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Vaccination coverage estimates from the National Health Interview Survey: United States, 2008

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Although vaccinations are responsible for reducing morbidity and mortality from several diseases, vaccination uptake among certain population subgroups remains low, and national health objectives have not been met (1-3). Despite 2010 influenza and pneumococcal vaccination objectives of 90% for adults aged 65 years and over and 60% for younger high-risk adults, only 66% and 35% of these groups, respectively, received an influenza vaccination during the 2006-2007 vaccination period (primarily September-February) (1-2). Similarly, only 60% of adults aged 65 years and over have ever received a pneumococcal vaccination, and levels vary considerably by race/ethnicity (3). The National Health Interview Survey (NHIS) historically includes several questions on receipt of well-established vaccinations and recently added questions on newly licensed vaccines. This Health E-Stat provides information on vaccination coverage for influenza, pneumococcal disease, tetanus (including pertussis), shingles, hepatitis A, hepatitis B, and human papillomavirus (HPV) by selected characteristics (age, vaccination target group status, and race/ethnicity) in Tables 1 and 2. Findings about coverage of new vaccines are highlighted here.

The prevalence of tetanus vaccination during the past 10 years was over 60% for adults aged 19-49 years and 50-64 years, compared with 52% for older adults (Table 2). Among all age groups, non-Hispanic whites (19-49 years: 69%, 50-64 years: 66%, 65 years and over: 54%) were more likely than non-Hispanic blacks (19-49 years: 57%, 50-64 years: 52%, 65 years and over: 37%) and Hispanics (19-49 years: 51%, 50-64 years: 48%, 65 years and over: 48%) to have been vaccinated. Approximately half (52%) of adults aged 19-64 years who had received a tetanus shot since 2005, when Tdap (the pertussis-containing tetanus vaccine) was first available, were given this recommended vaccine. Rates were similar among the racial/ethnic groups examined (non-Hispanic whites: 50%, non-Hispanic blacks: 56%, Hispanics: 53%).

The rate of shingles vaccination—licensed in May 2006 for adults aged 60 years and over—was 7% for this age group (Table 2). Rates were higher for non-Hispanic whites

(8%) than for non-Hispanic blacks (3%) and Hispanics (2%). Among adults aged 50-59 years, 3% had received the vaccination (results not shown). Low coverage may be related to the many barriers that exist for shingles vaccination for both physicians and patients, including high vaccine cost and substantial up-front out-of-pocket expense, complex methods for reimbursement, and a requirement for freezer storage (4-5).

A vaccine for HPV was licensed in 2006, and recommendations published by the Centers for Disease Control and Prevention in March 2007 included catch-up vaccination for females aged 13-26 years (6). Eleven percent of women aged 19-26 years received at least one HPV vaccination (Table 2), and 6% received three or more doses (results not shown). Levels were higher among non-Hispanic whites (13%) than among non-Hispanic blacks (7%) and Hispanics (6%). Among women aged 27-49 years, 0.8% had at least initiated the vaccination series (results not shown). Low rates of HPV vaccination exist despite reportedly high awareness of both the disease and the vaccine (approximately 80%) (7). This study (7) also found that women of higher socioeconomic status were more likely to be vaccinated. Estimates of HPV vaccination were calculated for a period not long (10 to 21 months) after the publication of the recommendations. Low coverage may be related to a variety of factors including high cost of the vaccine and because the primary target group for HPV vaccine is females aged 11-12 years old.

The NHIS—a nationally representative survey of the civilian noninstitutionalized household population of the United States conducted throughout the year from January through December—uses in-person interviews to collect information on health and health care for all eligible members of the sampled households. Information on adult vaccinations is self-reported by one randomly sampled adult within a family, except in rare cases when the selected adult is physically or mentally incapable of responding. Information on child vaccinations is provided by a knowledgeable adult household member. Vaccination questions are provided in the table footnotes. Analyses were based on data for 21,781 adults and 8,815 children. Estimates were calculated using SUDAAN software (8), to account for the complex sample design of the NHIS, and were weighted to reflect the U.S. civilian noninstitutionalized population. Estimates shown have less than or equal to 30% relative standard error. Estimates were compared using two-tailed significance tests at the 0.05 level, with no adjustment for multiple comparisons. Visit the NHIS website for more information.

