



Adult Vaccination Update

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Overview of Presentation

- Adult vaccination coverage
 - Data source
 - Coverage by age group, race/ethnicity, vaccination indication
 - Associations of coverage with age, health insurance status, usual place for health care, physician contacts, and nativity
 - Limitations
 - Conclusions
- Information Sources

Data Source

National Health Interview Survey, 2015

- Annual in-home survey of U.S. non-institutionalized civilian population
- Detailed health survey of one adult per family in each household sampled
- Provides national coverage estimates
- Final sample for estimating adult vaccination coverage:
 - Response rate: 55.2%
 - N = 33,348
- Sample for estimating influenza coverage, 2014-15 season:
 - Response rate: 58.9% (2014); 55.2% (2015)
 - N = 31,897

Adult Vaccination Coverage, NHIS 2015

- **Brief online report published February 7, 2017**
 - Publication concurrent with release of 2017 Adult Immunization Schedule
 - Highlighted key findings for all vaccines in this presentation, except influenza
 - Comprehensive adult vaccination coverage report pending publication in MMWR Surveillance Summary
- **Key findings from online and comprehensive reports included in presentation**

National Health Interview Survey, 2015

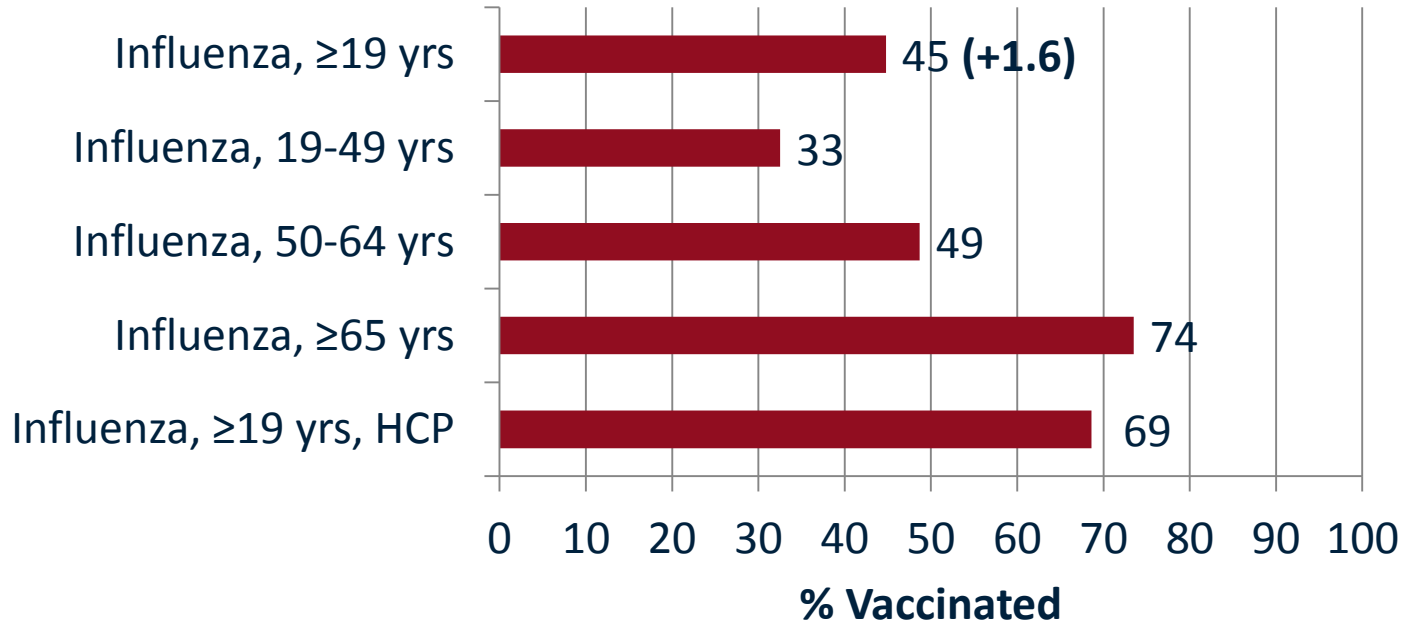
Vaccination Questions

- **Influenza**
- **PPSV or PCV13, Td/Tdap, HepA, HepB, Zoster, HPV**
 - No questions in NHIS to ascertain pneumococcal vaccination by type
- **High-risk/increased-risk status**
 - Limited information collected for Hep A and Hep B
 - Hep A (travel status & chronic liver disease)
 - Hep B (travel status, chronic liver disease, & diabetes mellitus)
 - PPSV or PCV13
- **Health Care Personnel (HCP)**

Definition of Increased Risk for Pneumococcal Disease

- **Adults were considered at increased risk for pneumococcal disease if they had been told by a doctor or other health care professional that they:**
 - Ever had:
 - Diabetes Mellitus
 - Emphysema
 - Chronic obstructive pulmonary disease (beginning in 2012)
 - Coronary Heart Disease, Angina, Heart Attack, or other Heart Condition
 - Lymphoma, Leukemia, or Blood Cancer
 - Had during the preceding 12 months:
 - Cancer Diagnosis (excluding non-melanoma skin cancer)
 - Asthma Episode or Attack
 - Chronic Bronchitis
 - Weak or Failing Kidneys
- **Or were Current Smokers**

