



Adult Immunization Update

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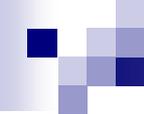
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Disclosures

- We have no financial interests in immunizations discussed here



Objectives

- State vaccines indicated for adults
- Updates in 2018 adult immunization schedule
- Describe the burden of vaccine-preventable diseases
- Vaccine Contraindications
- Strategies to improve adult immunization coverage

Adult Vaccination Coverage, United States, 2015

- Pneumococcal vaccination for 19–64y high risk: 23.0%
 - Pneumococcal vaccination for ≥ 65 y: 63.6%
 - Tdap for ≥ 19 y: 23.1%; adults living with infants < 1 y: 41.9%
 - Shingles vaccination for ≥ 60 y: 30.6%
 - Hepatitis B vaccination for 19–59 years among persons with diabetes: 24.4%
- Disparities by race and ethnicity, education, income, insurance



Influenza

Influenza Is Deadly

- 3,000 – 50,000 deaths per year
- >90% of deaths among ≥ 65 year olds
- >200,000 hospitalizations yearly
- Influenza attack rates in nursing home as high as 60%
 - Fatality rate 30%

Impact of Vaccination–Influenza

- Vaccine effectiveness varies depending on antigenic match, age and health
 - *60–70% in younger adults when good match*
 - *30% in adults $\geq 65y$ for medically attended illness when good match*
- 2016–2017 interim vaccine effectiveness estimate
 - 43% against A(H3N2), similar to years past
 - 61% against A(H1N1)
- 2017–2018 interim vaccine effectiveness estimate for preventing medically attended, laboratory-confirmed influenza virus infection was 36%.

Impact of Vaccination–Influenza (2)

- Acute respiratory illness or influenza-like illness increases acute MI risk 2x
- Influenza vaccination effectiveness: Meta-analyses
 - 29% (95%CI 9,44) against acute MI in persons with existing CVD
 - 36% (95%CI 14,53) against major cardiac events with existing CVD
- Vaccine effectiveness 29% in acute MI prevention
 - “On par or better than accepted preventive measures [as] statins (36%), anti-hypertensives (15–18%), and smoking cessation (26%)”
 - Recommended by American College of Cardiology and American Heart Association

Influenza

- **Simplified Recommendation**

- the ACIP and CDC recommend universal influenza vaccine for **ALL** people >6 months of age

Contraindications

- History of severe allergic reaction (e.g., anaphylaxis) to egg is a labeled contraindication to the use of inactivated and live attenuated influenza vaccines.
- However, the Advisory Committee on Immunization Practices (ACIP) recommends that any licensed, recommended, and appropriate inactivated or recombinant influenza vaccine may be administered to persons with egg allergy of any severity.

- Adapted from Grohskopf LA, Sokolow LZ, Broder KR, et al. Prevention and control of seasonal influenza with vaccines: recommendations of the Advisory Committee on Immunization Practices—United States, 2017–18 influenza season. *MMWR Recomm Rep.* 2017;66(2):4



Precautions

- Moderate-to-severe acute illness with or without fever
- History of Guillain-Barré syndrome within six weeks of receipt of influenza vaccine

Live attenuated influenza vaccine LAIV(FluMist)

- 2017–2018 season - the ACIP recommended that LAIV influenza vaccine not be used because of its low effectiveness against influenza A(H1N1) viruses during the 2013-2014 and 2015-2016 seasons.
- 2018-2019 season - the ACIP has recommended return of LAIV in the United States for the 2018-2019 season based on results from a US study in children aged 2 years to younger than 4 years that evaluated the shedding and antibody responses of the H1N1 strain following LAIV administration.

