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Author manuscript

Am J Prev Med. Author manuscript; available in PMC 2018 February 26.

Published in final edited form as:

Am J Prev Med. 2015 June ; 48(6): 647–661. doi:10.1016/j.amepre.2014.12.008.

Impact of health insurance status on vaccination coverage among adult populations

Peng-jun Lu, MD, PhD, Alissa O'Halloran, MSPH, and Walter W. Williams, MD, MPH

1Immunization Services Division, National Center for Immunization and Respiratory Diseases, Centers for Disease Control and Prevention, 1600 Clifton Road, NE, Atlanta, GA 30333

Abstract

Background—Underinsurance has been a barrier to vaccination among children. Information on vaccination among adults 18 years by insurance status is limited.

Purpose—To assess vaccination coverage among adults 18 years in the United States in 2012 by health insurance status and access to care characteristics.

Methods—The 2012 NHIS data were analyzed in 2014 to estimate vaccination coverage among adults 18 years by health insurance status for 7 vaccines routinely recommended for use. For the non-influenza vaccination coverage estimates among adults 18 years, regular descriptive analysis was used. To better assess influenza vaccination coverage for the 2011–12 influenza season, coverage was reported by restricting to individuals interviewed during September 2011 through June 2012, and vaccinated during August 2011 through May 2012, using the Kaplan-Meier survival analysis procedure.

Results—Overall, for all age groups, vaccination coverage was lower among those without health insurance compared with those with health insurance for all except HepA vaccination. Influenza vaccination coverage among adults 18 years without or with health insurance was 14.4% versus 44.3%, respectively, pneumococcal vaccination coverage among adults 18–64 years with high-risk conditions was 9.8% versus 23.0%, Td coverage (18 years) was 53.2% versus 64.5%, Tdap coverage (18 years) was 8.4% versus 15.7%, HepA coverage (18–49 years) was 16.6% versus 19.8%, HepB coverage (18–49 years) was 27.5% versus 38.0%, shingles coverage (60 years) was 6.1% versus 20.8%, and HPV coverage (female 18–26 years) was 20.9% versus 39.8%. In addition, vaccination coverage differed by type of insurance, whether or not respondents had a regular physician, or number of physician contacts. Persons without health insurance were less likely than those with health insurance to be vaccinated for influenza (18 years), pneumococcal (18–64 years with high-risk conditions), tetanus (18 years), Tdap (18 years), and HPV (women 18–26 years) after adjusting for confounders.

Correspondence and requests for reprints should be sent to: Peng-jun Lu, National Center for Immunization and Respiratory Diseases, Centers for Disease Control and Prevention, 1600 Clifton Road, NE, Mail Stop A-19, Atlanta, GA 30333, lhph8@cdc.gov, Phone: 404-639-8844, Fax: 404-417-0805.

Disclaimer: The findings and conclusions in this paper are those of the authors and do not necessarily represent the views of CDC.

Conflict of Interest Statement:

All authors have no conflicts of interest to be stated.

Conclusions—Overall, vaccination coverage among adults 18 years was lower among uninsured populations. Implementing effective strategies are needed to help improve vaccination coverage among adults 18 years, especially those without health insurance.

Keywords

Adult vaccination; vaccination coverage; health insurance status; type of health insurances; National Health Interview Survey (NHIS)

Introduction

Overall, in 2011, the percentage of people without health insurance in the United States was 15.7% (48.6 million) and the percentage was 17.8% (41.0 million) among adult populations.¹ Among non-Hispanic whites, 11.1% (21.7 million) were uninsured in 2011, for non-Hispanic blacks 19.5% (7.7 million), and for Hispanics 30.1% (5.8 million).¹ Cost has been a barrier to receiving timely preventive medical care. The relationship between health insurance and vaccination coverage among childhood and adolescent populations has been widely studied.^{2–5} Information regarding some adult vaccinations by health insurance status was documented previously.^{6–11}

Vaccination is the most effective strategy for preventing vaccine-preventable diseases and their complications. Adult vaccination coverage, however, remains low for most routinely recommended vaccines and well below *Healthy People 2020* targets.^{12–15} The adult immunization schedule,¹⁶ updated annually by the Advisory Committee on Immunization Practices (ACIP), provides current recommendations for vaccinating adults. Influenza vaccination is recommended for all adults each year; other vaccinations recommended for adults target different populations based on age, health conditions, behavioral risk factors, occupation, travel, and other indications.^{16, 17}

This study uses data from the 2012 National Health Interview Survey (NHIS) to examine associations of routinely recommended adult vaccinations (influenza, pneumococcal [PPSV], tetanus toxoid-containing vaccines including tetanus and diphtheria toxoid [Td], tetanus, diphtheria and acellular pertussis [Tdap], hepatitis A [HepA], hepatitis B [HepB], herpes zoster [shingles], and human papillomavirus [HPV]) with insurance status, having a primary physician, seeing a provider during the previous year, and select demographic characteristics.

Methods

The 2012 NHIS were analyzed in 2014 (The 2013 data became available after the manuscript was submitted). The NHIS is a multistage sampling survey, which collects health information on the U.S. civilian, non-institutionalized population.¹⁸ In the sample adult core, questions about receipt of recommended vaccinations for adults were asked of one randomly selected adult within each family in the household. In 2012, the final response rate for the sample adult core was 61.2%.¹⁸

Vaccination coverage for influenza, PPSV, Td, HepA, HepB, shingles, and HPV vaccines were assessed from coded survey questions on receipt of these vaccines (Respondents were asked whether they have ever received specific vaccinations or not except for influenza vaccination which seasonal vaccination were asked and assessed).¹⁸ To determine Tdap vaccination status, respondents were asked “Have you received a tetanus shot in the past 10 years?” Respondents who answered “yes” were asked “Was your most recent tetanus shot given in 2005 or later?” An affirmative answer to this question prompted another question, “Did the doctor tell you the vaccine included the pertussis or whooping cough vaccine?” Respondents without “yes” or “no” responses for the above three questions were excluded from the assessment of Tdap vaccination.