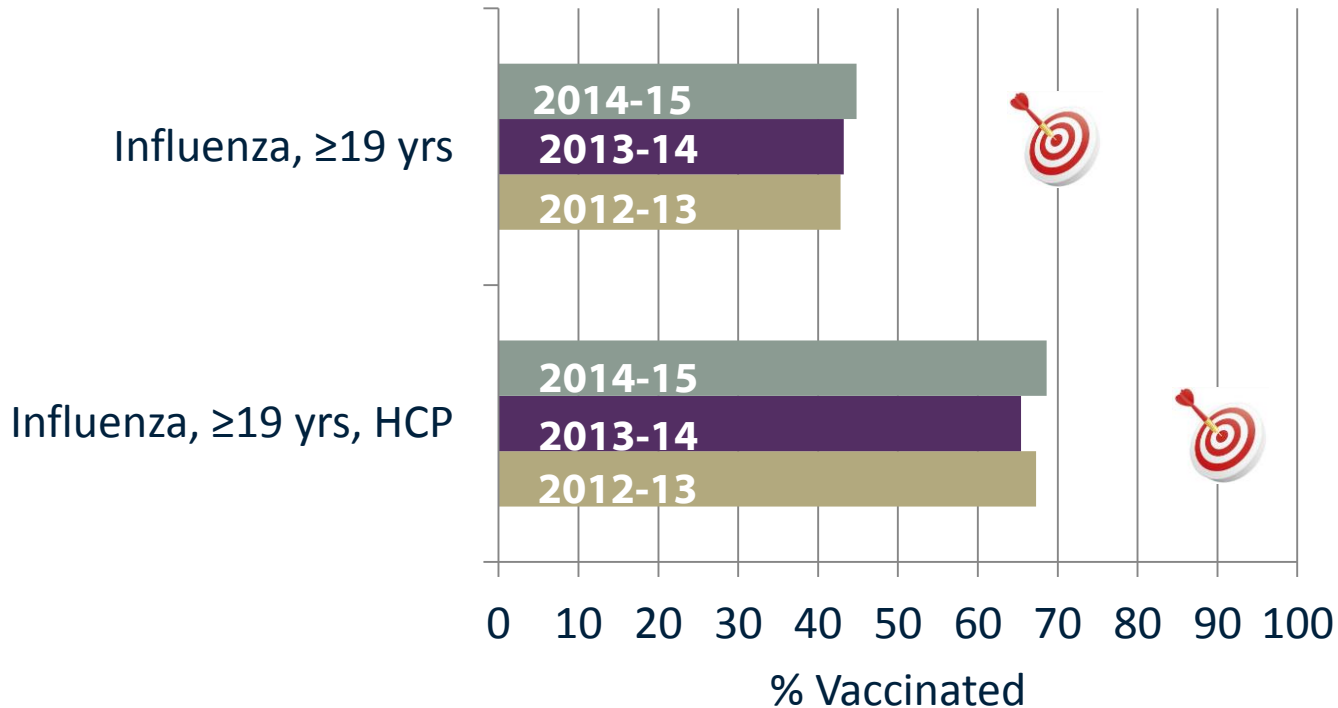
Adult Influenza Vaccination Coverage by Age, 2014-15 season, United States



Data Source: 2014-2015 NHIS

HP2020 Targets: 70% ≥19 years, 90% HCP ≥19 years

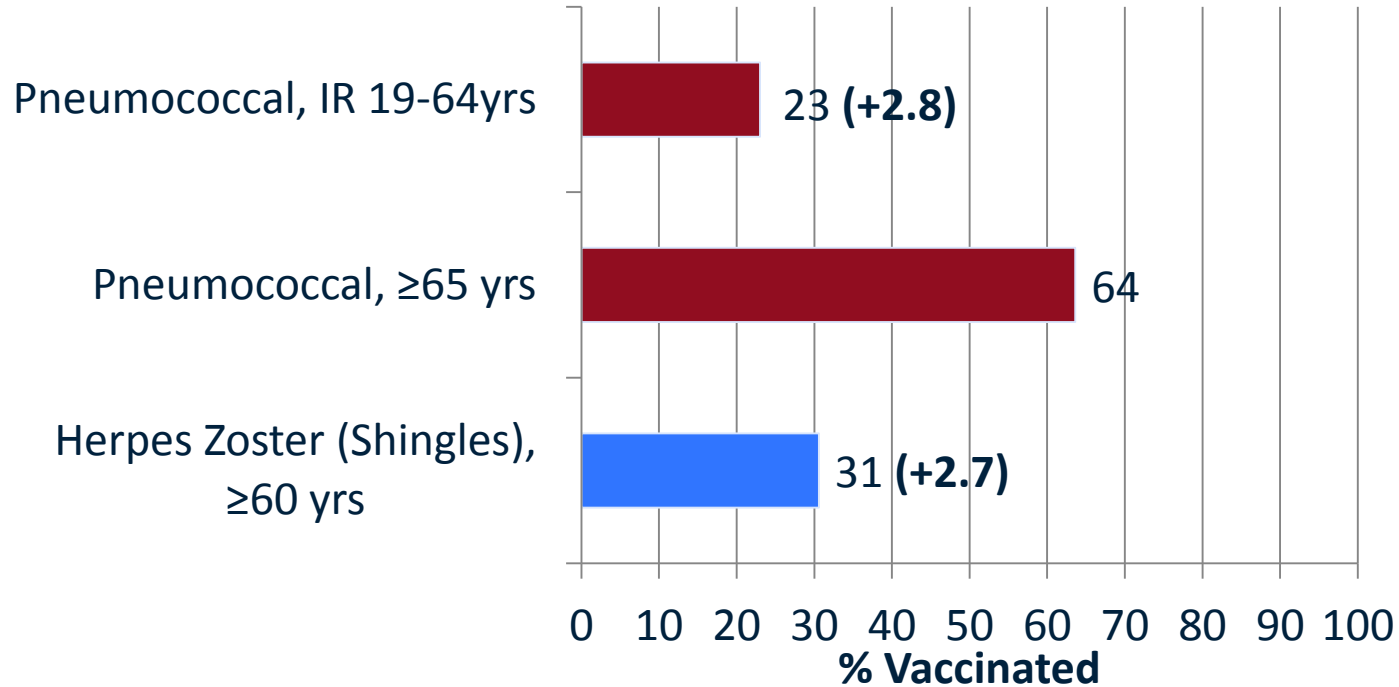
Adult Influenza Vaccination Coverage, by Age, 2012-13 through 2014-15 seasons, United States