Contraindications

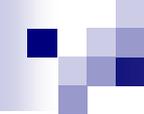
- History of severe allergic reaction to any component of the vaccine* or after a previous dose of any influenza vaccine
- Concomitant aspirin or salicylate-containing therapy in children and adolescents
- Children 2-4 years of age with diagnosis of asthma wheezing episode during the preceding 12 months
- Children and adults who are immunocompromised due to any cause (including immunosuppression caused by medications or by human immunodeficiency virus infection)
- Close contacts and caregivers of severely immunosuppressed persons who require a protected environment
- Pregnancy
- Receipt of influenza antiviral medication within the previous 48 hours

Precautions with LAIV

- Moderate-to-severe acute illness with or without fever
- History of Guillain-Barré syndrome within six weeks of receipt of influenza vaccine
- Asthma in persons five years or older
- Other underlying medical conditions that might predispose to complications after wild-type influenza infection (e.g., chronic pulmonary, cardiovascular [except isolated hypertension], renal, hepatic, neurologic, hematologic, or metabolic disorders [including diabetes mellitus])

EGG Allergy

- Persons who have experienced severe reactions (e.g., angioedema, respiratory distress, lightheadedness, recurrent emesis) after exposure to egg may receive any licensed and recommended influenza vaccine.
- These individuals should receive vaccination in an inpatient or outpatient setting under supervision of a clinician able to manage severe allergic reaction
- ACIP recommends that clinicians observe patients for 15 minutes after administration of any vaccine to decrease the risk of injury in case of syncope.



Pneumococcal Vaccine



Adult 65 and Older

- CDC recommends all adult ≥ 65 receive 2 types of pneumococcal vaccines
 - One dose of PCV13 (first)
 - One dose of PPSV23
 - This age group requires both vaccines for the best protection against pneumococcal disease

Adult 19 to 64 Years Who Only Need PPSV23

- Those with chronic conditions
 - Asthma
 - Diabetes
 - Heart disease
 - Alcoholism
 - Liver disease
- Cigarette smokers
- Residents of nursing homes or other long-term care facilities
- When they turn 65 this group should receive a dose of PCV13

Adults 19 to 64 Who Should Receive both PCV13 and PPSV23

- Functional or anatomic asplenia†
 - Cochlear implants
 - Cerebrospinal fluid leaks†
 - Lymphoma, leukemia, Hodgkin disease,†
 - Solid organ transplants†
-
- * PCV13 and PPSV23 cannot be given at the same visit
 - † A second PPSV23 vaccine is recommended for these individuals five years after the first PPSV23 dose

Pneumococcal Vaccine Timing—For Adults

DO NOT administer PCV13 and PPSV23 at the same visit.

Age 65 Years or Older

- If PCV13 was given before age 65 years, no additional PCV13 is needed.

No history of pneumococcal vaccine

**PCV
13**
Prennar 13®

1 year
(8 weeks for groups B & C as defined below)

**PPSV
23**
Pneumovax® 23

Received PPSV23 before age 65

1 year

**PCV
13**

1 year
(8 weeks for groups B & C as defined below)
and 5 years after prior dose of PPSV23

**PPSV
23**

Received PPSV23 at age 65 or older

1 year

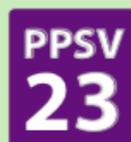
**PCV
13**

Age 19-64 Years With Underlying Condition(s)

- Prior doses count towards doses recommended below and do not need to be repeated.
- If PPSV23 given previously – wait one year before giving PCV13
 - for group B, wait at least five years before giving a second dose of PPSV23.
- No more than two doses of PPSV23 recommended before 65th birthday and one dose thereafter.

A. Smoker, or Chronic conditions:

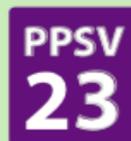
- heart disease (excluding hypertension)
- lung disease (including asthma)
- liver disease (including cirrhosis)
- diabetes
- alcoholism



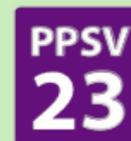
B. Immunocompromised (including HIV infection), Chronic renal failure, Nephrotic syndrome, or Asplenia (including sickle cell)



8 weeks



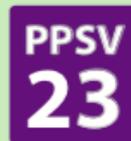
5 years



C. CSF leaks or Cochlear implants



8 weeks



For further details, see: www.cdc.gov/vaccines/hcp/acip-recs/vacc-specific/pneumo.html

California Department of Public Health, Immunization Branch www.EZIZ.org

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Pneumococcal Vaccine

■ Contraindications

- Severe allergic reaction (e.g., anaphylaxis) after a previous vaccine dose or to a vaccine component

■ Precautions

- Moderate or severe acute illness with or without fever



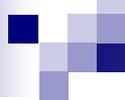
Human Papilloma Virus (HPV)

Human Papilloma Virus (HPV)