Covariates from coded survey questions were selected to measure associations between vaccination coverage and health insurance status (yes, no), health insurance type (public only, private (including some people with both private and public insurances), none), regular physician status (yes, no), number of provider visits during the prior year (0, 1–3, 4–9, 10+), and race/ethnicity (non-Hispanic white, non-Hispanic black, non-Hispanic Asian, and other races including American Indian/Alaska Native and persons reporting multiple races). Demographic (e.g., marital status) and access to care variables (e.g., health insurance) reflect the status as of the time of survey. HepA vaccination was assessed among those traveling to countries of high or intermediate endemicity. Pneumococcal vaccination was assessed among all persons 65 and older and adults 18–64 with high-risk conditions. Persons were considered at high risk for pneumococcal disease if they had ever been told by a doctor or other health professional that they had diabetes, emphysema, chronic obstructive pulmonary disease, coronary heart disease, angina, heart attack, or other heart condition; had a diagnosis of cancer during the previous 12 months (excluding nonmelanoma skin cancer); had ever been told by a doctor or other health professional that they had lymphoma, leukemia, or blood cancer; had been told by a doctor or other health professional that they had chronic bronchitis or weak or failing kidneys during the preceding 12 months; had an asthma episode or attack during the preceding 12 months; or were 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.¹⁹

SUDAAN statistical software was used to calculate point estimates and 95% confidence intervals (CIs) of vaccination coverage.²⁰ For the non-influenza adult vaccination coverage estimates, regular descriptive analysis was used. To better assess influenza vaccination coverage for the 2011–12 influenza season, coverage was reported by restricting to individuals interviewed during September 2011 through June 2012 and vaccinated during August 2011 through May 2012 using the Kaplan-Meier survival analysis procedure. Vaccination month was used to define the “event” variable and interview date to define the “censoring” variable of the Kaplan Meier procedure. The Kaplan-Meier has advantages for season-specific influenza estimates over other approaches, such as using a full calendar year of data which provides annual estimates representing incomplete estimates for up to three influenza seasons, or restricting estimates based on interviews conducted in the postvaccination period (e.g. March-June) which does not use all relevant data.²¹ The Kaplan-Meier approach allows us to use all relevant data to maximize precision and to use data collected during the vaccination period that likely has more accurate recall of

vaccinations.²¹ Estimates were weighted to the adult civilian population of the United States. Chi-square test was used to test coverage difference within or between variables assessed. Statistical significance was defined as $p < 0.05$ (p value is two-sided). Influenza, PPSV, and HepB coverage differences by health insurance status between 2001 and 2012 were assessed (information regarding other vaccines were not collected in the 2001 NHIS). Wide differences by insurance status (with versus without insurance) may indicate more strength of association between insurance status. To assess adjusted vaccination coverage and adjusted prevalence ratios for each selected vaccination, we used logistic regression and predicted marginal modeling comparing persons with health insurance and those without health insurance controlling 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. The NHIS was approved by Research Ethics Review Board (the ERB number is 2009-16) of the National Center for Health Statistics, Centers for Disease Control and Prevention.

Results

Characteristics of the study population are shown in Table 1.

Overall, vaccination coverage was significantly lower among adults without health insurance compared with those with health insurance, except for overall hepatitis A vaccination and HepB vaccination of persons ≥ 18 years with diabetes (Table 2): influenza coverage, adults ≥ 18 years (14.4% versus 44.3%), PPSV, 18–64 years with high-risk conditions (9.8% versus 23.0%), Td, ≥ 18 years (53.2% versus 64.5%), Tdap, ≥ 18 years (8.4% versus 15.7%), HepA (≥ 2 doses), 18–49 years traveling to countries of high or intermediate endemicity (16.6% versus 19.8%), HepB (≥ 3 doses), adults 18–49 years (27.5% versus 38.0%), shingles, adults ≥ 60 years (6.1% versus 20.8%), and HPV, females 18–26 years (20.9% versus 39.8%) ($p < 0.05$) (Table 2). Coverage was lower for these vaccinations among those with no insurance compared with those who reported either public or private health insurance. For influenza, pneumococcal, shingles, and HPV vaccination, coverage was two to three times higher among those with health insurance compared with those without insurance (Table 2).

Adult vaccination coverage differed by type of health insurance. Vaccination coverage was significantly higher among adults with private health insurance compared with those reporting public health insurance for pneumococcal vaccination among adults ≥ 65 years, tetanus vaccination among adults ≥ 18 years, Tdap vaccination among adults ≥ 18 years, HepB vaccination among adults 18–49 years and adults ≥ 18 years with diabetes, shingles vaccination among adults ≥ 60 years, and HPV vaccination among women 18–26 years ($p < 0.05$) but lower for influenza vaccination among adults ≥ 18 years, pneumococcal vaccination among adults 18–64 years with high-risk conditions, and HepA vaccination among adults 18–49 years ($p < 0.05$) (Table 2).

Generally, those with a regular physician were more likely to report having received recommended vaccinations than those who did not have a regular physician whether or not they had or did not have health insurance. Among adults with health insurance, coverage

was significantly higher among those who reported having a regular physician compared with those who did not have a regular physician, except for HepA vaccination among travelers. Among adults without health insurance, except for HepA vaccination among travelers and HPV vaccination among females 18–26 years, coverage was significantly higher among adults who had a regular physician compared to those who did not have a regular physician (Table 3).

With a few exceptions (HepA vaccination among travelers, HepB vaccination among adults with diabetes, and HPV vaccination among females 18–26 years) vaccination coverage was significantly higher among those reporting one or more physician contacts in the past year compared with those who had not visited a physician in the past year whether or not they had or did not have health insurance (Table 4). Additionally, vaccination coverage increased as the number of physician contacts increased (Table 4). Among adults who had health insurance and 10 or more physician contacts within the past year, 28.4%–80.4% reported not receiving recommended vaccinations (not receiving tetanus vaccination, 28.4%; PPSV [< 65 years], 30.2%; influenza, 41.1%; PPSV [high-risk, 18–64 years], 61.0%; HPV [females, 18–26 years], 61.4%; HepA [travelers, 18–49 years], 72%; HepB [< 18 years with diabetes], 76.5%; shingles, 76.9%; and, Tdap, 80.4% (Table 4).

Influenza and PPSV vaccination coverage among adults < 65 years were usually higher compared with coverage among adults 18–64 years but Td, Tdap, and HepB coverage among adults < 65 years were usually lower compared with coverage among adults 18–64 years (Table 2–Table 4). Shingles vaccination coverage among adults < 65 years were usually higher compared with coverage among adults 60–64 years (Table 2–Table 4). Additionally, for influenza, pneumococcal, and HepB vaccinations, majority of coverage differences by health insurance status (with insurance versus without insurance) were smaller in 2001 compared with coverage differences by health insurance status in 2012 (Table 5).