HP2020 Targets: 70% ≥19 years, 90% HCP ≥19 years

Data Source: 2012, 2013, 2014 and 2015 NHIS

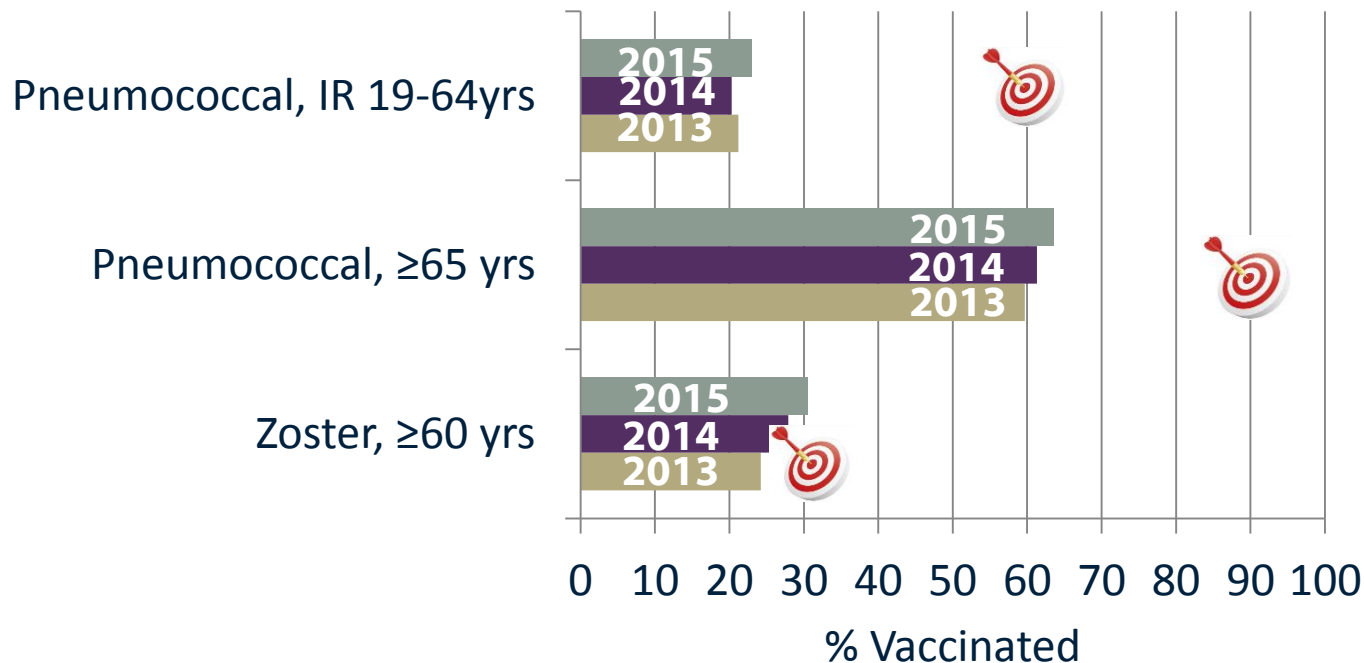
Adult Vaccination Coverage, Selected Vaccines by Age and Increased Risk (IR) Status, United States



HP2020 Targets: 60% PPV IR 19-64 years, 90% PPV ≥65 years, 30% Shingles

Data Source: 2015 NHIS

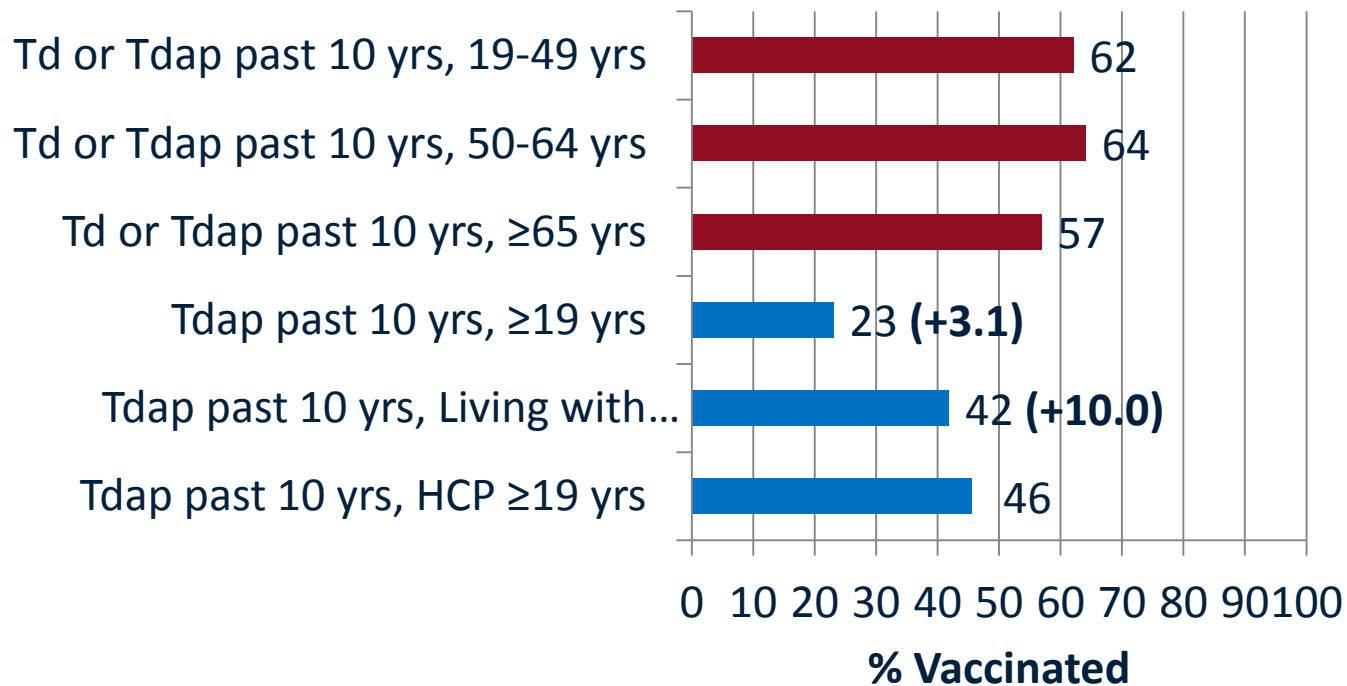
Adult Immunization Coverage, Selected Vaccines by Age and Increased-risk Status, 2013-2015, United States