- Every year **>30,000** people are diagnosed with a cancer caused by HPV

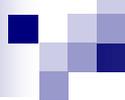


That's 1 case in every 20 minutes



HPV Vaccine

- The currently available HPV vaccine is the 9-valent human papillomavirus (9vHPV) vaccine. (Gardasil-9)
- Protects against the most common HPV types (16, 18, 6, 11, 31, 33, 45, 52, 58), which cause 90% of cervical, vaginal, vulvar, anal, and penile cancers.
- Prevents HPV types that cause genital warts in both males and females

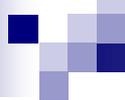


Updated Recommendations 2017

- Ideally administer before onset of sexual activity
- 2 doses (0, 6 or 12 mos) in girls and boys age 9–14
- 3 doses (0, 1–2, 6 mos) Females age 15-26, males age 15- 21, and high risk males age 22-26
- adult males 22–26 may be vaccinated.

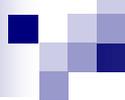
HPV Updated Recommendations

- Do not restart the vaccine series if schedule is interrupted
- Young adults who did not complete HPV series before age 15
 - Did not start –give 3 doses of HPV vaccine (0, 1–2, 6 mos)
 - Received 1 dose –give 1 dose HPV vaccine
 - Received 2 doses but <5 months apart –give 1 dose HPV vaccine
 - Received 2 doses ≥ 5 months apart –considered adequately vaccinated



HPV Efficacy

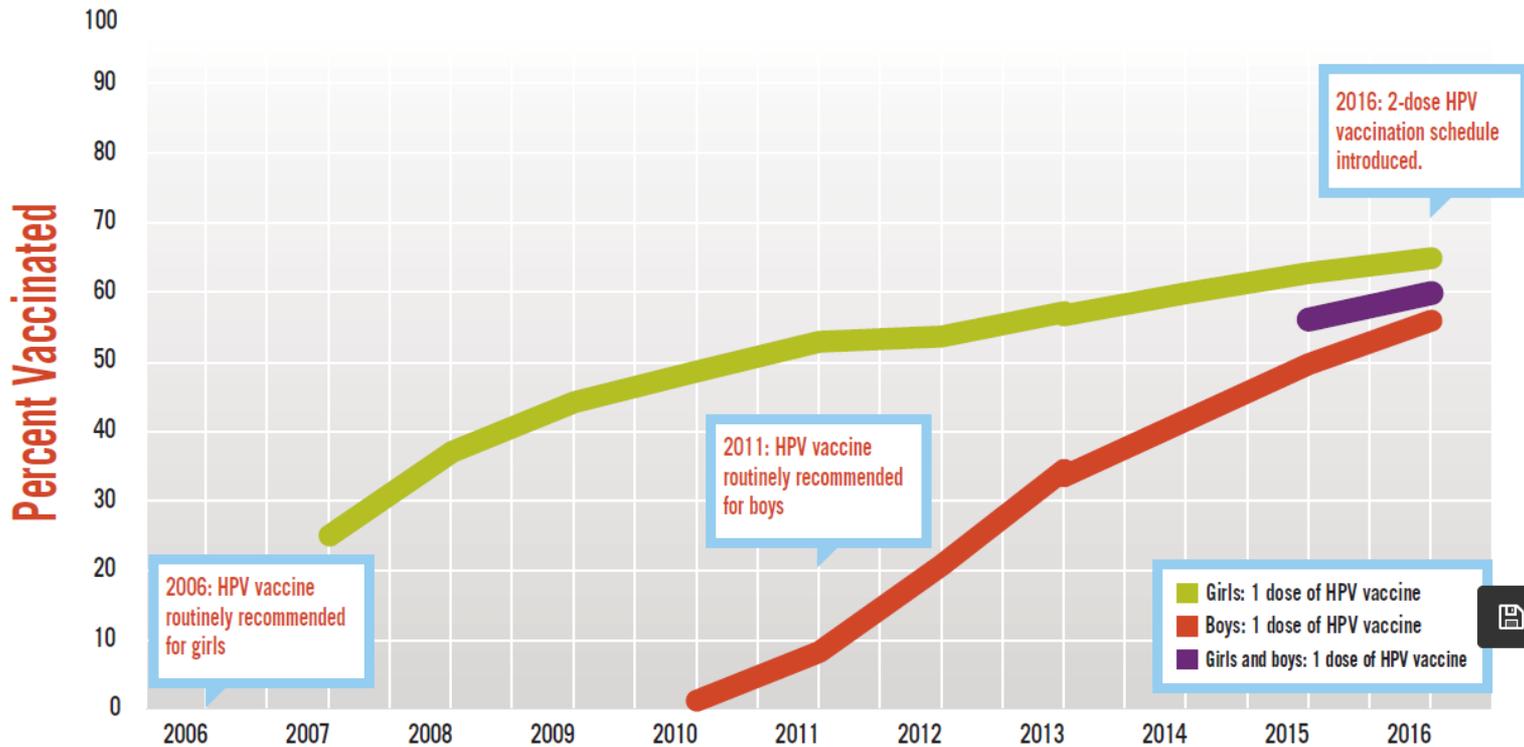
- Inactivated vaccine – can be administered either with, before, or after a live vaccine
- $\geq 97.9\%$ seroconversion to all 9 HPV types in 4 weeks after first dose
- 96.7% efficacy for prevention of genital pre-cancers caused by the HPV types covered in HPV 9



