

Vaccination in older adults

Archana Kudrimoti MBBS MPH

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Family and Community Medicine

University of Kentucky

Faculty Disclosure

I currently have the following relevant financial relationships during the past 24 months .

Invested stocks in Johnson and Johnson, Bristol Meyer Squibs, Pfizer

Educational Need/Practice Gap

Gap = lower adult vaccination rates

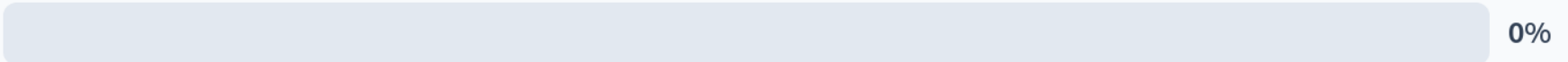
Need = Improve vaccination rates and address vaccine hesitancy

Objectives

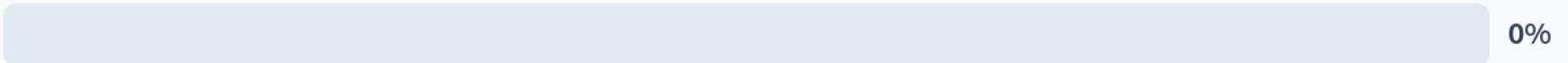
- Upon completion of this educational activity, you will be able to:
- Review the CDC recommendations for appropriate vaccines in older adults
- Describe the types of vaccines recommended for older adults to patients- the BIG 5
- Discuss tips to address vaccine hesitancy

What percentage of eligible patients are vaccinated against Herpes Zoster?

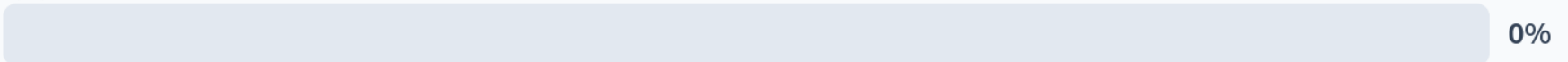
(A) 70%



(B) 50%



(C) 85%



(D) 35%

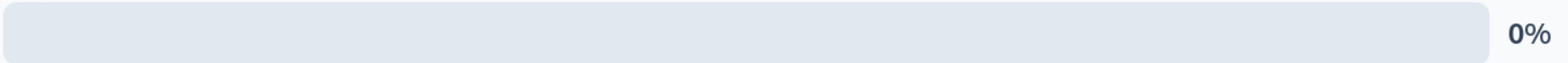


FIGURE. Estimated proportion of adults aged ≥ 19 years who received selected vaccines, by age group and risk status — National Health Interview Survey, United States, 2010–2018

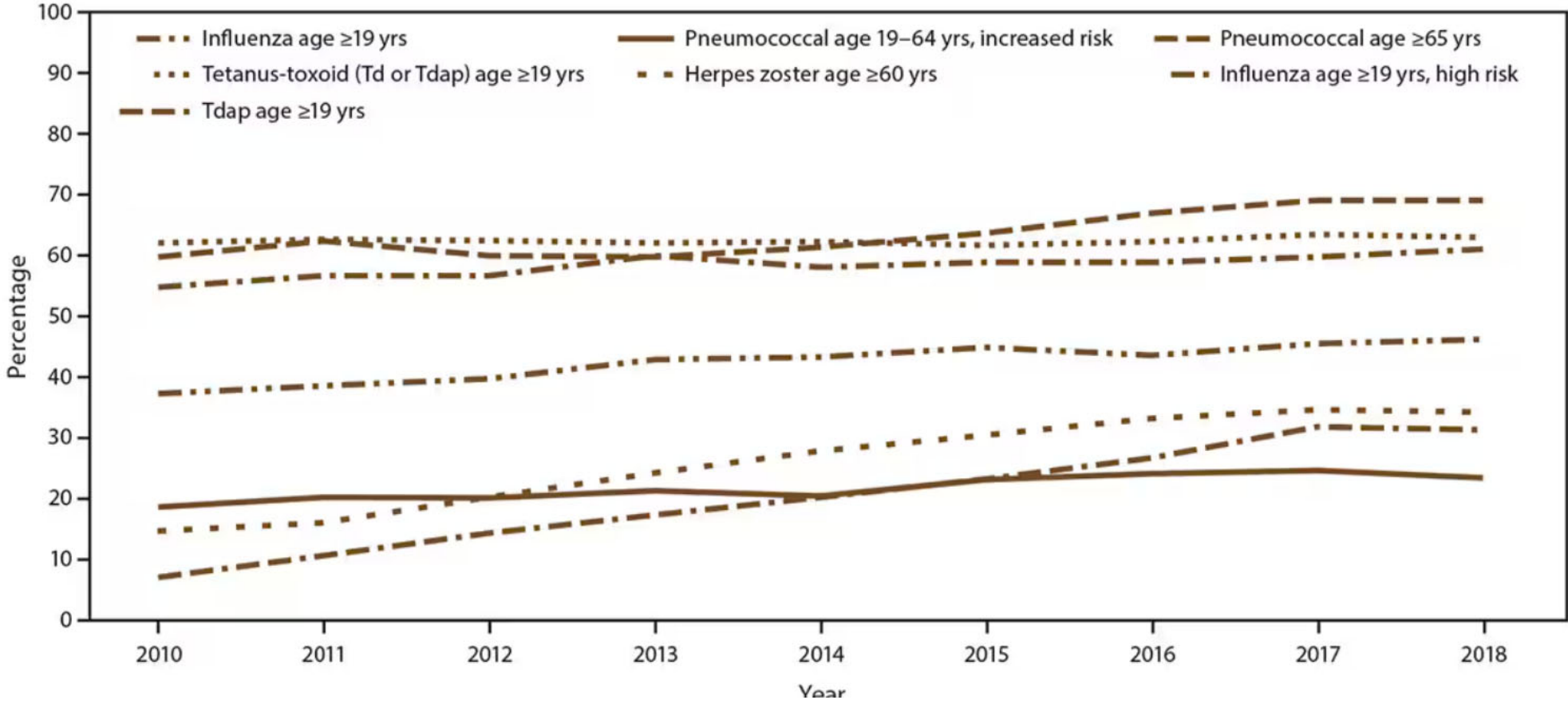


Table 1 Recommended Adult Immunization Schedule by Age Group, United States, 2024

Vaccine	19–26 years	27–49 years	50–64 years	≥65 years
COVID-19	1 or more doses of updated (2023-2024 Formula) vaccine (See Notes)			
Influenza inactivated (IIV4) or Influenza recombinant (RIV4)	1 dose annually			
Influenza live, attenuated (LAIV4)	1 dose annually			
Respiratory Syncytial Virus (RSV)	Seasonal administration during pregnancy. See Notes.			≥60 years
Tetanus, diphtheria, pertussis (Tdap or Td)	1 dose Tdap each pregnancy; 1 dose Td/Tdap for wound management (see notes)			
	1 dose Tdap, then Td or Tdap booster every 10 years			
Measles, mumps, rubella (MMR)	1 or 2 doses depending on indication (if born in 1957 or later)			For healthcare personnel, see notes
Varicella (VAR)	2 doses (if born in 1980 or later)		2 doses	
Zoster recombinant (RZV)	2 doses for immunocompromising conditions (see notes)		2 doses	
Human papillomavirus (HPV)	2 or 3 doses depending on age at initial vaccination or condition	27 through 45 years		
Pneumococcal (PCV15, PCV20, PPSV23)				See Notes
				See Notes
Hepatitis A (HepA)	2, 3, or 4 doses depending on vaccine			
Hepatitis B (HepB)	2, 3, or 4 doses depending on vaccine or condition			
Meningococcal A, C, W, Y (MenACWY)	1 or 2 doses depending on indication, see notes for booster recommendations			
Meningococcal B (MenB)	19 through 23 years	2 or 3 doses depending on vaccine and indication, see notes for booster recommendations		
Haemophilus influenzae type b (Hib)	1 or 3 doses depending on indication			
Mpox				