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Table 1. Percentage of persons aged 6 months and over who had received an influenza vaccination during September 2007 through February 2008 (2007-2008 influenza season), by age group, high-risk status, health care personnel status, and race/ethnicity: United States, 2008

Age group, high-risk[1] (HR) status, health care personnel[2] status, and race/ethnicity[3]	Sample size	Percent (95% CI)
6 months-18 years[4]	4,091	26.5 (24.81-28.19)
6-23 months[5]	270	49.2 (41.77-56.63)
2-4 years	638	40.3 (35.34-45.26)
5-18 years, HR	262	38.0 (30.67-45.33)
5-18 years, non-HR	2,915	20.5 (18.70-22.30)
5-12 years, non-HR	1,568	25.2 (22.59-27.81)
13-18 years, non-HR	1,347	14.6 (12.35-16.85)
19-49 years, HR		
Total	1,016	30.0 (26.47-33.53)
Not Hispanic or Latino, single race, white	624	30.3 (25.91-34.69)
Not Hispanic or Latino, single race, black	185	33.4 (24.68-42.12)
Hispanic or Latino	172	23.7 (16.10-31.30)
19-49 years, non-HR		
Total	5,984	17.4 (16.26-18.54)
Not Hispanic or Latino, single race, white	3,137	19.3 (17.77-20.83)
Not Hispanic or Latino, single race, black	986	12.9 (10.47-15.33)
Hispanic or Latino	1,379	13.0 (10.80-15.20)
50-64 years		
Total	3,155	38.7 (36.70-40.70)
Not Hispanic or Latino, single race, white	2,099	40.9 (38.57-43.23)
Not Hispanic or Latino, single race, black	493	32.1 (26.93-37.27)
Hispanic or Latino	399	30.0 (24.79-35.21)
50-64 years, HR		
Total	988	48.8 (45.06-52.54)
Not Hispanic or Latino, single race, white	629	49.3 (44.73-53.87)
Not Hispanic or Latino, single race, black	173	45.4 (36.05-54.75)
Hispanic or Latino	143	47.5 (37.66-57.34)
50-64 years, non-HR		
Total	2,158	34.4 (32.05-36.75)
Not Hispanic or Latino, single race, white	1,463	37.4 (34.62-40.18)
Not Hispanic or Latino, single race, black	320	25.8 (20.02-31.58)
Hispanic or Latino	256	21.9 (15.88-27.92)
19-64 years, health care personnel		
Total	945	45.4 (41.95-48.85)
Not Hispanic or Latino, single race, white	543	49.6 (45.41-53.79)
Not Hispanic or Latino, single race, black	211	30.4 (22.68-38.12)
Hispanic or Latino	136	40.0 (29.65-50.35)
65 years and over		
Total	2,595	66.6 (64.58-68.62)
Not Hispanic or Latino, single race, white	1,835	69.4 (67.13-71.67)
Not Hispanic or Latino, single race, black	365	53.2 (47.57-58.83)
Hispanic or Latino	262	51.2 (44.09-58.31)

[1] Children under age 18 years were considered at high risk for influenza-related complications if they had ever been told by a doctor or other health professional that they had diabetes, cystic fibrosis, sickle cell anemia, congenital heart disease, other heart disease, or neuromuscular conditions (seizures, cerebral palsy, and muscular dystrophy); or had an asthma episode or attack during the preceding 12 months. Adults were considered at high risk for influenza-related complications if they had ever been told by a doctor or other health professional that they had diabetes, emphysema, 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; or had an asthma episode or attack during the preceding 12 months.

[2] Adults were classified as health care personnel if they were currently employed in a health care occupation or in a health care industry setting, on the basis of standard occupation and industry categories.

[3] Persons who indicated a single race other than the race groups shown are included in the total but are not shown separately due to small sample sizes. Therefore, the frequencies for totals will be greater than the sum of the frequencies for the specific groups shown separately. Persons of Hispanic or Latino origin may be of any race or combination of races. The tables in this report use the complete current (1997) Office of Management and Budget race and Hispanic origin terms, and the text uses shorter versions of these terms, for conciseness.