Safety of HPV Vaccines

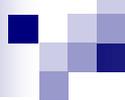
- >205 million doses of the HPV vaccine distributed worldwide
- >90 million doses of HPV vaccines have been distributed in the United States from June 2006 through March 2016.
- More than 10 years of monitoring and clinical trials showed HPV vaccines to be safe and effective.

[HPV vaccination is the best way to protect your children from cancers caused by HPV]



INFECTIONS WITH HPV TYPES THAT CAUSE MOST HPV CANCERS AND GENITAL WARTS HAVE **DROPPED 71 PERCENT** AMONG TEEN GIRLS

6 ^{OUT} **10** parents are choosing to get the human papillomavirus vaccine for their children



HPV Vaccine Common Side Effects

- Redness and soreness at the injection site
- Nausea
- Headache
- Dizziness
- Syncope - 15 minute observation after vaccination recommended due to increased syncope in adolescents/young adults

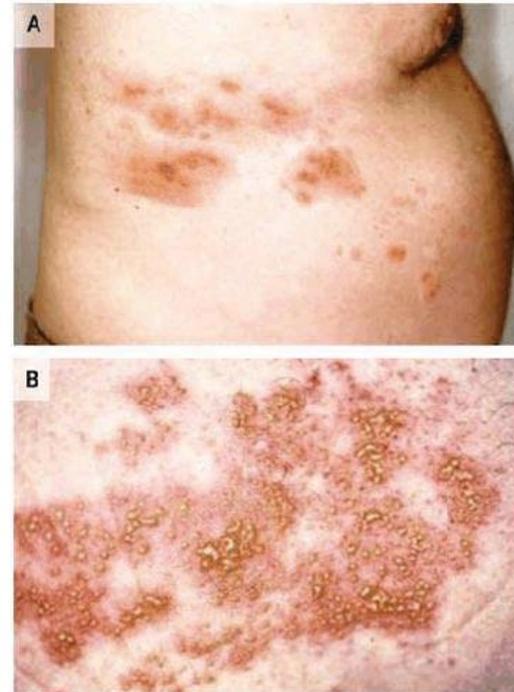


Herpes Zoster (Shingles)

Herpes Zoster

- 32% of Americans will experience a Zoster outbreak during their lifetime
- 1 out of 5 patients with Zoster get post-herpetic neuralgia