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

Recommended vaccination for adults with an additional risk factor or another indication

Recommended vaccination based on shared clinical decision-making

No recommendation/Not applicable

Table 2 Recommended Adult Immunization Schedule by Medical Condition or Other Indication, United States, 2024

Always use this table in conjunction with Table 1 and the Notes that follow. Medical conditions or indications are often not mutually exclusive. If multiple medical conditions or indications are present, refer to guidance in all relevant columns. See Notes for medical conditions or indications not listed.

VACCINE	Pregnancy	Immunocompromised (excluding HIV infection)	HIV infection CD4 percentage and count		Men who have sex with men	Asplenia, complement deficiency	Heart or lung disease	Kidney failure, End-stage renal disease or on dialysis	Chronic liver disease; alcoholism ^a	Diabetes	Healthcare Personnel ^b	
			<15% or <200mm ³	≥15% and ≥200mm ³								
COVID-19	See Notes											
IIV4 or RIV4	1 dose annually											
LAIV4						1 dose annually if age 19–49 years						1 dose annually if age 19–49 years
RSV	Seasonal administration. See Notes	See Notes						See Notes				
Tdap or Td	Tdap: 1 dose each pregnancy	1 dose Tdap, then Td or Tdap booster every 10 years										
MMR	*											
VAR	*		See Notes									
RZV			See Notes									
HPV	*		3 dose series if indicated									
Pneumococcal												
HepA												
Hep B	See Notes										Age ≥ 60 years	
MenACWY												
MenB												
Hib			HSCT: 3 doses ^c					Asplenia: 1 dose				
Mpox	See Notes		See Notes							See Notes		

 Recommended for all adults who lack documentation of vaccination, **OR** lack evidence of immunity
 Not recommended for all adults, but recommended for some adults based on either age **OR** increased risk for or severe outcomes from disease
 Recommended based on shared clinical decision-making
 Recommended for all adults, and additional doses may be necessary based on medical condition or other indications. See Notes.
 Precaution: Might be indicated if benefit of protection outweighs risk of adverse reaction
 Contraindicated or not recommended ^aVaccinate after pregnancy, if indicated
 No Guidance/ Not Applicable

a. Precaution for LAIV4 does not apply to alcoholism. b. See notes for influenza; hepatitis B; measles, mumps, and rubella; and varicella vaccinations. c. Hematopoietic stem cell transplant.

Before You Vaccinate Adults, Consider Their “H-A-L-O”!

What is H-A-L-O? It's an easy-to-use chart to help you make an initial decision about vaccinating a patient based on four factors — the patient's **Health, Age, Lifestyle, and Occupation**. Not all patients who mention one or more H-A-L-O factors will need to be vaccinated. Before you make a definitive decision about vaccinating

your patient, you should refer to the more detailed information found in the complete vaccine recommendations of the CDC's Advisory Committee on Immunization Practices (ACIP) at www.cdc.gov/acip-recs/hcp/vaccine-specific/index.html.

H-A-L-O checklist of factors that indicate a possible need for adult vaccination

Vaccine	H Health Factors									A Age Factors			L Lifestyle Factors						O Occupational or Other Factors							
	During pregnancy	Certain chronic diseases	Immunosuppressed (including HIV infection)	History of sexually transmitted diseases	Asplenia	Cochlear implant candidate/recipient	Organ transplant (or stem cell transplant; see ACIP's Best Practices Guidelines for Immunization)	Cerebrospinal fluid (CSF) leak	Alcoholism				Men who have sex with men	Not in a long-term, mutually monogamous relationship	User of injecting or non-injecting drugs	Homelessness	International traveler	Close contact of international adoptee	Tobacco smoking	College students	Healthcare worker	Certain lab workers	People who live or work in an area of an outbreak	Adults in institutional settings (e.g., long-term care, correctional)		
COVID-19	Routine for all adults, including during pregnancy. Recommendations may vary by age, and immunocompromised status																									
HepA		✓	✓								Anyone of any age who wants to be protected			✓		✓	✓	✓	✓				✓	✓		
HepB		✓	✓	✓							Routine through 59 yrs and based on risk factors for 60 yrs and older; may give to anyone 60+			✓	✓	✓		✓					✓			✓
Hib		✓			✓																					
HPV											Routine through 26 yrs; based on SCDM* for 27–45 yrs															
IPV											Recommended for any adult known or suspected of being unvaccinated							✓						✓		
Influenza	Annual vaccination is recommended for all adults																									
Meningococcal ACWY		✓	✓		✓												✓				✓		✓	✓		
Meningococcal B		✓			✓						Based on SCDM* for 16–23 yrs													✓	✓	
MMR			†								Routine 1 dose if born after 1956; 2nd dose for some							✓				✓	✓		✓	
Mpox†				✓								✓	✓										✓			
PCV15/PCV20/PCV21		✓	✓		✓	✓	✓	✓	✓		Routine for age 65 yrs and older; based on risk factors for 19–64 yrs								✓							
PPSV23	PPSV23 only recommended after an adult with an indication for PCV (see row above) has received PCV13 or PCV15; PPSV23 not needed after PCV20 or PCV21.																									
RSV	✓§	✓	✓								Routine for age 75 yrs and older; based on risk factors for 60–74 yrs															✓
Tdap/Td	Tdap/Td boosters every 10 years for all adults; pregnant women should receive Tdap during each pregnancy (gestational weeks 27–36)																									
Varicella	Completion of a 2-dose series for non-pregnant adults without evidence of immunity to varicella (see immunization schedule for details of acceptable evidence of immunity)																									
Zoster		✓	✓				✓				Routine for 50+ yrs; for 19–49 yrs who are immunocompromised															

NOTES * = SCDM (Shared Clinical Decision-Making): See ACIP recommendations on considerations for SCDM for HPV for adults 27–45 yrs and for MenB for 16–23 yrs.
 † = Vaccination may be indicated depending on degree of immunosuppression.
 ‡ = Post-exposure vaccination also recommended. Further evaluation for specific risks is required.
 § = Seasonal, one-time option for RSV vaccine at 32 through 36 wks 7 days gestation.
 || = Varicella is contraindicated in people who are immunocompromised.