HP2020 Targets: 90% PPV ≥65 yrs, 60% PPV IR 19-64 yrs, 30% zoster ≥60 yrs

Data Source: 2013, 2014 and 2015 NHIS

Adult Tetanus-containing Vaccination Coverage by Age and High-risk Status, United States



Data Source: 2015 NHIS

Potential for Bias in Tdap Estimates

- 39% of respondents were excluded

Those:

- without a “yes” or “no” response for tetanus vaccination, past 10 years (**5.7%**)
- without a response to tetanus vaccination during 2005-2015 (**1.7%**)
- who reported tetanus vaccination but not told (**25.2%**) or did not know the vaccine type, refused to answer, or data not obtained (**6.1%**)
- Sensitivity analysis to assess magnitude of bias -- Tdap coverage could range from: **16.3% - 50.4% (adults 19-64 years); 11.0% - 44.5% (adults ≥65 years)**

Data Source: 2015 NHIS

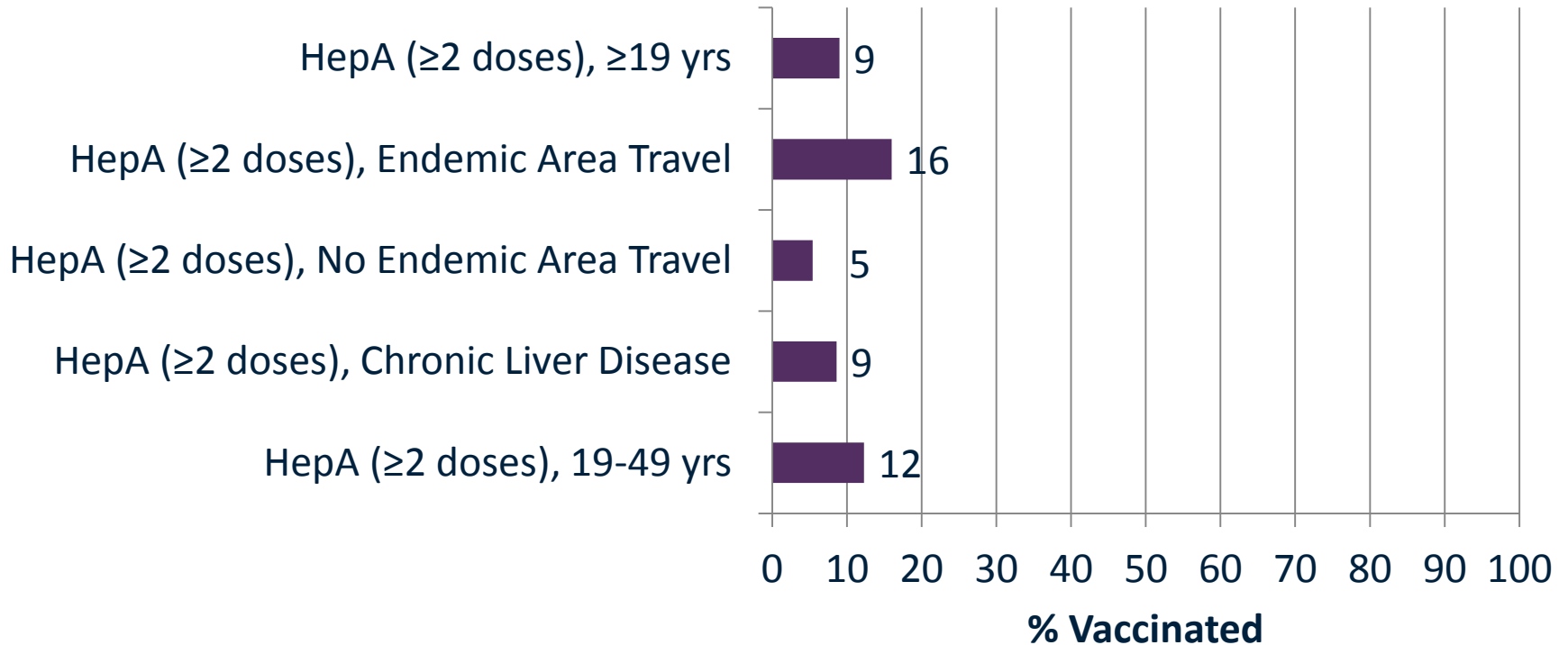
Proportion of adults ≥ 19 years of age who received Tdap vaccine

Group	Not Told (%)	Not Recall (%)	Tdap/Td+Tdap
Adults, ≥ 19 years, Overall	49	13	72
HCP, ≥ 19 years	32	10	78*
Non-HCP, ≥ 19 years	51	13	71