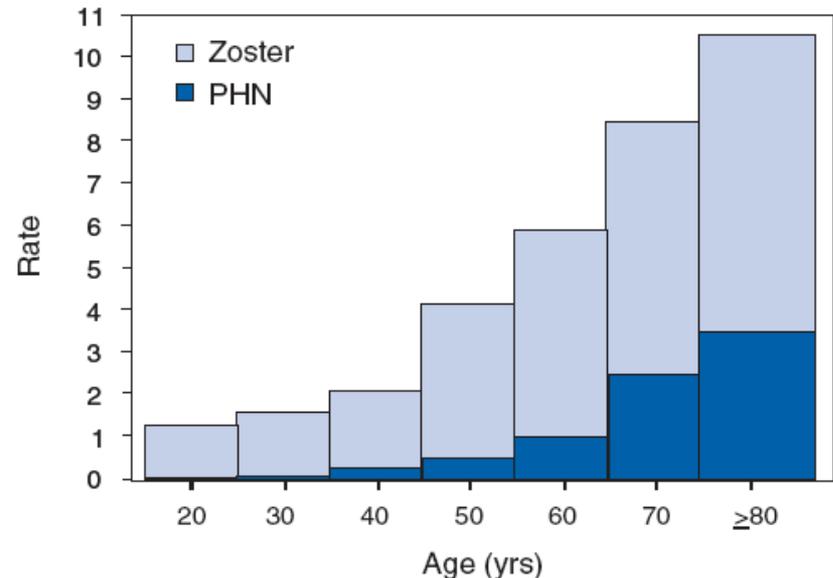
FIGURE 1. Thoracic distribution of zoster (A), and zoster rash with coalescing clusters of clear vesicles (B)



Age Most Important Zoster Risk Factor

- Risk increases when >50 years old
- 50% of people living to age 85 will get Zoster
- 50% of post-herpetic neuralgia (PHN) cases occur in adults age >85

FIGURE 3. Rate* of zoster and postherpetic neuralgia (PHN)†, by age — United States

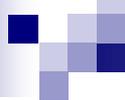


*Per 1,000 person-years.

†Defined as ≥ 30 days of pain.

Other Risk Factors

- Gender
 - Women 11-38% more likely to have Zoster
- Race
 - African-Americans lower risk
- Inflammatory illnesses
 - Higher risk
 - Example: Rheumatoid Arthritis risk doubled
- HIV
 - Risk 9-fold higher



New 2018 Recommendations

- Advisory Committee on Immunization Practices (ACIP) is recommending the preferential use of the new recombinant zoster vaccine (RZV; HZ/su; Shingrix), for use in immunocompetent adults aged ≥ 50 years over the herpes zoster live vaccine (ZVL; Zostavax).

ACIP Recommendation

Age 50 years and older

- Administer 2 doses of RZV 2–6 mo apart regardless of
 - past episode of herpes zoster, or
 - receipt of past doses of ZVL

Age 60 years or older

- Administer either RZV (preferred) or ZVL
 - wait at least 2 months after ZVL before dose of RZV

RZV is preferred over ZVL (but no head-to-head trial)

■ Efficacy

- 60-69 years: 97% vs. 64%
- 70-79 years: 91% vs. 41%
- >80 years 91% vs. 18%

■ Waning apparently slower than ZVL over the first 4 years

- Efficacy $\geq 85\%$ for 4 years following vaccination in ≥ 70 year olds

Recombinant Zoster Vaccine(RZV)

- 2 Dose Vaccine
- Not associated with serious adverse events in immunocompetent persons
- Persons with chronic medical conditions should receive RZV(CKD, DM, Pulm dz, rheum arthritis)
- Immunocompromised persons – No recommendations yet



Recombinant Zoster Vaccine(RZV)

CONTRAINDICATION

- severe allergic reaction

PRECAUTIONS

- Current herpes zoster infection
- Pregnancy and breastfeeding

Figure 1. Recommended immunization schedule for adults aged 19 years or older by age group, United States, 2018

This figure should be reviewed with the accompanying footnotes. This figure and the footnotes describe indications for which vaccines, if not previously administered, should be administered unless noted otherwise.

Vaccine	19–21 years	22–26 years	27–49 years	50–64 years	≥65 years
Influenza ¹	1 dose annually				
Tdap ² or Td ²	1 dose Tdap, then Td booster every 10 yrs				
MMR ³	1 or 2 doses depending on indication (if born in 1957 or later)				
VAR ⁴	2 doses				
RZV ⁵ (preferred) or ZVL ⁵				2 doses RZV (preferred) or 1 dose ZVL	
HPV–Female ⁶	2 or 3 doses depending on age at series initiation				
HPV–Male ⁶	2 or 3 doses depending on age at series initiation				
PCV13 ⁷					1 dose
PPSV23 ⁷	1 or 2 doses depending on indication				1 dose
HepA ⁸	2 or 3 doses depending on vaccine				
HepB ⁹	3 doses				
MenACWY ¹⁰	1 or 2 doses depending on indication, then booster every 5 yrs if risk remains				
MenB ¹⁰	2 or 3 doses depending on vaccine				
Hib ¹¹	1 or 3 doses depending on indication				