FOR PROFESSIONALS www.immunize.org / FOR THE PUBLIC www.vaccineinformation.org

www.immunize.org/catg.d/p3070.pdf
 Item #P3070 (8/22/2024)



Coverage of Vaccinations

Medicare Part B statutorily covers

- influenza vaccine

- pneumococcal pneumonia vaccine

- hepatitis B vaccines

- COVID vaccines

- other vaccines ONLY if directly related to the treatment of an illness or injury (eg, tetanus, anti-rabies)

Medicare Part D covers all other vaccines (eg, herpes zoster, tetanus, diphtheria, RSV) as long as ACIP recommends

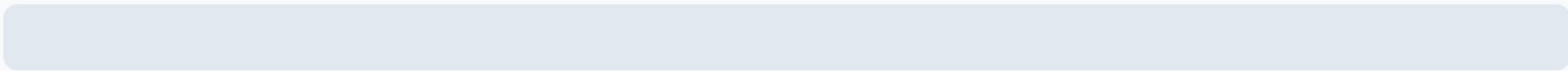
No copay for part D anymore

Influenza Vaccines

What are the Seasonal Influenza vaccination rates in Kentucky in elderly?

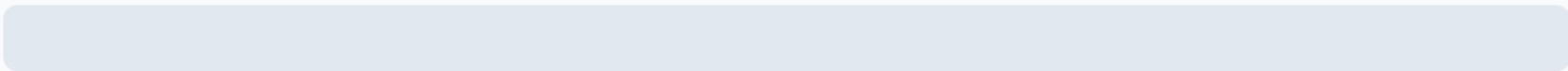
https://www.americashealthrankings.org/explore/measures/flu_vaccine/flu_vaccine_65/KY

30%



0%

50%



0%

45%



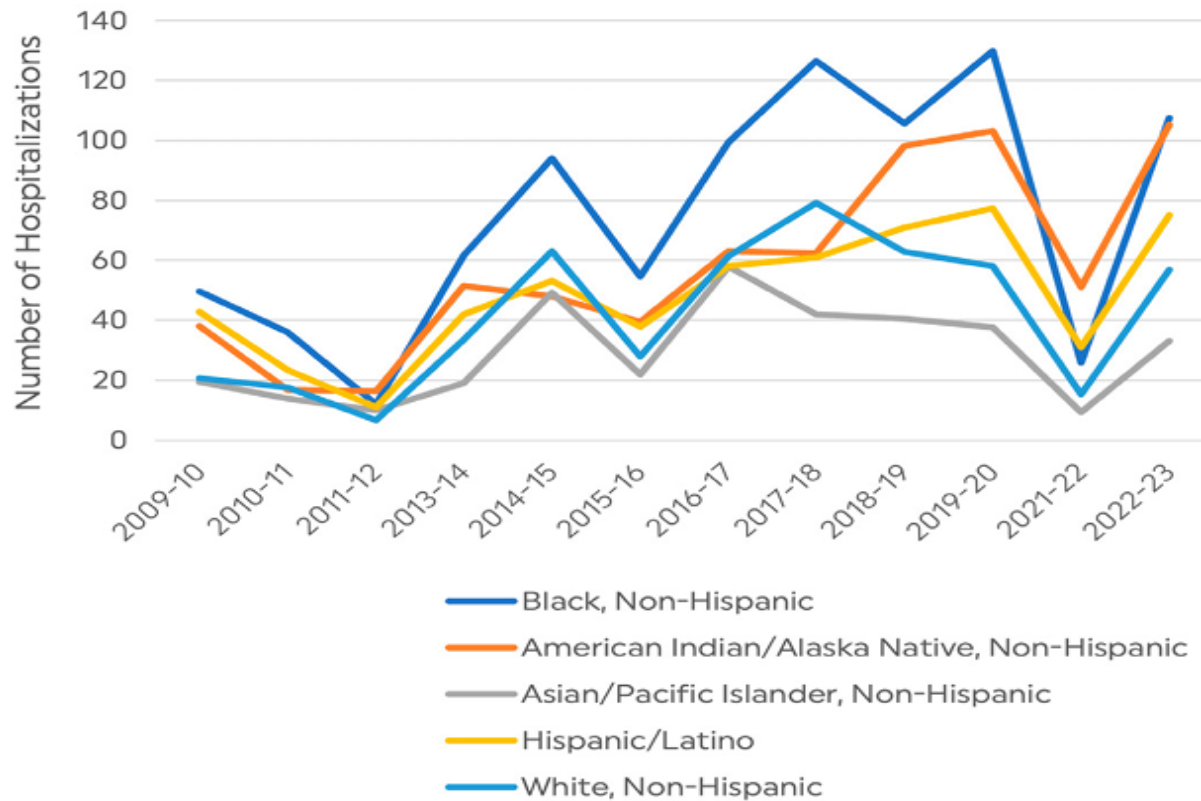
0%

65%



0%

Figure 1



Age-adjusted Cumulative Rates of Laboratory-confirmed Adult (≥ 18 Years) Influenza Hospitalizations per 100,000 Population by Race and Ethnicity, 2009-2010 to 2022-2023*

*During the 2020-21 season, case counts were not sufficient to allow reporting of stratified cumulative rates or weekly rates.

Adapted from Centers for Disease Control and Prevention, National Center for Immunization and Respiratory Diseases, *Flu Activity Report*, 2024. <https://www.cdc.gov/flu/highrisk/>

The CDC estimates that vaccination **prevented 64,000** influenza-related deaths from the 2010-2011 flu season through the 2022-2023 flu season.

February 2024, interim data for the 2023-2024 - influenza vaccine effectiveness for preventing influenza-related illness was up to **67%** in children and up to **49%** in adults.

2023-2024 seasonal influenza vaccines reduced pediatric influenza-associated hospitalization by up to **61%** and adult influenza-associated hospitalization by up to **44%**.

Benefits of High-Dose and Adjuvanted Influenza Vaccines in Older Adults

- HD-IIV, RIV, and aIIV have shown relative benefit compared with standard-dose inactivated influenza vaccines (SD-IIVs) in older adults for
 - Influenza illness
 - Influenza-associated hospitalizations
 - Deaths

aIIV, adjuvanted inactivated influenza vaccine; HD-IIV, high-dose inactivated influenza vaccine;
RIV, recombinant influenza vaccine.
Grohskopf LA, et al. *MMWR Recomm Rep*. 2023;72:1–25.

Influenza season 2024-2025

- ❖ ACIP recommends that adults aged ≥ 65 years preferentially receive any one of the following:
 - ❖ High-dose inactivated influenza vaccine (HD-IIV3, Fluzone High-Dose)
 - ❖ Recombinant influenza vaccine (RIV3, Flublok), or
 - ❖ Adjuvanted inactivated influenza vaccine (aIIV3, Fluad).
- ❖ ACIP recommends that adults aged ≥ 65 years preferentially receive any one of the following higher dose or adjuvanted influenza vaccines
- ❖ If none of these three vaccines is available at an opportunity for vaccine administration, then any other age-appropriate influenza vaccine should be used.
- ❖ Trivalent this year – H1N1, H3 N2 (Flu A) and Flu B strain

Vaccine Co-Administration

IIV4s and RIV may be given simultaneously with other vaccines

COVID-19

Pneumococcal

RZV

Tetanus

Administered at separate anatomic sites

Ideally offered during **September** or **October**

Not recommended during July or August

4 weeks between two live vaccines if given separately

If receive antivirals 48 hrs before and 2 weeks after Live vaccine should be revaccinated.

Kids- 6 months to 8 years need 2 doses if did not receive 2 doses (4 weeks apart) before July 2024

Persons with Egg allergy

- ❖ Multiple studies indicate that egg-allergic persons are not at increased risk of severe allergic reactions to egg-based influenza vaccines.
- ❖ Any influenza vaccine that is otherwise appropriate for the recipient's age and health status (egg based or non-egg based) can be administered to persons with egg allergy.
- ❖ Egg allergy necessitates no additional safety measures for influenza vaccination beyond those recommended for any recipient of any vaccine.
- ❖ Regardless of allergy history, all vaccines should be administered in settings in which personnel and equipment needed for rapid recognition and treatment of acute allergic reactions, including anaphylaxis, are available.