Persons without health insurance were significantly less likely than those with health insurance to be vaccinated for influenza (< 18 years), pneumococcal (18–64 years with high-risk conditions), tetanus (< 18 years), Tdap (< 18 years), and HPV (women 18–26 years) after adjusting for confounders (Table 6). The difference in adjusted vaccination coverage between persons with health insurance and persons without health insurance ranged from –0.2% (HepA vaccination among travelers 18–49 years) to 10.9% (influenza vaccination among persons < 18 years) (Table 6).

Discussion

This is the first comprehensive assessment of vaccination coverage by health insurance status among adult populations in the United States. Such information is important for understanding factors that contribute to disparities in vaccination coverage and implementing strategies to improve vaccination coverage.^{2–5, 22–28} Most respondents (83%) in this study indicated having some type of health insurance. Having health insurance was associated with a greater likelihood of having received recommended vaccinations even after adjusting for confounders for influenza, pneumococcal, tetanus, and Tdap. For influenza, pneumococcal, shingles, and HPV vaccination, coverage was two to three times higher

among those with health insurance compared with those without insurance. Wider coverage differences by insurance status (with versus without insurance) in 2012 compared with 2001 may indicate a greater strength of association between health insurance and vaccination in 2012 compared with 2001. Additionally, after controlling demographic and access to care variables based on our multivariable analysis, coverage might increase up to 11 percentage points if those without health insurance had health insurance.

The type of health insurance indicated by respondents had a significant association with vaccination coverage. In this study, vaccination coverage was generally higher among adults with private health insurance compared with those reporting public health insurance. Studies on insurance status and vaccination in children have reported similar findings.^{2, 3, 29, 30} The factors contributing to vaccination levels by type of health insurance are not well understood. In one study, persons with private health insurance declined during 1999 through 2011, ranging from 67% to 74% during 1999 through 2008, and 64% during 2009 through 2011.¹ This downward shift in private insurance coverage could have a negative impact on most adult vaccination coverage. Better understanding is needed of factors influencing vaccination by type of health insurance.

For those 65 years, Medicare covers some vaccinations. Medicare Part B covers influenza, PPSV, and HepB (if people are at high risk). Part B also covers other vaccinations only if people have been exposed to a dangerous virus or disease (e.g., if people step on a rusty nail (acute wound)), Medicare will cover a Td shot). All vaccines other than influenza, PPSV, and HepB are covered under Medicare Part D including shingles. Medicare Part D plan pays for the vaccination itself and for doctor or other health care provider who give people the shot (administration). Those Medicare benefits may remove financial barriers to some vaccinations for those 65 years and help improve vaccination coverage among senior adults.³¹

Vaccination coverage for three vaccines in this report that are included in *Healthy People 2020* (influenza, pneumococcal, and herpes zoster) were well below the respective target levels of 70% for influenza vaccination among adults 18 years, 60% for pneumococcal vaccination among adults 18–64 years with high-risk conditions, 90% for pneumococcal vaccination among adults 65 years, and 30% for shingles vaccination among adults 60 years, even among those with health insurance.^{14, 15} Substantial improvement in vaccination coverage among adult populations, especially among those without health insurance, will be needed to achieve *Healthy People 2020* targets.

Removing cost barriers to adult vaccination might improve coverage.^{23–25} The federal Immunization Grant Program supports the immunization infrastructure to deliver vaccines to underinsured children and, as funding permits, to uninsured and underinsured adults.³² The vaccine manufacturer of HepA, HepB, shingles, and HPV vaccines has implemented a program, the Merck Vaccine Patient Assistance Program, which provides free vaccines to all adults who are uninsured and poor (household income less than \$44,680 for individuals, \$60,520 for couples, or \$92,200 for a family of four).³³ Additionally, this manufacturer sometimes makes exceptions based on individual circumstances in special circumstances of financial or medical hardship.³³ Programs like this might help improve vaccination coverage

among uninsured and poor adult populations. Federal, state, and local partners should continue to build support for adult vaccination and identify other strategies to remove cost barriers for uninsured populations.

Generally, those with a regular physician were more likely to report having received recommended vaccinations than those who did not have a regular physician whether or not they had or did not have health insurance and vaccination coverage generally increased as the number of physician contacts increased. This observation from our study suggests that increased number of physician contacts might have facilitated opportunities to be reminded of the need for vaccinations and discussions about vaccinations that were indicated and a recommendation and decision to vaccinate. These findings are also consistent with previous reports indicating that persons who have a usual place for health care or medical home and who seek medical care one or more times during the year are more likely to be vaccinated and receive other preventive services than those without a usual place for health care.^{30, 34} Studies have shown that healthcare provider recommendations for vaccination are strongly associated with adult vaccination coverage.^{35–38} Having a regular physician and routine physician contact can provide important opportunities for providers to educate their patients about vaccine-preventable diseases, recommend, and offer vaccination.^{23, 35–37} Routine patient reminder and recall, expanded access in health care settings, reduced patient's out-of-pocket costs, provider reminder, standing orders, and provider assessment and feedback should be incorporated into routine clinical care of adults.^{39–41}

The findings in this report are subject to limitations. First, adult vaccination coverage was self-reported and therefore might be subject to recall bias. However, self-reported influenza and PPSV vaccination status among adults have been shown to be fairly sensitive and specific.^{42–46} Adult self-reported vaccination status has also been shown to be sensitive for tetanus, HepA, HepB, HPV, and shingles vaccination and specific for vaccination with all these vaccines, except for tetanus vaccination.⁴⁶ Second, NHIS response rates were 60%–70%, and it is possible that nonresponse bias may have remained after weighting adjustments. Third, self-reported vaccination might be subject to social desirability bias. Third, statistical tests for estimates were conducted with one group as referent and we did not do multiple comparisons. Finally, other factors like cultural, religious, vaccine safety concerns, state immunization intervention programs, lots of other factors may also affect vaccination coverage and NHIS did not collect those kinds of information.