*** $p < 0.05$ by t test for comparisons between HCP and non-HCP ≥ 19 years.**

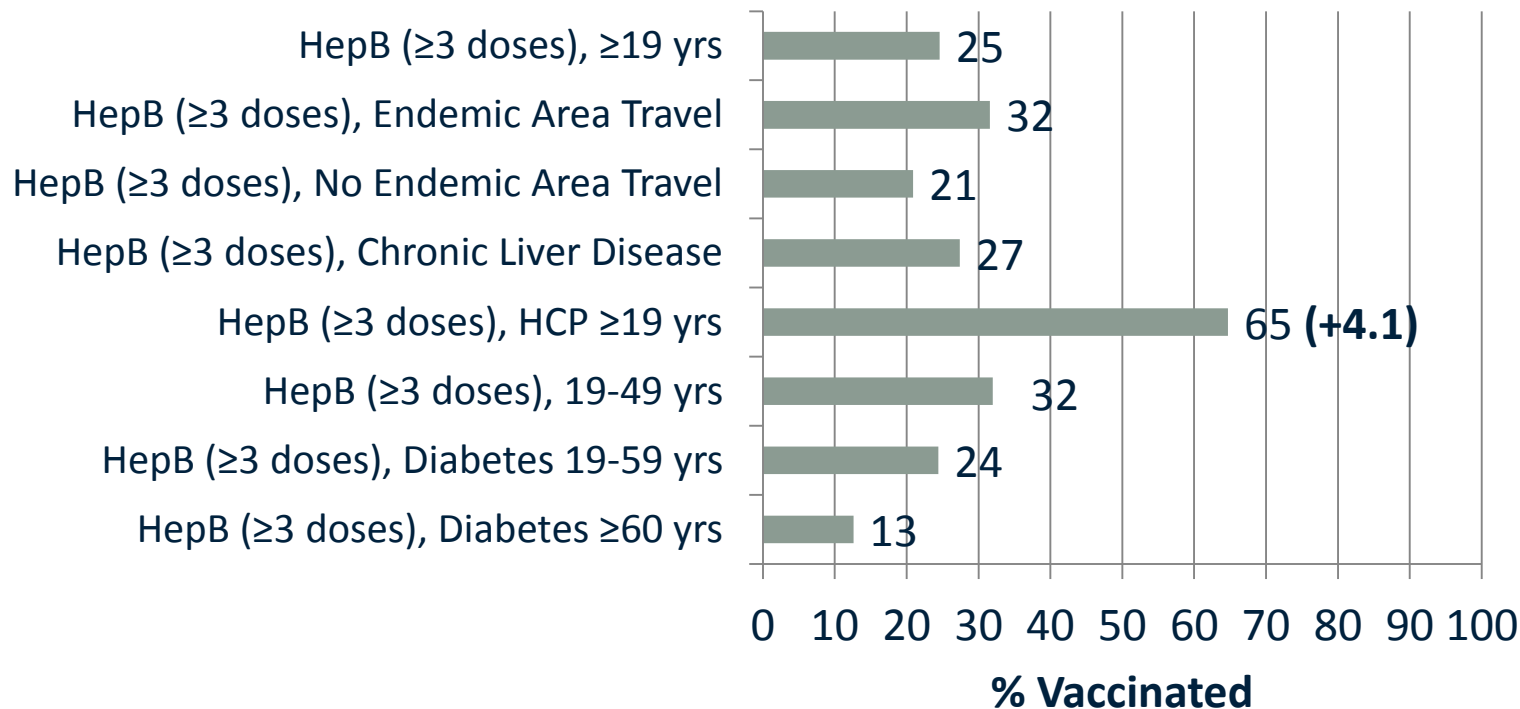
Data Source: 2015 NHIS

Hepatitis A Vaccination Coverage by Age and High-risk Status, United States



Data Source: 2015 NHIS

Hepatitis B Vaccination Coverage by Age and High-risk Status, United States



HP2020 Target: 90% HepB Healthcare Personnel (HCP)

Data Source: 2015 NHIS

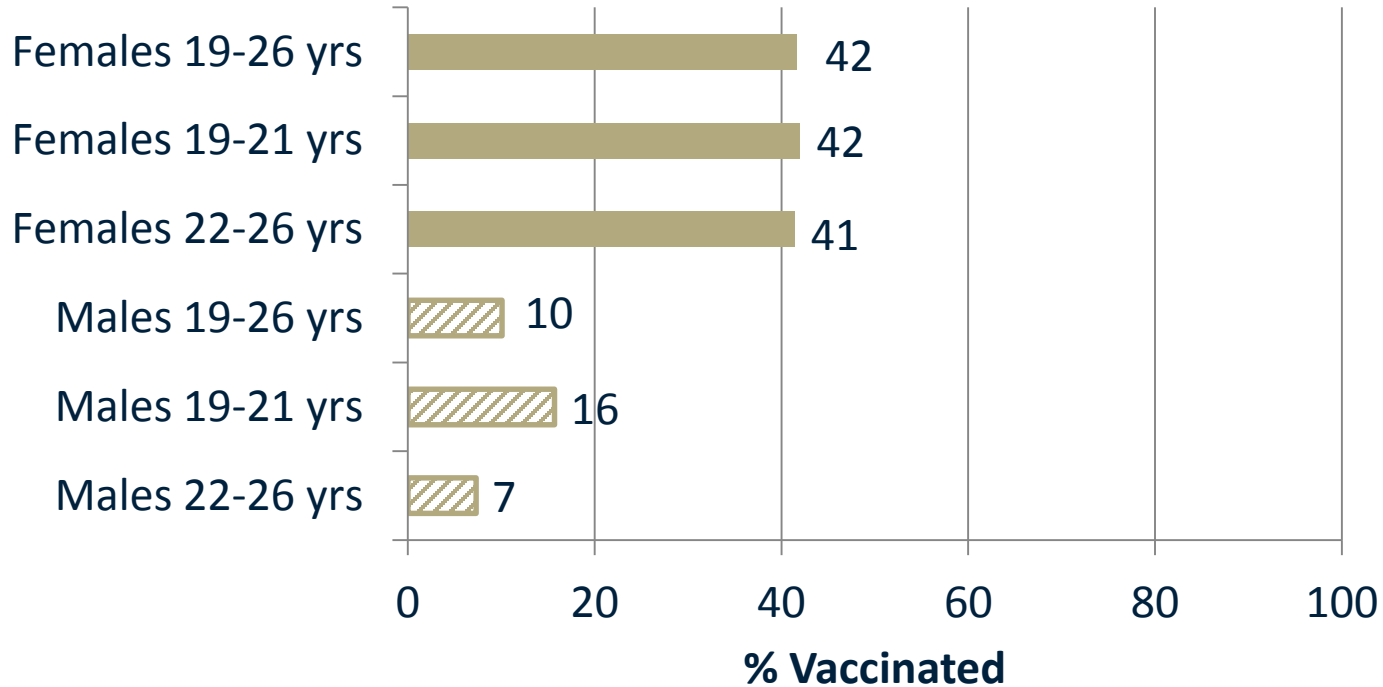
Proportion of HCP ≥ 19 years of age who received selected vaccines, by direct patient care