Recommended for adults who meet the age requirement, lack documentation of vaccination, or lack evidence of past infection



Recommended for adults with other indications

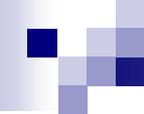


No recommendation

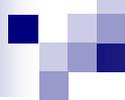


Zoster Vaccine Coverage

- Medicare coverage
 - All Medicare Part D's required to cover Zoster vaccine
 - Patient co-pay may vary according to his/her Part D plan
- Other payers – variable to no coverage
- RZV - \$140/dose; ZVL - \$208



Tetanus, Diphtheria and Pertussis (Tdap)



Pertussis

- Pertussis epidemics occur periodically
 - Pertussis in the US
 - 1976: 1,020 cases
 - 2004: 25,827 cases
 - 2014: 32,971 cases
 - 2015: 20,762 cases
- To protect against resurgence of pertussis, routine Tdap boosters instituted in 2006



Tdap Recommendations

- All adults 19 years and older need a one time Tdap booster
- Tdap should be administered regardless of interval since last tetanus or diphtheria-toxoid containing vaccine
- Adults should receive a Tdap dose if the dose is recommended and no record of previous administration exists
- Follow-up boosters of Td recommended every 10 years

Tdap

- If high-risk, give at less than 2-year interval
 - Healthcare workers with direct patient care
 - Close contact with infants <12 months old
 - During a pertussis outbreak
 - Postpartum women

Tdap

■ Contraindications

- Severe allergic reaction (e.g., anaphylaxis) after a previous vaccine dose or to a vaccine component
- Encephalopathy not attributable to another cause within 7 days of previous dose of DTP, DTaP or Tdap

Tdap

■ Precautions

- Moderate or severe acute illness with or without fever
- Guillain-Barre <6 weeks after a previous dose of tetanus toxoid vaccine
- Progressive or unstable neurological disorder
- Uncontrolled seizures
- Progressive encephalopathy

Tdap

- OK to give Tdap with:
 - Stable neurologic disorder
 - Brachial neuritis
 - Latex allergy that is not anaphylactic
 - Breast feeding
 - Immunosuppression

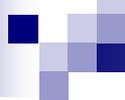


Hepatitis B

Hepatitis B Vaccine (HBV)

Indications

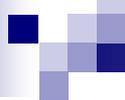
- **Diabetes – age 18-60, >60 based on clinical decision**
- Chronic liver disease
- ESRD (pre-dialysis, hemo- or peritoneal dialysis patients)
- Immunocompromised (including HIV) patients
- Men who have sex with men (MSM)
- IV drug abusers
- Household, needle sharing or sexual contact of known Hepatitis B positive person



Hepatitis B Vaccine (HBV)

Indications

- Healthcare and public safety workers
- Residents/staff of facilities for developmentally disabled people
- Anyone requesting Hepatitis B vaccine
- International travel to endemic areas



Hepatitis B Vaccine (HBV)

■ Contraindications

- Severe allergic reaction (e.g., anaphylaxis) after a previous vaccine dose or to a vaccine component

■ Precautions

- Moderate or severe acute illness with or without fever

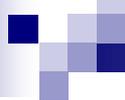
New Recombinant Vaccine Recommendation

- On February 21, 2018, the Advisory Committee on Immunization Practices (ACIP) recommended Heplisav-B (HepB-CpG)
 - a yeast-derived vaccine prepared with a novel adjuvant for adults ≥ 18 years
 - administered as a 2-dose series (0, 1 month)
 - Improved adherence
 - Earlier protection
 - Additional option, not preferred over other vaccines

What can be done to improve adult Immunizations?

Role of Providers

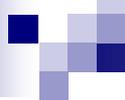
- Provide strong recommendations to patients
- Incorporate vaccination into patient flow
 - Standing orders
 - Provider reminders
- Use EHR to document vaccination
 - Consolidates patients vaccination records in one place
 - Patient reminder and recall systems
 - Provider assessment and feedback



What can be done to improve adult Immunizations?