Adult vaccination coverage is low overall and especially low for those without health insurance. Any comprehensive strategy needs to be tailored to the needs of the health care institution to improve coverage among general adults and adults without health insurance.^{39, 40} The Patient Protection and Affordable Care Act (ACA) requires that certain clinical preventive services including all ACIP recommended vaccines be provided without cost sharing in Medicare Part B benefits and by newly qualified private and public health plans. The ACA also encourages state Medicaid programs to provide selected clinical preventive services with no cost-sharing.⁴⁷ Beginning in 2013, state Medicaid programs that eliminate cost sharing for these preventive services may receive enhanced federal matching funds for them.^{47,48} The expanded enrollment in public and private insurance programs expected from provisions of the ACA might improve access to health care services (including vaccination)

for persons who were previously without health insurance. Other provisions of the ACA that create incentives for primary care, including increased payments for primary care services provided by primary care doctors, and coverage without cost sharing⁴⁹ for vaccines recommended by the ACIP, should also help to improve adult vaccination coverage. Additionally, to improve vaccination coverage, routine patient reminder and recall, expanded access in health care settings, reduced patient's out-of-pocket costs, provider reminder, standing orders, and provider assessment and feedback should be incorporated into routine clinical care of adults.^{39–41}

Acknowledgments

We thank James A. Singleton and Stacie M. Greby for their thoughtful review of the manuscript.

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Table 1
 Characteristics of the study population by access to care factors, National Health Interview Survey 2012

Characteristics	All adults		With health insurance		Without health insurance		Regular physician		Physician contacts in the past 12 months			
	N	%	Overall	Public	Private	Yes	No	None	1-3	4-9	10	
Total	34,525	83.0	24.5	75.5	17.0	83.9	16.1	19.7	43.8	23.1	13.4	
Age												
18	34,525	83.0	24.5	75.5	17.0	83.9	16.1	19.7	43.8	23.1	13.4	
18-26	4,558	74.0	23.5	76.5	26.0	72.1	27.9	29.6	45.5	15.5	9.4	
18-49	18,165	76.4	18.4	81.6	23.6	77.3	22.7	26.2	45.3	17.6	10.9	
18-64 HR	9,799	76.6	28.2	71.8	23.4	81.2	18.8	19.5	37.8	24.9	17.8	
60	10,269	95.7	40.2	59.8	4.3	95.0	5.0	8.0	39.2	34.1	18.7	
65	7,382	99.3	48.0	52.0	0.7	96.7	3.3	6.8	37.0	36.0	20.1	
Gender												
Male ^a	15,273	80.7	22.3	77.7	19.3	79.3	20.7	26.7	44.4	18.7	10.3	
Female	19,252	85.1	26.5	73.5	14.9	88.1	11.9	13.2	43.2	27.3	16.3	
Race/Ethnicity												
Non-Hispanic white ^a	20,619	88.4	20.7	79.3	11.6	87.3	12.7	16.0	44.0	25.0	14.9	
Non-Hispanic black	5,119	79.4	36.8	63.2	20.6	84.0	16.0	20.4	45.4	22.6	11.6	
Hispanic	5,859	61.6	37.2	62.8	38.4	69.6	30.4	33.4	40.3	16.9	9.4	
Non-Hispanic Asian	2,108	83.3	19.8	80.2	16.7	81.8	18.2	25.6	47.7	18.2	8.4	
Other	820	83.6	33.4	66.6	16.4	81.8	18.2	19.2	41.3	21.9	17.6	
Marital status												
Married ^a	14,930	87.7	18.5	81.5	12.3	87.8	12.2	16.5	45.8	24.7	13.1	
Widowed/divorced/separated	9,124	85.1	41.4	58.6	14.9	87.8	12.2	14.8	38.3	28.4	18.5	
Never married	10,393	73.3	26.0	74.0	26.7	74.6	25.4	28.3	43.3	17.3	11.1	
Education												
Less than high school ^a	5,487	68.8	55.3	44.7	31.2	76.5	23.5	28.3	35.9	22.1	13.8	
High school graduate	8,938	78.4	29.8	70.2	21.6	82.0	18.0	22.5	41.5	22.4	13.6	

Characteristics	All adults		With health insurance		Without health insurance		Regular physician		Physician contacts in the past 12 months			
	N	%	Overall		Private		Yes	No	None	1-3	4-9	10
			Public	Private	%	%						
Some college/college graduate	16,577	86.9**	17.9**	82.1**	13.1**	85.6**	14.4**	17.4**	46.5**	23.0	13.1	
Higher than college graduate	3,370	96.3**	11.6**	88.4**	3.7**	90.9**	9.1**	11.3**	47.1**	27.4**	14.2	
Employment status												
Employed	20,038	82.7**	10.5**	89.5**	17.3**	81.7**	18.3**	22.5**	48.4**	19.9**	9.2	
Unemployed ^a	2,077	53.6	45.0	55.0	46.4	66.6	33.4	34.6	39.2	16.8	9.4	
Not in work force	12,385	89.1**	46.3	53.7	10.9**	91.3**	8.7**	11.6**	36.1**	30.4**	22.0**	
Poverty level												
At or above poverty	24,725	85.9**	18.1**	81.9**	14.1**	85.4**	14.6**	18.1**	45.6**	23.4**	12.9**	
Below poverty ^a	6,008	64.9	67.6	32.4	35.1	73.5	26.5	29.1	33.5	20.5	16.9	
Self-reported health status												
Excellent/very good ^a	19,602	84.1	16.3	83.7*	15.9*	82.6	17.4*	21.9	49.5	19.8	8.8*	
Good	9,636	81.2**	28.4**	71.6**	18.8**	84.6**	15.4**	18.2**	40.3**	26.8**	14.7**	
Fair	3,999	80.8**	52.1**	47.9**	19.2**	87.3**	12.7**	14.1**	26.0**	31.9**	27.9**	
Poor	1,270	84.6	67.0**	33.0**	15.4	92.6**	7.4**	6.6**	16.7**	29.3**	47.4**	
US born status												
U.S. born ^a	27,956	86.2	23.4	76.6*	13.8*	86.1	13.9*	17.3	44.1	24.1	14.4*	
Born outside U.S. -- In U.S. 10 yrs	1,339	52.1**	25.5	74.5	47.9**	55.7**	44.3**	42.1**	39.4**	12.9**	5.6**	
Born outside U.S. -- In U.S. > 10 yrs	5,167	72.1**	32.5**	67.5**	27.9**	77.9**	22.1**	27.6**	42.7**	19.9**	9.8**	
Region of residence												
Northeast ^d	5,774	88.3	23.6	76.4*	11.7*	89.7	10.3*	16.3	44.9	24.9	13.9*	
Midwest	7,193	86.2**	19.2**	80.8**	13.8**	85.8**	14.2**	17.8	45.3	22.9**	14.0	
South	12,536	79.8**	26.8**	73.2**	20.2**	81.8**	18.2**	20.5**	42.8**	23.7	13.0	
West	9,022	80.7**	27.4**	72.6**	19.3**	80.6**	19.4**	23.0**	42.8**	21.0**	13.1	

Note: Boldface indicates significance.