Group	%
Influenza (2014-15 season), ≥ 19 years, with direct patient care	69
Influenza (2014-15 season), ≥ 19 years, without direct patient care	68
Tdap, ≥ 19 years, with direct patient care	51
Tdap, ≥ 19 years, without direct patient care	36*
HepB (<u>>3 doses</u>), ≥ 19 years, with direct patient care	74 (+6.4)
HepB (<u>>3 doses</u>), ≥ 19 years, without direct patient care	49*

* $p < 0.05$ by t test for comparisons -between HCP with direct patient care responsibilities and HCP without direct patient care responsibilities.

Data Source: 2014 and 2015 NHIS

HPV Vaccination Coverage (≥ 1 dose ever), Adults 19-26 years of age by Sex, United States



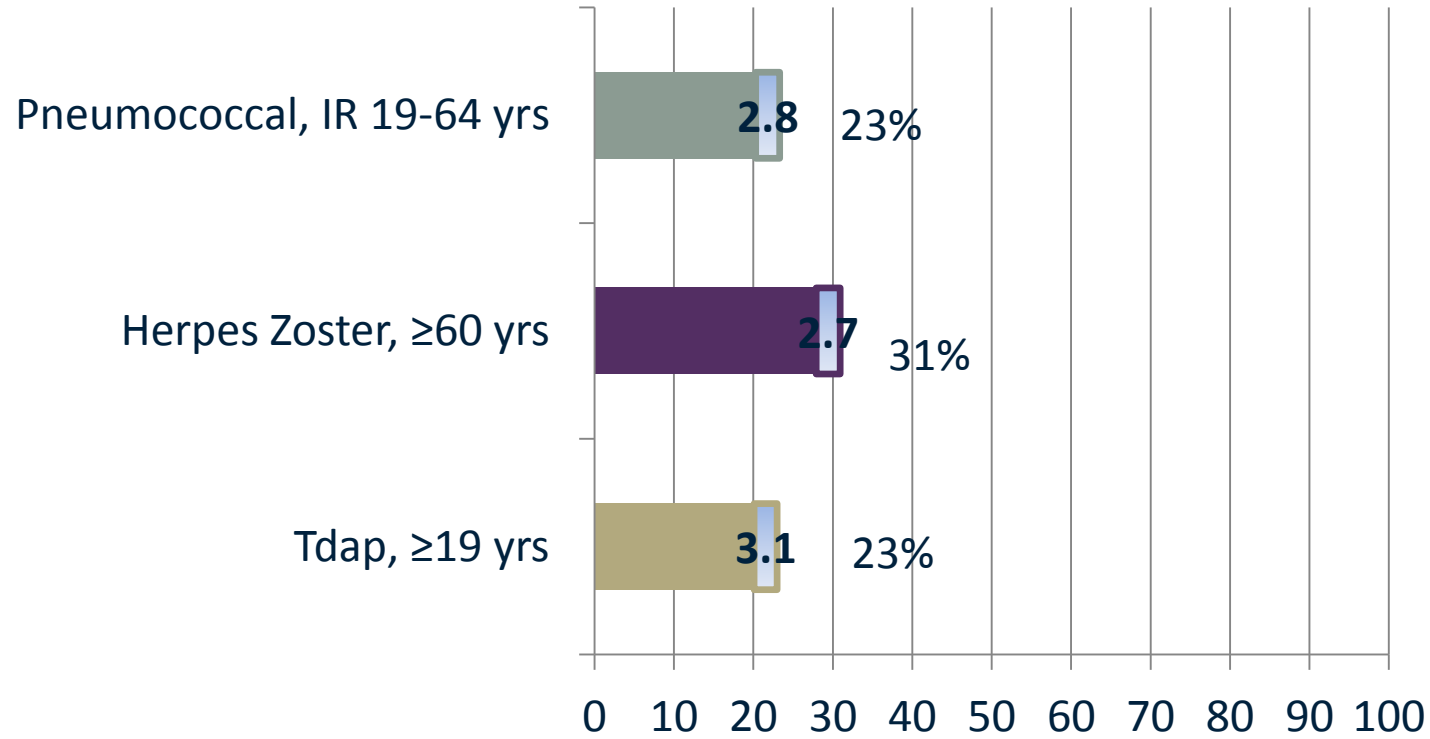
Data Source: 2015 NHIS

Age at First Dose of HPV Vaccination, Among Adults 19-26 years, United States

Age at First Dose (years)	Women (%)	Men (%)
8-10	2	4
11-12	6	7
13-17	56	43
18	16	15
19-26	20	30