Major Contraindications- IIV3,ccIIV3,RIV3

Severe allergic reactions (except for eggs) eg- anaphylaxis

GBS within 6 weeks of receiving Flu vaccine

Severe illness with or without fever

23-24 season – 160 Million got flu vaccine and 216 had severe reaction (anaphylaxis)

1.35 severe allergic reactions per one million doses of seasonal influenza vaccine administered

Major contraindications- LAIV3 (live)

- Chronic aspirin or salicylate therapy
- CSF leaks
- kids 2-4 years with respiratory condition
- Immunocompromised
- Received antivirals
- Pregnancy

RSV Vaccines

Which of the following is a true statement regarding RSV vaccination

Document Shared decision making before vaccinating between ages 60-74 with risk factors

0%

One-time vaccination for those above age 75 years

0%

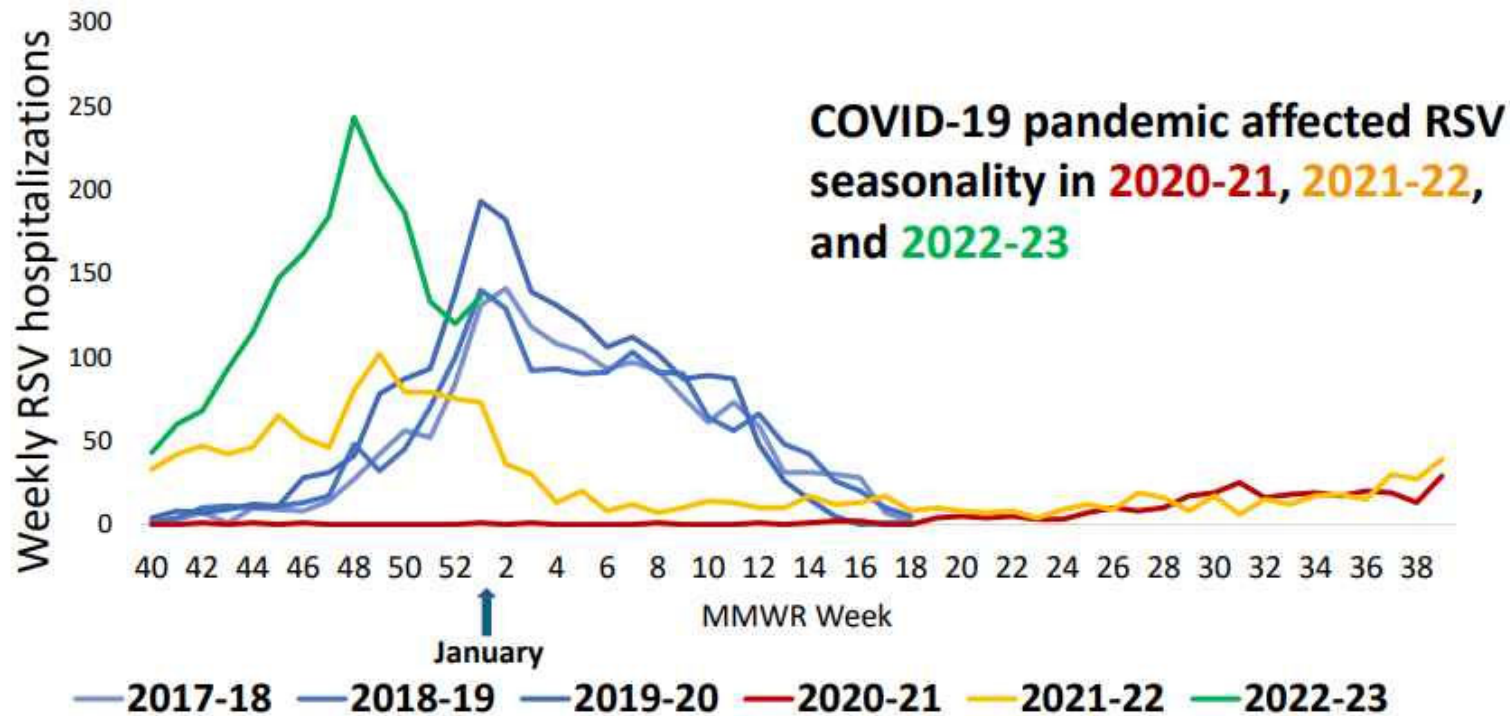
Vaccinate every RSV season annually

0%

Vaccinate 60-74 years with hypertension as risk factor

0%

RSV Hospitalizations in adults aged ≥ 65 years by season: RSV-NET 2017–2023



†: unpublished data. Surveillance for 2017-18 through 2019-20 seasons were conducted from October – April; for 2020-21 and 2021-22 surveillance was conducted continuously from October – September. Data shown for 2022-23 season is from October – December 2022.

- Pfizer RSV vaccine (ABRYSSVO -2023) is approved for individuals aged 60 years and older to prevent lower respiratory tract disease (LRTD) caused by RSV. (recommended in Pregnancy)
- GSK RSV vaccine (AREXVY-2023) is approved for individuals aged 60 years and older and adults ages 50 to 59 who are at increased risk to prevent LRTD caused by RSV.
- Moderna RSV vaccine (mRESVIA-2024) is only approved for individuals aged 60 years and older to prevent LRTD caused by RSV.

- The global clinical trials for RSVPreF3 (Arexvy, GSK) vaccine involved nearly 25,000 participants. One dose reduced the risk of laboratory-confirmed RSV-associated LRTD with two or more symptoms by **82.6%** during the first RSV season and **56.1%** during the second season.
- The RSVpreF (Abrysvo, Pfizer) vaccine global clinical trials involved nearly 37,000 participants. One dose reduced the risk of symptomatic, laboratory-confirmed RSV-associated LRTD with 3 or more symptoms by **88.9%** during the first RSV season and **78.6%** during a partial second season.
- The mRNA RSV (mResvia, Moderna) vaccine global clinical trials involved nearly 37,000 participants. One dose reduced the risk of symptomatic laboratory-confirmed RSV LRTD with three or more symptoms by **80.9%** in the first season. After a median follow up time of 18.8 months, its efficacy declined to **48.4%**.

RSV vaccination

- ❖ RSV vaccination provides meaningful protection against severe RSV disease for at least 2 RSV seasons. Late summer and early fall best time to vaccinate
- ❖ In June 2024 update, ACIP routinely recommends a single dose of any of the three licensed RSV vaccines for all adults age 75 years and older.
- ❖ Single dose of any RSV vaccine for adults age 60 through 74 years who are increased risk for serious RSV infection due to specific high risk conditions, frailty, or high-risk living arrangements (e.g., residents of long-term care facilities).