^aReference level

p < 0.05 by chi-square test (comparing health insurance (yes/no), private vs. public insurance, regular physician (yes/no), and physician contacts in the past 12 months by each demographic variable)

* p < 0.05 by chi-square test (comparing within each demographic variable with the indicated reference level)

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Table 2
Adult vaccination coverage by health insurance status in the U.S., National Health Interview Survey 2012

	All adults			With health insurance		Without health insurance	
	% (95% CI)	Overall	Public	Private	% (95% CI)	% (95% CI)	
Influenza vaccination (2011–12 season)^a							
18+	39.2 (38.3, 40.2)	44.3 (43.3, 45.4) *	50.8 (48.8, 52.8) **	42.3 (41.1, 43.5) *	14.4 (12.8, 16.1)		
18–64	32.6 (31.6, 33.6)	37.3 (36.2, 38.5) *	39.4 (36.7, 42.2) *	36.9 (35.6, 38.1) *	14.3 (12.8, 16.0)		
65+	70.1 (68.2, 72.0) ***	70.5 (68.6, 72.4) ***	66.6 (63.9, 69.3) **	74.0 (71.5, 76.5) ***	23.4 (12.9, 40.1)		
Pneumococcal vaccination (ever received)							
18–64 HR	19.9 (18.8–21.0)	23.0 (21.7–24.4) *	29.8 (27.1–32.8) **	20.4 (18.9–21.9) *	9.8 (8.4–11.4)		
65+	59.9 (58.4–61.4) ***	60.2 (58.7–61.7) ***	56.4 (53.9–58.7) **	63.7 (61.8–65.5) ***	-- <i>b</i>		
Tetanus vaccination (past 10 yrs)							
18+	62.5 (61.8–63.3)	64.5 (63.6–65.3) *	59.2 (57.6–60.8) **	66.2 (65.2–67.1) *	53.2 (51.5–54.9)		
18–64	64.1 (63.3–64.9)	66.9 (66.0–67.8) *	63.8 (61.8–65.8) **	67.6 (66.6–68.5) *	53.4 (51.7–55.1)		
65+	55.1 (53.6–56.7) ***	55.4 (53.8–56.9) ***	52.6 (50.4–54.8) **	57.9 (55.8–60.0) ***	26.2 (14.1–43.4) ***		
Tetanus vaccination including pertussis vaccine (past 7 yrs)							
18+	14.3 (13.7–15.0)	15.7 (15.0–16.4) *	10.7 (9.5–12.0) **	17.3 (16.5–18.1) *	8.4 (7.2–9.6)		
18–64	15.7 (15.0–16.5)	17.8 (17.0–18.7) *	13.4 (11.7–15.3) **	18.8 (17.9–19.7) *	8.4 (7.3–9.7)		
65+	8.0 (7.0–9.1) ***	8.1 (7.1–9.2) ***	7.2 (5.9–8.8) **	8.9 (7.5–10.5) ***	0.0 (-, -) ***		
Hepatitis A vaccination (2 doses)							
18–49 among travelers	19.1 (17.7–20.6)	19.8 (18.2–21.4)	24.6 (20.0–29.9) **	19.2 (17.5–21.0)	16.6 (13.8–19.9)		
Hepatitis B vaccination (3 doses)							
18–49	35.5 (34.5–36.5)	38.0 (36.9–39.2) *	34.4 (31.9–37.0) **	38.8 (37.5–40.1) *	27.5 (25.7–29.3)		
18+ with diabetes	21.2 (19.3–23.1)	21.3 (19.4–23.3)	16.9 (14.4–19.8) **	24.3 (21.6–27.3)	20.2 (15.0–26.5)		
18–64 with diabetes	27.1 (24.4–30.1)	28.5 (25.5–31.6) *	25.5 (20.3–31.4)	30.0 (26.3–34.0) *	20.2 (15.0–26.7)		
65+ with diabetes	12.0 (9.9–14.5) ***	12.0 (9.9–14.5) ***	9.7 (7.3–12.7) **	14.4 (11.1–18.4) ***	-- <i>b</i>		
Shingles vaccination (ever received)							

	All adults			With health insurance		Without health insurance	
	% (95% CI)	Overall	Public	Private	% (95% CI)	% (95% CI)	
60+	20.1 (19.1–21.2)	20.8 (19.8–21.9)*	17.7 (16.3–19.2)*,***	22.9 (21.4–24.5)*	6.1 (3.9–9.5)		
60–64	14.0 (12.4–15.7)	15.1 (13.4–17.1)*	8.4 (6.1–11.4)**	16.8 (14.7–19.1)*	6.5 (4.0–10.2)		
65+	22.9 (21.6–24.2)***	23.0 (21.8–24.4)***	19.2 (17.6–20.9)**,*	26.6 (24.6–28.6)***	-- <i>b</i>		
Human papillomavirus vaccination (1 dose)							
18–26 Male	3.7 (2.7–5.1)	4.2 (2.9–6.0)	-- <i>b</i>	3.5 (2.3–5.3)	-- <i>b</i>		
18–26 Female	35.6 (33.0–38.3)	39.8 (36.7–42.9)*	30.4 (25.2–36.2)*,***	43.4 (39.7–47.2)*	20.9 (16.8–25.7)		

Note: Boldface indicates significance.

Abbreviations: CI=Confidence interval.

^aInfluenza vaccination coverage estimates are based on interviews conducted during September 2011 through June 2012, and vaccination received during August 2011 through May 2012.

^bEstimates may not be reliable due to sample size < 30 or relative standard error (RSE) > 30%.

* p < 0.05 by chi-square test (comparing health insurance types with “without health insurance” as the reference group).

** p < 0.05 by chi-square test (private health insurance vs. public health insurance)

*** p < 0.05 by chi-square test (comparing persons 18–64 years with 65+ years for influenza, tetanus, and Tdap; persons 18–64 years with high-risk conditions to persons 65+ years for pneumococcal; persons 18–64 years with diabetes with 65+ with diabetes for Hepatitis B; persons 60–64 years with 65+ years for shingles).