Data Source: 2015 NHIS

Adult Vaccination Coverage Rate Increases from 2014 to 2015



Data Source: NHIS 2014-2015

Racial/Ethnic Vaccination Disparities

Vaccination Group	% Vaccinated Whites	Disparity, Blacks	Disparity, Hispanics	Disparity, Asians
Influenza, ≥19 yrs	49	-11	-16	+1
Influenza, 19-49 yrs	35	-6	-10	+9
Influenza, 50-64 yrs	50	-8	-5	-4
Influenza, ≥65 yrs	75	-11	-11	+8
Influenza, HCP ≥19 yrs	71	-11	-11	+3

Data Source: 2015 NHIS

Racial/Ethnic Vaccination Disparities

Vaccination Group	% Vaccinated Whites	Disparity, Blacks	Disparity, Hispanics	Disparity, Asians
Pneumo., IR 19-64 yrs	24	-2	-5	-3
Pneumo., ≥65 yrs	68	-18	-26	-19
Tetanus, 19-49 yrs	69	-15	-17	-14
Tetanus, 50-64 yrs	69	-16	-14	-24
Tetanus, ≥65 yrs	59	-16	-9	-13
Tdap, ≥19 yrs	27	-12	-13	-7
Tdap, 19-64 yrs	30	-14	-15	-9
Tdap, ≥65 yrs	18	-9	-9	-4
HepA, 19-49 yrs	13	-2	-2	+5
HepB, 19-49 yrs	35	-6	-12	+3
Herpes Zoster, ≥60 yrs	35	-21	-19	-9
HPV, Females 19-26 yrs	45	-7	-9	-8
Tdap, HCP ≥19 yrs	49	-21	-11	0
HepB, HCP ≥19 yrs	68	-11	-11	-4

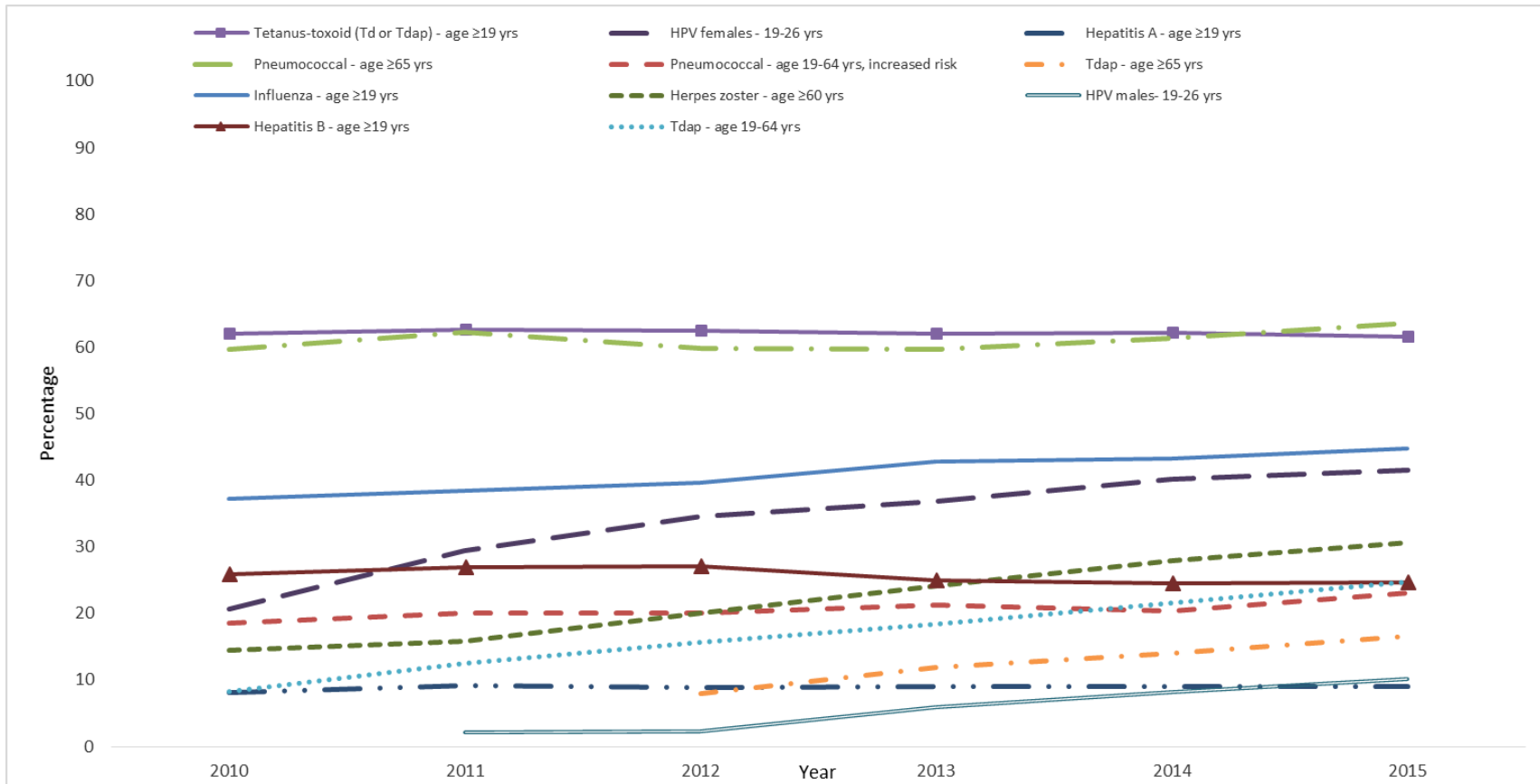
Racial/Ethnic Vaccination Disparities -- NHIS 2015

Compared with 2014, racial/ethnic differences persisted for all seven and widened for pneumococcal and herpes zoster:

