percentages were used. To better assess unadjusted influenza vaccination coverage for the 2011–2012 influenza season, the Kaplan–Meier survival analysis procedure was used to assess coverage among individuals interviewed from September 2011 through June 2012 and vaccinated during August 2011 through May 2012.³¹ Kaplan–Meier analysis has advantages for season-specific influenza estimates over other approaches, such as using a full calendar year of data, or restricting estimates based on interviews conducted in the postvaccination period (e.g., March–June), which does not use all relevant data.³¹ The Kaplan–Meier approach uses all relevant data to maximize precision and use data collected during the vaccination period that likely has more accurate recall of vaccinations.³¹ To assess adjusted vaccination coverage and adjusted prevalence ratios, this study used logistic regression and predicted marginal modeling comparing the U.S. and foreign born for each selected vaccination. The NHIS was approved by the Research Ethics Review Board ([ERB] No. 2009-16) of the National Center for Health Statistics, CDC.

Results

Demographic characteristics of the study population are given in [Table 1](#). Of adults aged ≥ 18 years, 82.6% were born in the U.S. and 17.4% were foreign born. Among the

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