System Changes

- ★ Reduce barriers for providers to offer vaccine
 - Providers identify payment issues as top barriers



Summary

- Burden of vaccine-preventable diseases among adults – High
- Impact of vaccination for adults – High
- Vaccines widely available but underutilized by adults
- Implementation of the standards for adult immunization practice – Talk to adult patients about vaccines
- Implement evidence-based interventions to promote vaccination for adults
- Ensure that adults are up-to-date on recommended vaccines to help adults stay healthy and prevent hospitalizations, disability, and premature deaths

Figure 1. Recommended immunization schedule for adults aged 19 years or older by age group, United States, 2018

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VAR ⁴	2 doses				
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HPV–Female ⁶	2 or 3 doses depending on age at series initiation				
HPV–Male ⁶	2 or 3 doses depending on age at series initiation				
PCV13 ⁷					1 dose
PPSV23 ⁷	1 or 2 doses depending on indication				1 dose
HepA ⁸	2 or 3 doses depending on vaccine				
HepB ⁹	3 doses				
MenACWY ¹⁰	1 or 2 doses depending on indication, then booster every 5 yrs if risk remains				
MenB ¹⁰	2 or 3 doses depending on vaccine				
Hib ¹¹	1 or 3 doses depending on indication				



Recommended for adults who meet the age requirement, lack documentation of vaccination, or lack evidence of past infection



Recommended for adults with other indications



No recommendation

Figure 2. Recommended immunization schedule for adults aged 19 years or older by medical condition and other indications, United States, 2018

This figure should be reviewed with the accompanying footnotes. This figure and the footnotes describe indications for which vaccines, if not previously administered, should be administered unless noted otherwise.

Vaccine	Pregnancy ¹⁻⁶	Immuno-compromised (excluding HIV infection) ^{3-7,11}	HIV infection CD4+ count (cells/ μ L) ^{3-7,9-10}		Asplenia, complement deficiencies ^{7,10,11}	End-stage renal disease, on hemodialysis ^{7,9}	Heart or lung disease, alcoholism ⁷	Chronic liver disease ⁷⁻⁹	Diabetes ^{7,9}	Health care personnel ^{3,4,9}	Men who have sex with men ^{6,8,9}	
			<200	\geq 200								
Influenza ¹												1 dose annually
Tdap ² or Td ²	1 dose Tdap each pregnancy											1 dose Tdap, then Td booster every 10 yrs
MMR ³		contraindicated										1 or 2 doses depending on indication
VAR ⁴		contraindicated										2 doses
RZV ⁵ (preferred)												2 doses RZV at age \geq 50 yrs (preferred)
or ZVL ⁵		contraindicated										1 dose ZVL at age \geq 60 yrs
HPV-Female ⁶			3 doses through age 26 yrs									2 or 3 doses through age 26 yrs
HPV-Male ⁶			3 doses through age 26 yrs									2 or 3 doses through age 26 yrs
PCV13 ⁷												1 dose
PPSV23 ⁷												1, 2, or 3 doses depending on indication
HepA ⁸												2 or 3 doses depending on vaccine
HepB ⁹												3 doses
MenACWY ¹⁰												1 or 2 doses depending on indication, then booster every 5 yrs if risk remains
MenB ¹⁰												2 or 3 doses depending on vaccine
Hib ¹¹			3 doses HSCT recipients only									1 dose



Recommended for adults who meet the age requirement, lack documentation of vaccination, or lack evidence of past infection



Recommended for adults with other indications



Contraindicated



No recommendation

References

- https://www2.cdc.gov/vaccines/ed/pickup/ciinc/2017/CIINC_4_26_2017.pdf
- <https://www.cdc.gov/vaccines/acip/meetings/downloads/slides-2017-10/adult-immunization-02-kim.pdf>
- <https://www.aafp.org/patient-care/public-health/immunizations/schedules.html>
- https://www.uptodate.com/contents/standard-immunizations-for-nonpregnant-adults?search=adult%20immunization%20schedule&source=search_result&selectedTitle=1~150&usage_type=default&display_rank=1
- <http://www.immunize.org/catg.d/p2011.pdf>