- **Non-immunocompromising chronic health conditions:**
 - Chronic cardiovascular disease (such as heart failure, coronary artery disease, or congenital heart disease [excluding isolated hypertension])
 - Chronic lung disease (such as chronic obstructive lung disease [COPD], emphysema, asthma, interstitial lung disease, or cystic fibrosis)
 - End-stage kidney disease or dependence on hemodialysis or other renal replacement therapy
 - Diabetes mellitus complicated by chronic kidney disease, neuropathy, retinopathy, or other end-organ damage, or requiring treatment with insulin or sodium-glucose cotransporter-2 (SGLT2) inhibitor
 - Severe obesity (measured as a body mass index of 40 kilograms per meter squared or greater)
 - Chronic liver disease (such as cirrhosis)
 - Neurologic or neuromuscular conditions causing impaired airway clearance or respiratory muscle weakness (such as poststroke dysphagia [swallowing dysfunction], amyotrophic lateral sclerosis [ALS], or muscular dystrophy [excluding history of stroke without impaired airway clearance])
- **Chronic blood disorders (such as sickle cell disease, thalassemia)**
- **Moderate or severe immune compromise (due to a medical condition or due to immunosuppressive medications or treatment)**
- **Overall frailty (based on an assessment of frailty)**
- **Residence in a nursing home or other long-term care facility**
- **Other chronic medical conditions or risk factors not specified in this list that a healthcare provider determines might increase the risk of severe disease due to RSV respiratory infection**

Event	GSK %	Moderna %	Pfizer%
Injection site pain	60.9	55.9	40.6
Myalgia	28.9	25.6	26.5
Fatigue	33.6	30.8	46.1
Headache	27.2	26.7	31.0
Arthralgia	18.1	21.7	11.6
Fever	2.0	2.7	2.6

RSV vaccine and GBS risk

Using VAERS data, estimated Guillain –Barre syndrome reporting rates after RSV vaccination among persons aged ≥ 60 years were 4.4 and 1.8 reports per million doses of Pfizer and GSK vaccine administered, respectively.

GBS occurred within 42 days of vaccination- unclear if related or chance

Benefits of RSV vaccine and prevention of RSV and complications outweighs the risk the very small risk of GBS

Pneumococcal vaccines

Benefits of Pneumococcal vaccine include

Prevents pneumococcal pneumonia

0%

Non-bacteremic pneumococcal pneumonia

0%

Invasive pneumococcal disease

0%

All of the above

0%

Pneumococcal Deaths in Older Adults



1 in 20
Pneumococcal pneumonia kills about 1 in 20 older adults who get it



1 in 6
Pneumococcal bloodstream infection kills about 1 in 6 older adults who get it



1 in 6
Pneumococcal meningitis kills about 1 in 6 older adults who get it

Pneumococcal Vaccines: PCVs vs. PPSV23

	1	3	4	5	6A	6B	7F	9V	14	18 C	19 A	19 F	23 F	22 F	33 F	8	10 A	11 A	12 F	15 B	2	9N	17 F	23F		
PCV13																										
PCV15																										
PCV20																										
PPSV23																										

PCV: pneumococcal conjugate vaccine, PPSV23: 23-valent pneumococcal polysaccharide vaccine

	PCV	PPSV23
Basic Vaccine Composition	Capsular polysaccharides conjugated to CRM197 Carrier Protein	Capsular polysaccharide antigens
Mechanism of action	T-cell dependent	T-cell independent
Memory B cell production	Yes	No

Benefits of Pneumococcal Vaccines in Older Adults

- PCV13 in a placebo-controlled randomized trial showed
 - **46%** efficacy against vaccine-type pneumococcal pneumonia
 - **45%** efficacy against vaccine-type non–bacteremic pneumococcal pneumonia
 - **75%** efficacy against vaccine-type IPD
- PCV15 and PCV20 produce **similar immune responses** as PCV13 for shared serotypes
- PPSV23 in cohort studies demonstrated
 - **56–75%** effectiveness against IPD

Pneumococcal Conjugate (PCV) and Polysaccharide (PPSV) Vaccines

Generic name Trade name (Manufacturer)	Structure	Valence	Dose
PCV15 Vaxneuvance (Merck)	Capsular saccharides + diphtheria toxin protein conjugate	15 serotypes	0.5 mL IM
PCV20 Prennar 20 (Pfizer)	Capsular saccharides + diphtheria toxin protein conjugate	20 serotypes All PCV15 plus 8, 10A, 11A, 12F, &15B	0.5 mL IM
PPSV23 Pneumovax 23 (Merck)	Capsular saccharides alone	23 serotypes All PCV20 (except 6A) plus 9N, 17F, 20	0.5 mL IM or SC

Kobayashi M, et al. *MMWR Morb Mortal Wkly Rep.* 2022;71(4):109–117

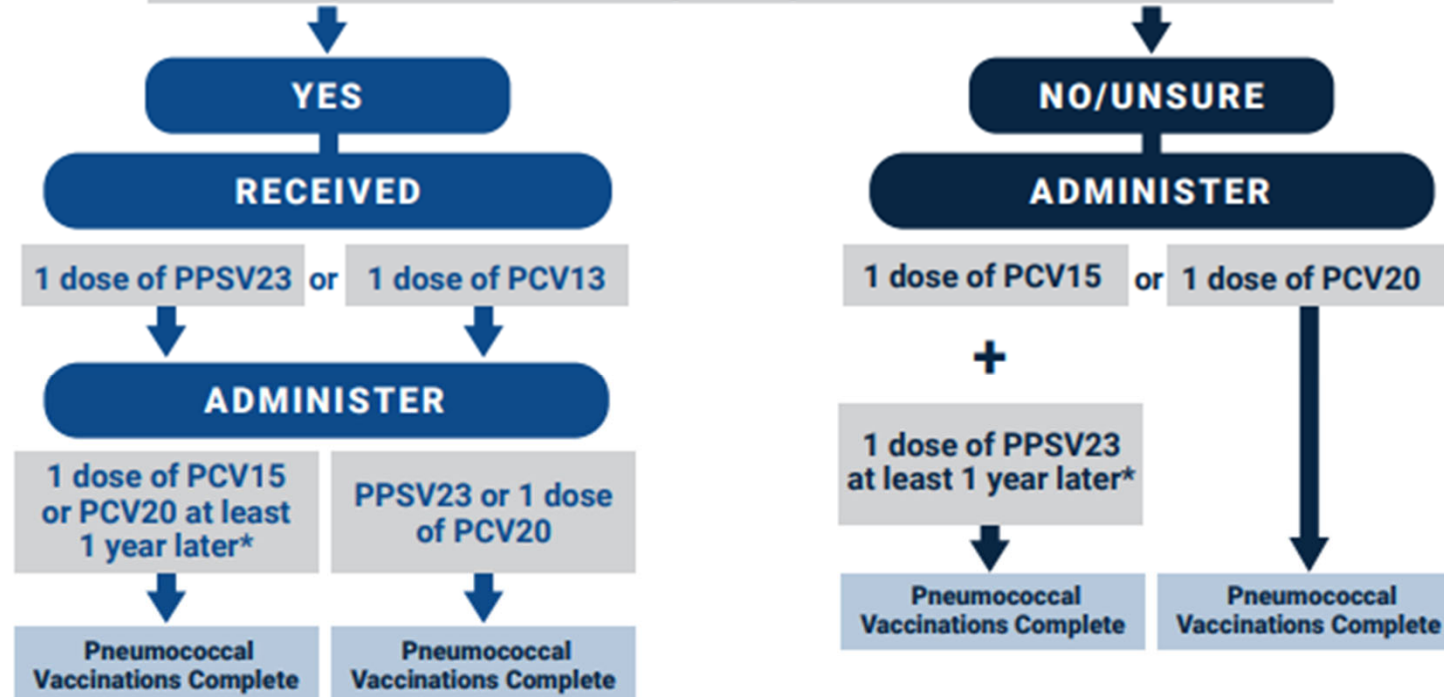
PCV 21

1. Has 8 serotypes unique compared to others
2. ACIP recommended PCV21 as an option for adults aged ≥ 19 years who are currently recommended to receive a dose of PCV
3. No updates to the current ACIP vaccine schedule
4. Increased immunogenicity to certain serotypes that can cause IPD.