[4] Starting with the 2008-2009 influenza season, the Advisory Committee on Immunization Practices (ACIP) expanded its child recommendation for annual influenza vaccination to include all children aged 6 months through 18 years. Prior to the 2008-2009 influenza season, ACIP's child annual influenza vaccination recommendation was limited to all children aged 6 months through 4 years and children aged 5 through 18 years at high risk for serious complications from influenza. Starting with the 2007-2008 influenza season, all children aged 6 months through 8 years who have no prior influenza vaccination should receive two doses of vaccine (4 or more weeks apart) the first year they are vaccinated (and if not the first year, the second year). For the 2008-2009 season this included most children aged 6-23 months, as well as those aged 2 through 18 years previously unvaccinated or in their second year following a one-dose first year.

[5] The National Immunization Survey (NIS) is the usual source of influenza vaccination estimates for children aged 6-23 months, including estimates of the proportion fully vaccinated with two doses as indicated. Estimates based on the NIS will be available in fall 2009.

NOTES: CI is confidence interval. Respondents were asked in separate questions if they had received a flu shot during the past 12 months and if they had received a flu vaccine sprayed in their nose during the past 12 months. If so, month and year of most recent shot/vaccine were asked for each question. Estimates were based on interviews conducted during March through August and included vaccinations received from September 2007 through February 2008. Inclusion and development of the vaccination questions on the NHIS were supported, in part, by the National Center for Immunization and Respiratory Diseases, Centers for Disease Control and Prevention.

DATA SOURCE: CDC\NCHS, National Health Interview Survey, 2008. Estimates are based on household interviews of a sample of the civilian noninstitutionalized population.

Table 2. Percentage of adults aged 19 years and over who had received selected vaccinations, by age group, high-risk status, health care personnel status, and race/ethnicity: United States, 2008

Vaccination, age group, high-risk[1] (HR) status, health care personnel[2] status, and race/ethnicity[3]	Sample size	Percent (95% CI)
Pneumococcal vaccination,[4] ever		
19-64 years, HR		
Total	3,044	24.9 (23.08-26.72)
Not Hispanic or Latino, single race, white	1,948	26.5 (24.25-28.75)
Not Hispanic or Latino, single race, black	514	22.6 (17.70-27.50)
Hispanic or Latino	447	15.8 (11.68-19.92)
65 years and over		
Total	4,265	60.0 (58.29-61.71)
Not Hispanic or Latino, single race, white	3,052	64.3 (62.38-66.22)
Not Hispanic or Latino, single race, black	571	44.6 (39.27-49.93)
Hispanic or Latino	424	36.4 (31.15-41.65)
Tetanus vaccination, past 10 years[5]		
19-49 years		
Total	11,154	63.6 (62.38-64.82)
Not Hispanic or Latino, single race, white	6,085	69.2 (67.69-70.71)
Not Hispanic or Latino, single race, black	1,818	57.1 (54.16-60.04)
Hispanic or Latino	2,402	51.1 (48.47-53.73)
50-64 years		
Total	5,003	62.4 (60.81-63.99)
Not Hispanic or Latino, single race, white	3,367	66.0 (64.20-67.80)
Not Hispanic or Latino, single race, black	785	52.0 (47.61-56.39)
Hispanic or Latino	593	48.1 (42.83-53.37)
65 years and over		
Total	4,109	51.9 (49.96-53.84)
Not Hispanic or Latino, single race, white	2,935	54.4 (52.20-56.60)
Not Hispanic or Latino, single race, black	546	37.0 (32.20-41.80)
Hispanic or Latino	418	47.5 (41.01-53.99)
Tetanus vaccination including pertussis vaccine, since 2005[6]		
19-64 years		
Total	1,312	51.5 (48.13-54.87)
Not Hispanic or Latino, single race, white	899	50.1 (46.12-54.08)
Not Hispanic or Latino, single race, black	197	56.2 (47.65-64.75)
Hispanic or Latino	158	52.9 (43.14-62.66)
Shingles vaccination,[7] ever		
60 years and over		
Total	5,751	6.7 (5.90-7.50)
Not Hispanic or Latino, single race, white	4,134	7.6 (6.64-8.56)
Not Hispanic or Latino, single race, black	766	2.5 (1.17-3.83)
Hispanic or Latino	562	2.1 (0.90-3.30)
Hepatitis A vaccination (at least 2 doses),[8] ever		
19-49 years		
Total	10,284	8.8 (8.02-9.58)
Not Hispanic or Latino, single race, white	5,656	9.3 (8.30-10.30)
Not Hispanic or Latino, single race, black	1,680	7.6 (6.01-9.19)
Hispanic or Latino	2,203	7.5 (5.93-9.07)
Had traveled outside the United States to countries other than Europe, Japan, Australia, New Zealand, or Canada since 1995	3,376	14.4 (12.91-15.89)
Had not traveled outside the United States to countries other than Europe, Japan, Australia, New Zealand, or Canada since 1995	6,887	6.1 (5.26-6.94)