Table 3

Adult vaccination coverage by health insurance and regular physician status, National Health Interview Survey 2012

	With health insurance						Without health insurance					
	With a regular physician			Without a regular physician			With a regular physician			Without a regular physician		
	N ^a	% (95% CI)	N	% (95% CI)	N	% (95% CI)	N	% (95% CI)	N	% (95% CI)	N	% (95% CI)
Influenza vaccination (2011–12 season)^b												
18+	145.0	47.0 (45.9, 48.1)	14.0	18.0 (15.5, 20.9) *	16.1	21.7 (19.1, 24.7)	17.1	7.6 (6.2, 9.2)*				
18–64	112.6	39.7 (38.5, 41.0)	13.0	17.4 (14.8, 20.4) *	16.0	21.6 (18.9, 24.5)	17.0	7.6 (6.2, 9.2) *				
65+	32.4	71.8 (69.9, 73.7) **	0.9	26.9 (19.8, 35.9) *,**	0.1	--c	0.1	--c				
Pneumococcal vaccination (ever received)												
18–64 HR	45.4	24.5 (23.1–26.0)	4.8	8.5 (6.3–11.4) *	7.8	12.8 (10.7–15.2)	7.5	6.8 (5.0–9.0) *				
65+	39.7	61.4 (59.8–62.9) **	1.2	20.7 (15.1–27.7) *,**	0.1	--c	0.1	--c				
Tetanus vaccination (past 10 yrs)												
18+	175.3	65.2 (64.4–66.0)	17.0	57.0 (54.3–59.7) *	19.0	58.6 (56.3–60.9)	20.3	48.1 (45.7–50.5) *				
18–64	135.6	67.9 (67.0–68.8)	15.8	58.3 (55.5–61.1) *	18.9	58.8 (56.5–61.1)	20.1	48.3 (45.9–50.7) *				
65+	39.7	55.8 (54.3–57.4) **	1.2	40.1 (31.4–49.6) *,**	0.1	--c	0.1	--c				
Tetanus vaccination including pertussis vaccine (past 7 yrs)												
18+	175.3	16.2 (15.4–17.0)	17.0	11.0 (9.1–13.3) *	19.0	11.0 (9.2–13.2)	20.3	6.0 (4.8–7.6) *				
18–64	135.6	18.6 (17.7–19.5)	15.8	11.8 (9.7–14.2) *	18.9	11.1 (9.2–13.3)	20.1	6.1 (4.8–7.6) *				
65+	39.7	8.3 (7.3–9.5) **	1.2	--c	0.1	--c	0.1	--c				
Hepatitis A vaccination (2 doses)												
18–49 among travelers	32.6	19.9 (18.2–21.7)	5.1	18.9 (15.4–23.0)	3.9	17.7 (13.5–22.8)	5.1	15.8 (12.4–20.0)				
Hepatitis B vaccination (3 doses)												
18–49	87.0	38.6 (37.3–39.8)	12.8	34.3 (31.4–37.3) *	13.9	29.5 (26.9–32.3)	16.8	25.8 (23.4–28.3) *				
18+ with diabetes	18.8	21.3 (19.4–23.4)	0.3	--c	1.5	21.8 (15.8–29.2)	0.5	--c				
18–64 with diabetes	10.6	28.6 (25.6–31.8)	0.2	--c	1.5	21.9 (15.9–29.3)	0.5	--c				
65+ with diabetes	8.2	12.1 (9.9–14.6) **	0.1	--c	0.0	--c	0.0	--c				
Shingles vaccination (ever received)												

	With health insurance						Without health insurance					
	With a regular physician			Without a regular physician			With a regular physician			Without a regular physician		
	N ^a	% (95% CI)	N	% (95% CI)	N	% (95% CI)	N	% (95% CI)	N	% (95% CI)	N	% (95% CI)
60+	55.0	21.2 (20.1–22.4)	2.0	8.9 (5.8–13.5) *	1.6	7.6 (4.6–12.5)	1.0	..c	..c	..c	..c	
60–64	15.2	15.6 (13.8–17.6)	0.7	..c	1.4	7.8 (4.6–13.1)	0.9	..c	..c	..c	..c	
65+	39.7	23.4 (22.0–24.8) **	1.2	11.6 (7.4–17.7) *	0.1	..c	0.1	..c	..c	..c	..c	
Human papillomavirus vaccination (1 dose)												
18–26 Male	10.4	5.1 (3.5–7.4)	2.8	..c	2.0	..c	3.6	..c	..c	..c	..c	
18–26 Female	12.6	42.0 (38.7–45.4)	2.1	24.6 (17.7–33.2) *	2.2	22.7 (17.0–29.5)	2.0	19.0 (13.7–25.8)	..c	..c	..c	

Note: Boldface indicates significance.

Abbreviations: CI=Confidence interval.

^aWeighted sample size in millions

^bInfluenza vaccination coverage estimates are based on interviews conducted during September 2011 through June 2012, and vaccination received during August 2011 through May 2012.

^cEstimates may not be reliable due to sample size < 30 or relative standard error (RSE) > 30%.

* p < 0.05 by chi-square test (with regular physician vs. without regular physician).

** p < 0.05 by chi-square test (comparing persons 18–64 years with 65+ years for influenza, tetanus, and Tdap; persons 18–64 years with high-risk conditions to persons 65+ years for pneumococcal; persons 18–64 years with diabetes with 65+ with diabetes for Hepatitis B; persons 60–64 years with 65+ years for shingles).

Table 4

Adult vaccination coverage by health insurance and physician contacts, National Health Interview Survey 2012