PNEUMOCOCCAL VACCINE FOR US ADULTS

ADULTS AGE 65 YEARS AND OLDER

Did the patient receive prior pneumococcal vaccine?



ADULTS AGE 19-64 YEARS

Does the patient have any of the following risk factors?

- Chronic medical condition such as heart, lung, kidney, or liver disease, or diabetes
- Conditions that weaken the immune system, such as sickle cell disease, HIV/AIDS, cancer, or damaged or missing spleen
- Cochlear implants or cerebrospinal fluid (CSF) leaks
- Alcoholism
- Smoker

YES

NO

Did patient previously receive prior pneumococcal vaccine?

YES

NO/UNSURE

RECEIVED

ADMINISTER

PPSV23 only or PCV13 with or without PPSV23

1 dose of PCV15 or 1 dose of PCV20

ADMINISTER

1 dose of PCV15 or PCV20 at least 1 year later* or PPSV23 or 1 dose of PCV20

1 dose of PPSV23 at least 1 year later*

Pneumococcal Vaccinations Complete

Pneumococcal Vaccinations Complete

Pneumococcal Vaccinations Complete

Pneumococcal Vaccinations Complete

Pneumococcal vaccination not recommended

* pneumococcal polysaccharide vaccine
 pneumococcal conjugate vaccine

A minimum interval of 8 weeks can be considered in adults with an immunocompromising condition, cochlear implant, or CSF leak

PCV20 is shared clinical decision in Adults ≥ 65 who received PCV13 + PPSV23

- If had PCV13 at any age plus
- PPSV23 at age ≥ 65 years
- Then Shared Clinical Decision-Making
- Consider individual risks from concurrent illness or environment
- If decide yes, then at least 5 years after last pneumococcal vaccine

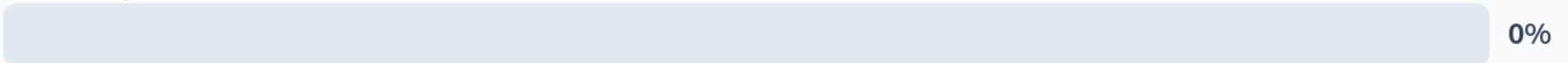
Safety of Pneumococcal Vaccines in Older Adults Local and Systemic Adverse Events

Event	PCV15	PCV20	PPSV23
Injection site pain	66.8	55	60.0
Myalgia	26.9	39	11.9
Fatigue	21.5	30	13.2
Headache	18.9	22	17.6
Arthralgia	7.7	15	Not Reported

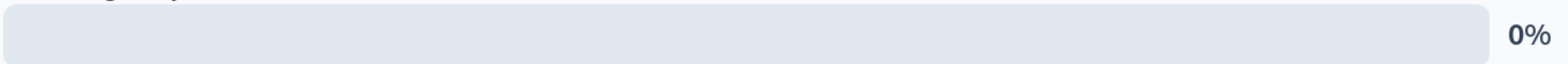
Herpes Zoster vaccine

As per ACIP the following patients should not get a varicella- zoster (Shingrix) vaccine

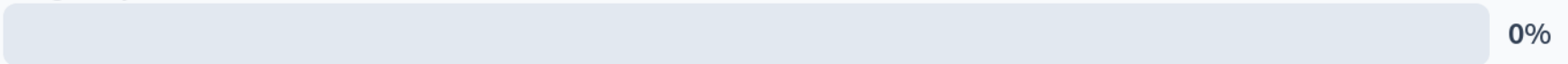
Above 19 years with autoimmune condition