- **Non-Hispanic blacks, Hispanics, and Non-Hispanic Asians had lower vaccination coverage than that of non-Hispanic whites for all of the vaccines routinely recommended for adults, except for:**
 - Influenza 19+ years -- Asians had coverage similar to whites
 - PPSV/PCV13 19-64 years -IR -- Blacks and Asians had coverage similar to whites
 - HepA 19-49 years – Blacks had coverage similar to whites and Asians had higher coverage than whites
 - HepB 19-49 years – Asians had coverage similar to whites
 - HPV 19-26 years females – Blacks and Asians had coverage similar to whites
- **Health Care Personnel (HCP) – Non-Hispanic black HCP and Hispanic HCP had lower coverage than white HCP for influenza, Tdap, and HepB vaccinations.**

Trends in Adult Vaccination

FIGURE. Estimated proportion of adults aged ≥ 19 years who received selected vaccines,* by age group and increased risk status[†] — National Health Interview Survey, United States, 2010–2015



Footnotes for Figure

Abbreviations: HPV = human papillomavirus; Td = tetanus-diphtheria toxoid; Tdap = tetanus, diphtheria, and acellular pertussis vaccine.

* Influenza vaccination coverage for 2010 is coverage from the 2009-10 season, 2011 is coverage from the 2010-11 season, 2012 is coverage from the 2011-12 season, 2013 is coverage from the 2012-13 season, 2014 is coverage from the 2013-14 season, and 2015 is coverage from the 2014-15 season. Interviews from August through June of each season were used to estimate coverage from July through May using Kaplan Meier survival analysis. Tdap vaccination coverage data among adults aged ≥ 65 years are available beginning in the NHIS 2012 survey. The 2010 HPV vaccination coverage estimate among males is suppressed due to relative standard error $> 30\%$.

† 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, chronic obstructive pulmonary disease (beginning in 2012), 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.

Association of Age with Vaccination Coverage

- Influenza and pneumococcal vaccination – adults aged ≥ 65 years had higher coverage than those aged 19-64 years
- Td and Tdap vaccination – adults aged 19-64 years had higher coverage than those aged ≥ 65 years
- HepB vaccination, persons with diabetes – adults aged 19-59 years had higher coverage than those aged ≥ 60 years
- Herpes zoster vaccination – adults age ≥ 65 years had higher coverage than those aged 60-64 years

Association of Health Insurance Status with Vaccination Coverage

- Most study respondents (89%) indicated having some type of health insurance
- Coverage was generally lower among adults without health insurance compared with those with health insurance
- Coverage differed by type of health insurance
- Coverage was generally higher among those reporting private versus public insurance

Data Source: 2015 NHIS



Association of Health Insurance Status and Having a Usual Place for Health Care with Vaccination Coverage

- Generally, adults with a usual place for health care were more likely to report having received recommended vaccinations than those who did not have a usual place for health care, among those with or without health insurance

Adult Vaccination Coverage by Health Insurance Status and Physician Contacts

- With few exceptions, coverage was higher among those reporting having had one or more physician contacts in the past year compared with those who had not visited a physician, regardless of whether they had health insurance
- Vaccination coverage generally increased as the number of physician contacts increased
- Missed opportunities to vaccinate occurred among 18.2%–85.6% of respondents with ≥ 10 physician contacts, depending on the vaccine

Data Source: 2015 NHIS



Adult Vaccination Coverage by Nativity

- Vaccination coverage among U.S.-born respondents was higher than that of foreign-born respondents with few exceptions (influenza vaccination, aged 19-49 years and aged 50-64 years; HepA vaccination, aged ≥ 19 years; HepB vaccination, persons with diabetes, or chronic liver disease)

Data Source: 2015 NHIS



Adult Vaccination Coverage by Years Living in the United States and Citizenship

- Coverage varied for foreign-born persons living in the United States ≥ 10 years compared with those living in the United States < 10 years, but with no consistent pattern
- Coverage among foreign-born adults who were U.S. citizens was generally higher than that for foreign-born respondents who were not U.S. citizens

Data Source: 2015 NHIS



Limitations of Findings

- NHIS excludes persons in the military and those residing in institutions – results apply to the civilian, non-institutionalized population
- Response rate 55.2% -- low response rate can result in selection bias if the nonresponse is unequal among participants regarding vaccination
- Reported vaccination status and high-risk/increased-risk conditions not validated by medical records
- Self-report of vaccination subject to recall bias
- Tdap estimates: potential bias due to exclusions

Conclusions

- **Overall coverage remains below HP2020 targets**
 - 70% for 19+ years for influenza vaccine
 - 90% for 65+ years for pneumococcal vaccine
 - 60% for high risk 19-64 years for pneumococcal vaccine
 - 30% for 60+ years for Zoster vaccine
 - 90% for hepatitis B vaccine for healthcare personnel
- **Some improvement from 2014**
 - Pneumococcal (19-64 years, IR), Tdap (≥ 19 years), and herpes zoster (≥ 60 years) vaccines
 - No improvements for other vaccines
- **Racial and ethnic disparities remain**
- **Much remains to be done to increase vaccine utilization among adults and to eliminate disparities**

Collaborators

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For Additional Information:

ACIP Recommendations for Specific Vaccines

- <http://www.cdc.gov/vaccines/hcp/acip-recs/index.html>

Surveillance of Adult Vaccination Coverage, NHIS 2014

- http://www.cdc.gov/mmwr/volumes/65/ss/ss6501a1.htm?s_cid=ss6501a1_w.htm

Online Report on Adult Vaccination Coverage, February 2017:

- <https://www.cdc.gov/vaccines/imz-managers/coverage/adultvaxview/coverage-estimates/2015.html>

AdultVaxView

- <http://www.cdc.gov/vaccines/imz-managers/coverage/adultvaxview/index.html>



For more information, contact CDC
1-800-CDC-INFO (232-4636)
TTY: 1-888-232-6348 www.cdc.gov

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