	N ^a	Without health insurance														
		With health insurance					Without health insurance									
		Physician contacts in the past 12 months		Physician contacts in the past 12 months		Physician contacts in the past 12 months		Physician contacts in the past 12 months		Physician contacts in the past 12 months						
	None	1-3	4-9	10	None	1-3	4-9	10	None	1-3	4-9	10				
	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)				
Influenza vaccination (2011-12 season)^b																
18+	20.5	20.7 (18.6, 23.1)	71.7	39.9 (38.4, 41.5) [*]	42.2	55.8 (53.7, 57.9) [*]	23.1	58.1 (55.3, 60.9) [*]	15.8	8.0 (6.4, 9.9)	11.6	14.8 (12.5, 17.6) [*]	3.5	28.7 (22.2, 36.7) [*]	2.0	39.3 (29.8, 50.5) [*]
18-64	18.5	19.1 (16.8, 21.6)	59.8	34.7 (33.0, 36.4) [*]	29.7	47.0 (44.6, 49.4) [*]	16.7	50.3 (46.9, 53.7) [*]	15.7	7.9 (6.3, 9.8)	11.5	14.8 (12.4, 17.6) [*]	3.5	28.7 (22.2, 36.7) [*]	1.9	39.1 (29.6, 50.3) [*]
65+	2.0	35.7 (29.3, 43.0) ^{**}	12.0	66.1 (63.0, 69.2) ^{*,**}	12.5	76.0 (72.9, 78.9) ^{*,**}	6.5	78.3 (74.3, 82.0) ^{*,**}	0.1	--c	0.1	--c	0.0	--c	0.0	--c
Pneumococcal vaccination (ever received)																
18-64 HR	6.0	8.9 (6.7-11.8)	19.2	17.8 (15.9-19.9) [*]	14.1	24.3 (22.0-26.8) [*]	10.3	39.0 (35.6-42.5) [*]	6.6	6.1 (4.4-8.3)	5.3	10.4 (8.2-13.1) [*]	2.1	17.8 (13.1-23.8) [*]	1.2	14.8 (10.1-21.2) [*]
65+	2.6	31.3 (26.2-36.9) ^{**}	15.0	55.7 (53.2-58.1) ^{*,**}	14.7	64.8 (62.3-67.2) ^{*,**}	8.2	69.8 (66.5-72.9) ^{*,**}	0.2	--c	0.1	--c	0.0	--c	0.0	--c
Tetanus vaccination (past 10 yrs)																
18+	26.0	55.4 (53.4-57.5)	86.9	64.3 (63.1-65.5) [*]	49.2	65.5 (64.0-67.0) [*]	28.5	71.6 (69.9-73.4) [*]	19.2	46.7 (44.2-49.2)	13.5	56.9 (54.1-59.7) [*]	4.0	61.2 (55.8-66.2) [*]	2.3	71.5 (65.0-77.3) [*]
18-64	23.4	57.4 (55.2-59.6)	71.9	66.3 (65.0-67.6) [*]	34.5	69.7 (68.0-71.4) [*]	20.3	75.0 (73.0-77.0) [*]	19.0	46.9 (44.4-49.4)	13.4	57.0 (54.2-59.8) [*]	3.9	61.5 (56.2-66.6) [*]	2.3	71.5 (64.9-77.2) [*]
65+	2.6	37.6 (32.6-42.9) ^{**}	15.0	54.3 (51.7-56.9) ^{*,**}	14.7	55.4 (52.9-57.9) ^{*,**}	8.2	63.1 (59.9-66.3) ^{*,**}	0.2	--c	0.1	--c	0.0	--c	0.0	--c
Tetanus vaccination including pertussis vaccine (past 7 yrs)																
18+	26.0	9.5 (8.1-11.2)	86.9	16.2 (15.2-17.3) [*]	49.2	16.3 (14.9-17.7) [*]	28.5	19.6 (17.6-21.8) [*]	19.2	5.4 (4.3-6.7)	13.5	9.5 (7.6-11.9) [*]	4.0	13.5 (9.8-18.2) [*]	2.3	19.8 (12.6-29.7) [*]
18-64	23.4	10.0 (8.5-11.8)	71.9	18.1 (16.9-19.3) [*]	34.5	19.6 (17.9-21.5) [*]	20.3	24.0 (21.4-26.8) [*]	19.0	5.4 (4.4-6.7)	13.4	9.6 (7.7-12.0) [*]	3.9	13.6 (9.9-18.4) [*]	2.3	19.8 (12.6-29.7) [*]
65+	2.6	--c	15.0	7.6 (6.1-9.3) ^{**}	14.7	8.6 (7.0-10.5) ^{**}	8.2	9.4 (7.2-12.2) ^{**}	0.2	0.0 (-,*) ^{**}	0.1	--c	0.0	--c	0.0	--c
Hepatitis A vaccination (2 doses)																
18-49 among travelers	6.2	17.3 (14.2-21.0)	18.8	18.2 (16.2-20.4)	8.1	20.7 (17.5-24.4)	4.6	28.0 (23.3-33.3) [*]	4.4	15.2 (11.4-19.8)	3.3	17.7 (13.2-23.4)	0.8	17.9 (11.2-27.6)	0.5	21.2 (12.0-34.6)
Hepatitis B vaccination (3 doses)																
18-49	18.1	32.4 (30.0-35.0)	48.2	36.3 (34.6-38.0) [*]	20.4	41.8 (39.4-44.4) [*]	12.4	47.5 (44.0-51.0) [*]	15.8	22.4 (20.1-24.9)	10.3	32.1 (29.1-35.2) [*]	2.5	36.6 (30.2-43.5) [*]	1.8	31.2 (23.9-39.7) [*]
18+ with diabetes	0.6	22.1 (12.6-35.8)	5.2	21.2 (17.7-25.1)	7.6	19.8 (17.1-22.9)	5.3	23.5 (19.9-27.5)	0.4	--c	0.7	21.5 (12.8-33.9)	0.7	20.9 (12.0-33.8)	0.3	27.3 (14.4-45.7)
18-64 with diabetes	0.4	29.2 (15.8-47.4)	3.3	26.8 (21.9-32.3)	4.1	28.5 (24.0-33.4)	2.9	30.9 (25.2-37.2)	0.3	--c	0.7	21.7 (12.9-34.2)	0.7	20.5 (11.6-33.6)	0.3	28.0 (14.7-46.7)

	Without health insurance												
	With health insurance					Without health insurance							
	Physician contacts in the past 12 months					Physician contacts in the past 12 months							
	None	1-3	4-9	10	None	1-3	4-9	10	None	1-3	4-9	10	
	% (95% CI)	N	% (95% CI)	N	% (95% CI)	N	% (95% CI)	N	% (95% CI)	N	% (95% CI)	N	% (95% CI)
65+ with diabetes	0.2	1.9	11.7 (8.0-16.8)**	3.5	9.7 (7.2-13.0)**	2.4	15.1 (10.8-20.9)**	0.0	--c	0.0	--c	0.0	--c
Shingles vaccination (ever received)													
60+	3.8	22.0	21.3 (19.7-23.0)*	19.5	21.6 (19.7-23.5)*	10.8	23.1 (20.6-25.9)*	0.9	--c	1.0	--c	0.5	--c
60-64	1.2	7.0	16.8 (14.1-19.8)	4.9	14.8 (11.5-18.9)	2.6	15.8 (11.9-20.7)	0.7	--c	0.9	--c	0.5	--c
65+	2.6	15.0	23.4 (21.5-25.4)**	14.7	23.8 (21.7-26.1)**	8.2	25.5 (22.6-28.7)**	0.2	--c	0.1	--c	0.0	--c
Human papillomavirus vaccination (1 dose)													
18-26 Male	4.1	6.8	5.1 (3.2-7.9)	1.4	--c	0.7	--c	3.6	--c	1.6	--c	0.2	--c
18-26 Female	1.7	6.9	41.2 (36.5-46.1)*	3.7	43.0 (37.5-48.7)*	2.3	38.6 (31.3-46.5)	1.6	17.3 (11.6-24.9)	1.6	21.0 (14.7-29.2)	0.5	30.3 (17.5-47.2)

Note: Boldface indicates significance.