Hepatitis B vaccination (at least 3 doses),[9] ever		
19-49 years, HR		
Total	400	31.6 (25.97-37.23)
Not Hispanic or Latino, single race, white	245	33.1 (25.99-40.21)
Not Hispanic or Latino, single race, black	64	22.9 (10.89-34.91)
Hispanic or Latino	72	25.6 (13.02-38.18)
19-49 years, non-HR		
Total	10,030	33.8 (32.39-35.21)
Not Hispanic or Latino, single race, white	5,483	36.7 (34.98-38.42)
Not Hispanic or Latino, single race, black	1,655	31.8 (28.86-34.74)
Hispanic or Latino	2,132	24.8 (22.17-27.43)
19-49 years, health care personnel		
Total	1,078	69.3 (65.99-72.61)
Not Hispanic or Latino, single race, white	601	74.0 (69.86-78.14)
Not Hispanic or Latino, single race, black	239	56.9 (49.61-64.19)
Hispanic or Latino	166	62.1 (53.32-70.88)
Human papillomavirus (HPV) vaccination (at least 1 dose),[10] ever		
19-26 years		
Total	1,381	10.5 (8.48-12.52)
Not Hispanic or Latino, single race, white	691	13.3 (10.38-16.22)
Not Hispanic or Latino, single race, black	286	6.8 (3.12-10.48)
Hispanic or Latino	296	6.4 (3.17-9.63)

[1] Adults 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, 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; or 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. Adults were considered at high risk for hepatitis B if they had hemophilia and had received clotting factor concentrations, were a man who had sex with other men, had taken street drugs by needle, had traded sex for money or drugs, had tested positive for HIV, or had sex with someone who would meet any of the previous criteria.

[2] Adults were classified as health care personnel if they were currently employed in a health care occupation or in a health care industry setting, on the basis of standard occupation and industry categories.

[3] Persons who indicated a single race other than the race groups shown are included in the total but are not shown separately due to small sample sizes. Therefore, the frequencies for totals will be greater than the sum of the frequencies for the specific groups shown separately. Persons of Hispanic or Latino origin may be of any race or combination of races. The tables in this report use the complete current (1997) Office of Management and Budget race and Hispanic origin terms, and the text uses shorter versions of these terms, for conciseness.

[4] Respondents were asked if they had ever had a pneumonia shot.

[5] Respondents were asked if they had received a tetanus shot in the past 10 years.

[6] Respondents who had received a tetanus shot in the past 10 years were asked if their most recent shot was given in 2005 or later. Respondents who had received a tetanus shot since 2005 were asked if they were told that their most recent tetanus shot included the pertussis or whooping cough vaccine.

[7] Respondents were asked if they had ever received a shingles vaccine.

[8] Respondents were asked if they had ever received the hepatitis A vaccine, and if yes, were asked how many shots were received.

[9] Respondents were asked if they had ever received the hepatitis B vaccine, and if yes, if they had received at least three doses or less than three doses.

[10] Respondents were asked if they had ever received the HPV shot or cervical cancer vaccine.

NOTES: CI is confidence interval. Inclusion and development of the vaccination questions on the NHIS were supported, in part, by the National Center for Immunization and Respiratory Diseases, Centers for Disease Control and Prevention. Inclusion and development of the HPV questions on the NHIS were also supported, in part, by the National Cancer Institute, National Institutes of Health.

DATA SOURCE: CDC\NCHS, National Health Interview Survey, 2008. Estimates are based on household interviews of a sample of the civilian noninstitutionalized population.