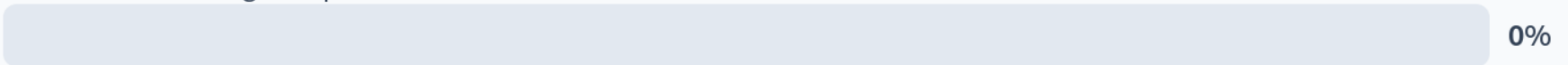
Above age 50 years



Pregnancy

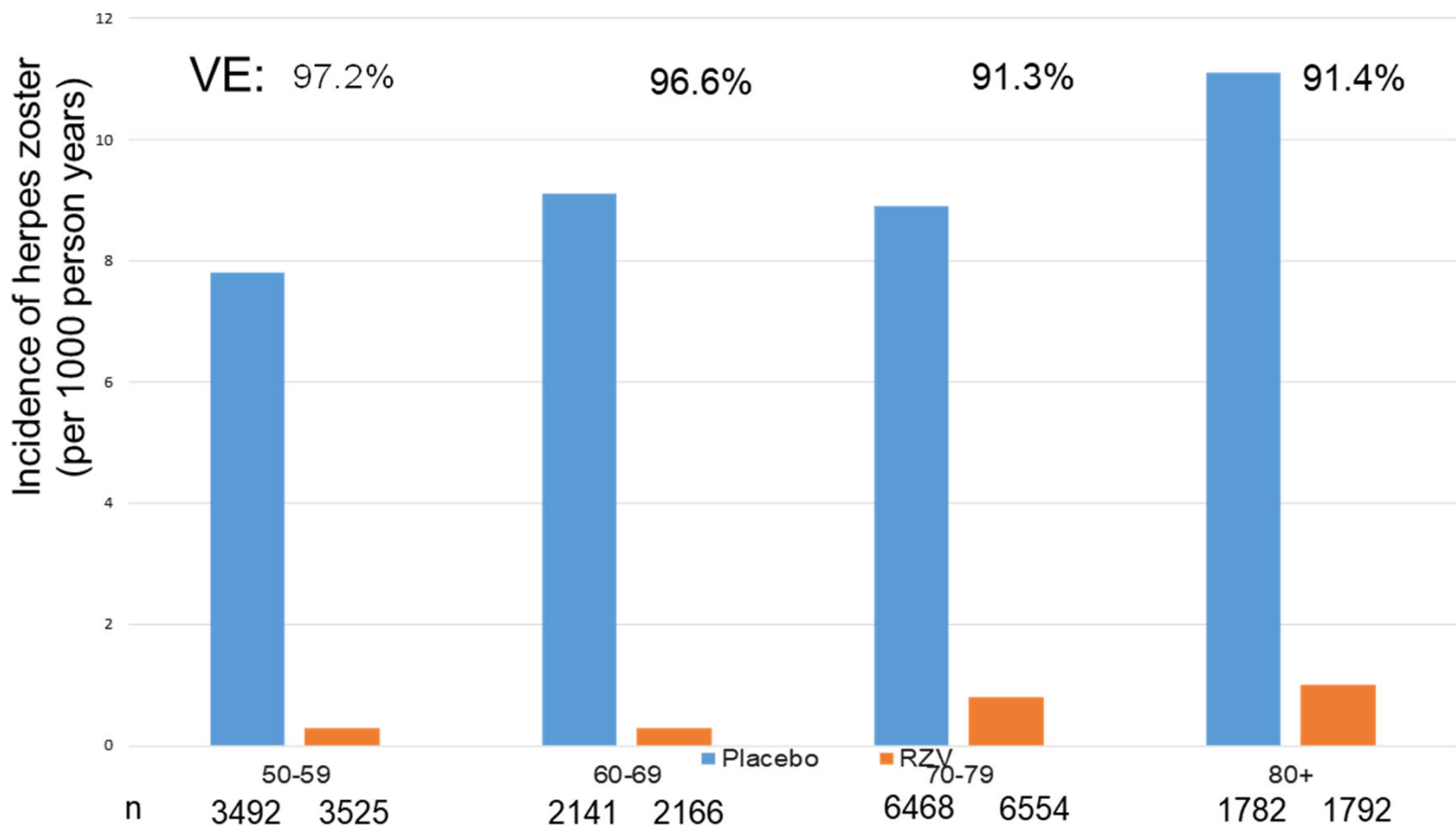


Those who had shingles in past



Recombinant Zoster Vaccine Efficacy Against Herpes Zoster

ZOE-50 and ZOE-70 Pooled Analyses



VE, vaccine efficacy.

Lal H, et al. *N Engl J Med.* 2015;372(22):2087–2096. Cunningham AL, et al. *N Engl J Med.* 2016;375(11):1019–1032. Curran D, et al. *J Am Geriatr Soc.* 2021;69(3):744–752. Izurieta HS, et al. *Clin Infect Dis.* 2021;73(6):941–948. SHINGRIX [package insert]. Research Triangle Park: GlaxoSmithKline; 2021.

Vaccine effectiveness

In a real-world Medicare study

RZV effectiveness was 70.1% after 2 doses, which was not significantly lower for beneficiaries aged >80 years, for second doses received at ≥ 180 days, or for individuals with autoimmune conditions.

Two-dose vaccine effectiveness against postherpetic neuralgia was 76.0%.

RZV Local and Systemic AEs by Age*
 ZOE-50 and ZOE-70 Pooled Analyses

Adverse Event			
	50–59 y	60–69 y	≥70 y
Injection site reaction, pain	88.8	82.8	69.2
Grade 3 [†]	10.3	6.9	4.0
Myalgia	56.9	49.0	35.1
Grade 3	8.9	5.3	2.8
Fatigue	57.0	45.7	36.6
Grade 3	8.5	5.0	3.5
Headache	50.6	39.6	29.0
Grade 3	6.0	3.7	1.5
Shivering	35.8	30.3	19.5
Grade 3	6.8	4.5	2.2
Fever	27.8	23.9	14.3
Grade 3	0.4	0.5	0.1

RZV Two-Dose Regimen

- Second dose recommended 2 to 6 months after first dose
 - If 2- to 6-month window is missed, administer the second dose any time after 6 months
 - Do not restart the series

Counsel about potential reactions before administering either dose

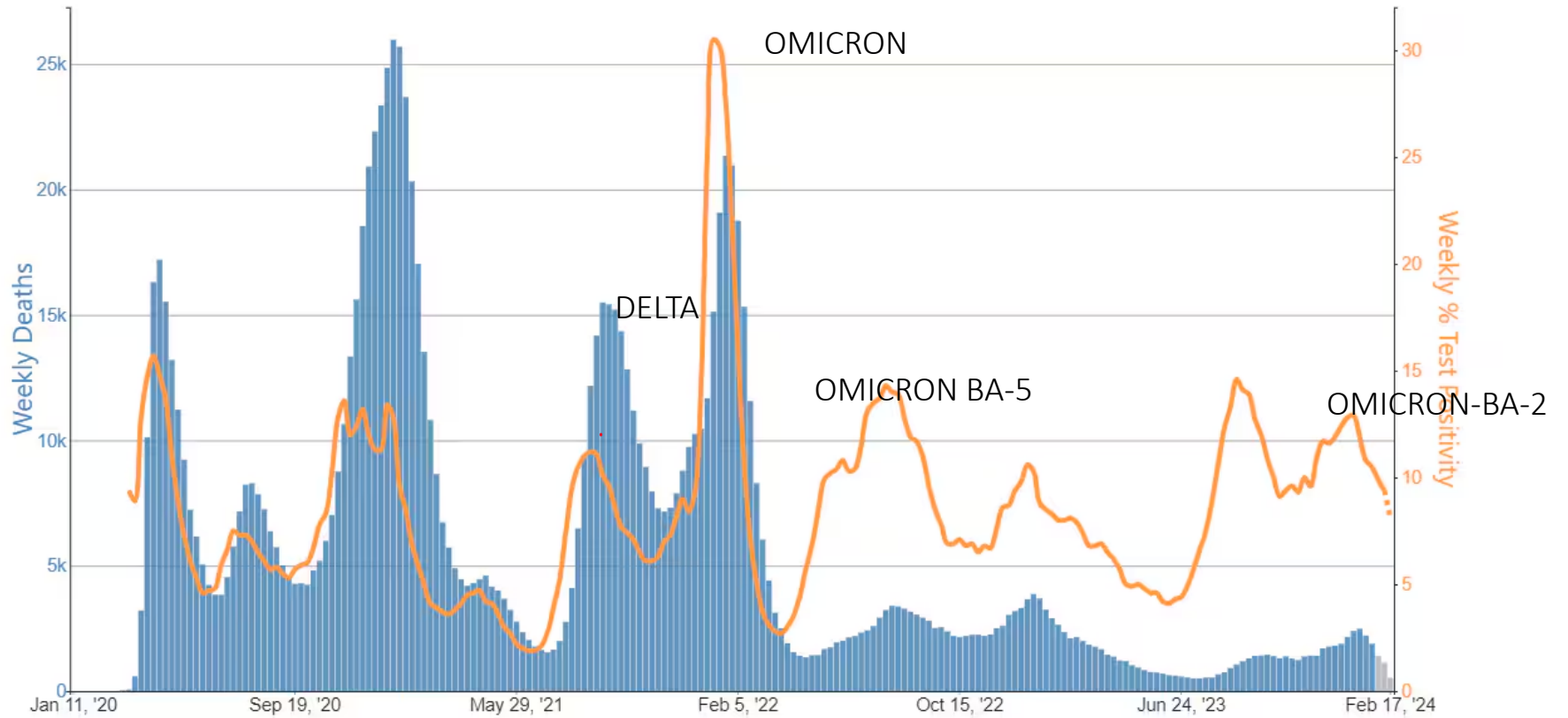
About 1 in 6 persons have reactions that prevent them from doing normal activities

Avoid strenuous activities for a few days after vaccination

Most symptoms resolve in 1 to 3 days

COVID vaccines

Provisional COVID-19 Deaths and COVID-19 Nucleic Acid Amplification Test (NAAT) Percent Positivity, by Week, in The United States, Reported to CDC



Centers for Disease Control and Prevention. COVID Data Tracker. Atlanta, GA: U.S. Department of Health and Human Services, CDC; 2024, February 23. <https://covid.cdc.gov/covid-data-tracker>

How mRNA COVID-19 Vaccines Work

Understanding the virus that causes COVID-19.

Coronaviruses, like the one that causes COVID-19, are named for the crown-like spikes on their surface, called **spike proteins**. These **spike proteins** are ideal targets for vaccines.

What is mRNA?