Abbreviations: CI=Confidence interval.

^aWeighted sample size in millions.

^bInfluenza vaccination coverage estimates are based on interviews conducted during September 2011 through June 2012, and vaccination received during August 2011 through May 2012.

^cEstimates may not be reliable due to sample size < 30 or relative standard error (RSE) > 30%.

* p < 0.05 by t-test (comparing physician contacts where "none" is the reference group).

** p < 0.05 by t-test (comparing persons 18-64 years with 65+ years for influenza, tetanus, and Tdap; persons 18-64 years with high-risk conditions to persons 65+ years for pneumococcal; persons 18-64 years with diabetes with 65+ with diabetes for Hepatitis B; persons 60-64 years with 65+ years for shingles).

Table 5
Adult vaccination coverage by health insurance status in the U.S., National Health Interview Survey 2001 and 2012

	2012		2001		Difference
	With health insurance % (95% CI)	Without health insurance % (95% CI)	With health insurance % (95% CI)	Without health insurance % (95% CI)	
Influenza vaccination (past 12 months)^b					
18+	44.3 (43.3, 45.4)	14.4 (12.8, 16.1)	29.9* (28.5–29.8)	9.9 (9.1–10.9)	19.2*
18–64	37.3 (36.2, 38.5)	14.3 (12.8, 16.0)	23.0* (20.7–22.0)	9.6 (8.8–10.5)	11.7*
65+	70.5 (68.6, 72.4)	23.4 (12.9, 40.1)	47.1* (61.9–64.7)	38.1 (24.3–54.1)	25.1*
Pneumococcal vaccination (ever received)					
18–64 HR	23.0 (21.7–24.4)	9.8 (8.4–11.4)	13.2* (16.9–19.7)	11.3 (8.7–14.4)	7.0*
65+	60.2 (58.7–61.7)	--c	54.2 (52.6–55.7)	23.5 (12.9–38.9)	30.6*
Hepatitis B vaccination (3 doses)					
18–49	38.0 (36.9–39.2)	27.5 (25.7–29.3)	10.6* (25.2–27.1)	19.3 (17.8–20.8)	6.8*
18+ with diabetes	21.3 (19.4–23.3)	20.2 (15.0–26.5)	1.1 (11.1–14.5)	17.6 (12.3–24.4)	–4.9
18–64 with diabetes	28.5 (25.5–31.6)	20.2 (15.0–26.7)	8.2* (16.2–21.6)	16.6 (11.5–23.3)	2.1
65+ with diabetes	12.0 (9.9–14.5)	--c	4.2 (2.9–6.1)	--c	--c

Note: Boldface indicates significance.

Abbreviations: CI=Confidence interval.

^aVaccination coverage estimate among those with health insurance minus vaccination coverage estimate among those without health insurance.

^bInfluenza vaccination coverage estimates are based on proportion of respondents who answered that they had received a flu shot in the past 12 months.

^cEstimates may not be reliable due to sample size < 30 or relative standard error (RSE) > 30%.

* p < 0.05 by chi-square test (comparing with health insurance to without health insurance).

Table 6

Adjusted adult vaccination coverage by health insurance status, United States, National Health Interview Survey 2012

	With health insurance			Without health insurance			Difference ^b
	Adjusted ^a vaccination coverage (95% CI)	Adjusted prevalence ratio (95% CI)	Adjusted vaccination coverage (95% CI)	Adjusted prevalence ratio (95% CI)	Adjusted vaccination coverage (95% CI)	Adjusted prevalence ratio (95% CI)	
Influenza vaccination (2011–12 season)^c							
18+	30.9 (29.8, 32.0)	Reference	20.0 (17.8, 22.4)		0.6 (0.6, 0.7)*		10.9
Pneumococcal vaccination (ever received)							
18–64 HR	14.6 (13.0, 16.4)	Reference	10.1 (8.3, 12.2)		0.7 (0.5, 0.9)*		4.5
65+	51.9 (49.4, 54.3)	Reference	41.6 (21.5, 65.0)		0.8 (0.5, 1.4)		10.3
Tetanus vaccination (past 10 yrs)							
18+	61.3 (60.1, 62.4)	Reference	57.5 (55.3, 59.7)		0.9 (0.9, 1.0)*		3.8
Tetanus vaccination including pertussis vaccine (past 7 yrs)							
18+	13.9 (13.1, 14.8)	Reference	10.6 (8.9, 12.5)		0.8 (0.6, 0.9)*		3.4
Hepatitis A vaccination (2 doses)							
18–49 among travelers	17.7 (15.9, 19.6)	Reference	17.9 (14.1, 22.4)		1.0 (0.8, 1.3)		–0.2
Hepatitis B vaccination (3 doses)							
18–49	33.6 (32.1, 35.1)	Reference	32.1 (29.6, 34.7)		1.0 (0.9, 1.0)		1.5
18+ with diabetes	22.3 (18.6, 26.6)	Reference	19.4 (12.1, 29.6)		0.9 (0.5, 1.4)		2.9
Shingles vaccination (ever received)							
60+	18.7 (17.1, 20.4)	Reference	15.5 (9.2, 25.1)		0.8 (0.5, 1.4)		3.1
Human papillomavirus vaccination (1 dose)							
18–26 Male	-- <i>d</i>	Reference	-- <i>d</i>		-- <i>d</i>		-- <i>d</i>
18–26 Female	34.9 (30.9, 39.2)	Reference	29.5 (22.6, 37.5)		0.8 (0.6, 1.1)		5.4

Note: Boldface indicates significance.

Abbreviations: CI=Confidence interval.

^aMultivariable logistic model was conducted to get adjusted vaccination coverage (adjusted for age, gender, race/ethnicity, marital status, education, employment status, poverty level, number of physician contacts in the past year, usual source of care, self-reported health status, US born status, region of residence).

^bAdjusted vaccination coverage among those with health insurance minus adjusted vaccination coverage among those without health insurance.

^cInfluenza vaccination coverage estimates are based on interviews conducted during September 2011 through June 2012, and vaccination received during the past 12 months.

^dNot enough sample size to run adjusted models.

* $p < 0.05$.

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