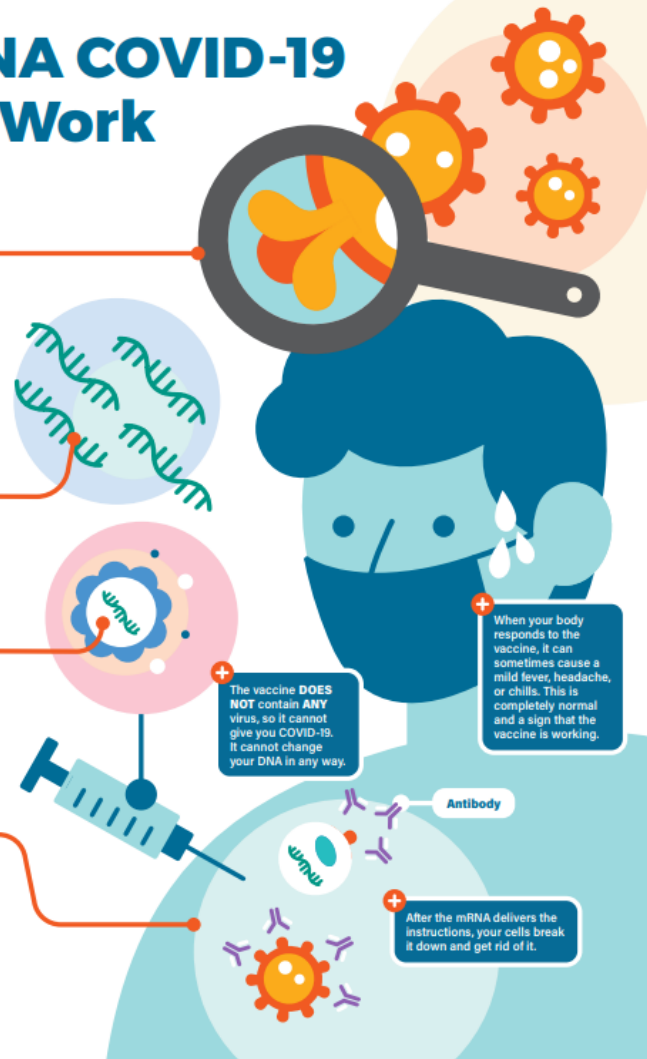
Messenger RNA, or mRNA, is genetic material that tells your body how to make proteins.

What is in the vaccine?

The vaccine is made of mRNA wrapped in a coating that makes delivery easy and keeps the body from damaging it.

How does the vaccine work?

The mRNA in the vaccine teaches your cells how to make copies of the **spike protein**. If you are exposed to the real virus later, your body will recognize it and know how to fight it off.



When your body responds to the vaccine, it can sometimes cause a mild fever, headache, or chills. This is completely normal and a sign that the vaccine is working.

The vaccine DOES NOT contain ANY virus, so it cannot give you COVID-19. It cannot change your DNA in any way.

After the mRNA delivers the instructions, your cells break it down and get rid of it.

GETTING VACCINATED?

For information about COVID-19 vaccine,



How Protein Subunit COVID-19 Vaccines Work

Understanding the virus that causes COVID-19.

Coronaviruses, like the one that causes COVID-19, are named for the crown-like spikes on their surface, called **spike proteins**. These **spike proteins** are ideal targets for vaccines.

What is a protein subunit vaccine?

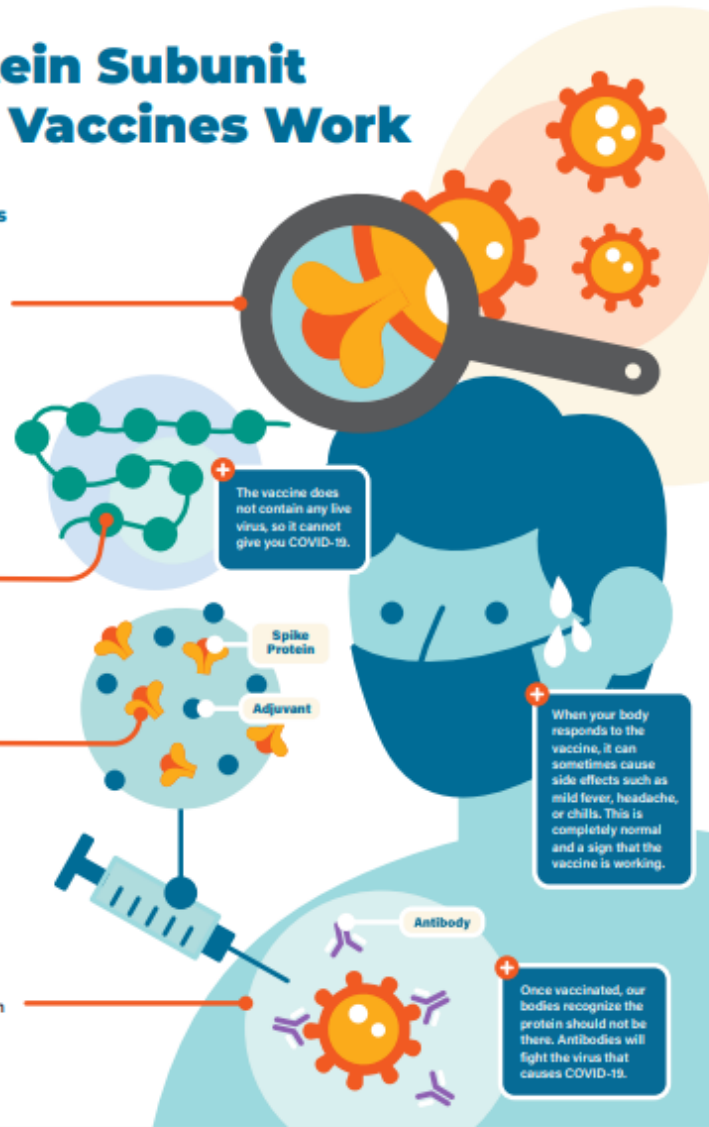
Protein subunit vaccines are a type of vaccine that contains harmless copies of the COVID-19 spike protein. These vaccines do not contain the entire virus.

What is in the vaccine?

The vaccine contains virus pieces called **spike protein** and another ingredient called an **adjuvant**.

How does it work?

When you are vaccinated, nearby cells pick up the proteins. The immune system recognizes that these proteins do not belong. The adjuvant helps the immune system produce antibodies and activate other immune cells to fight off future infections.



COVID VACCINE

- Decreases risk of Hospitalizations/ED visits
- Death
- Serious illness

- Vaccine effectiveness ranges from 30-50 % and depends on median interval from last vaccine dose

Vaccine effectiveness

Several factors influence vaccine effectiveness, including:

- ❖ host-related factors, such as age, presence of underlying medical conditions (e.g., diabetes, cancer), and history of prior infection
 - ❖ pathogen-related factors, such as the virus variant(s) circulating
 - ❖ vaccine-related factors, such as type of vaccine and time since vaccination
-
- ❖ During October 2023–April 2024, VE among adults aged ≥ 18 years against symptomatic SARS-CoV-2 infection 60–119 days after vaccination was 58% (95% CI = 33%–73%) for likely XBB-sublineage infection and 37% (95% CI = 13%–51%) for likely JN. 1-sublineage infection.

COVID vaccination rates are higher among (choose one correct statement)

urban more than rural

0%

males more than female

0%

uninsured more than insured

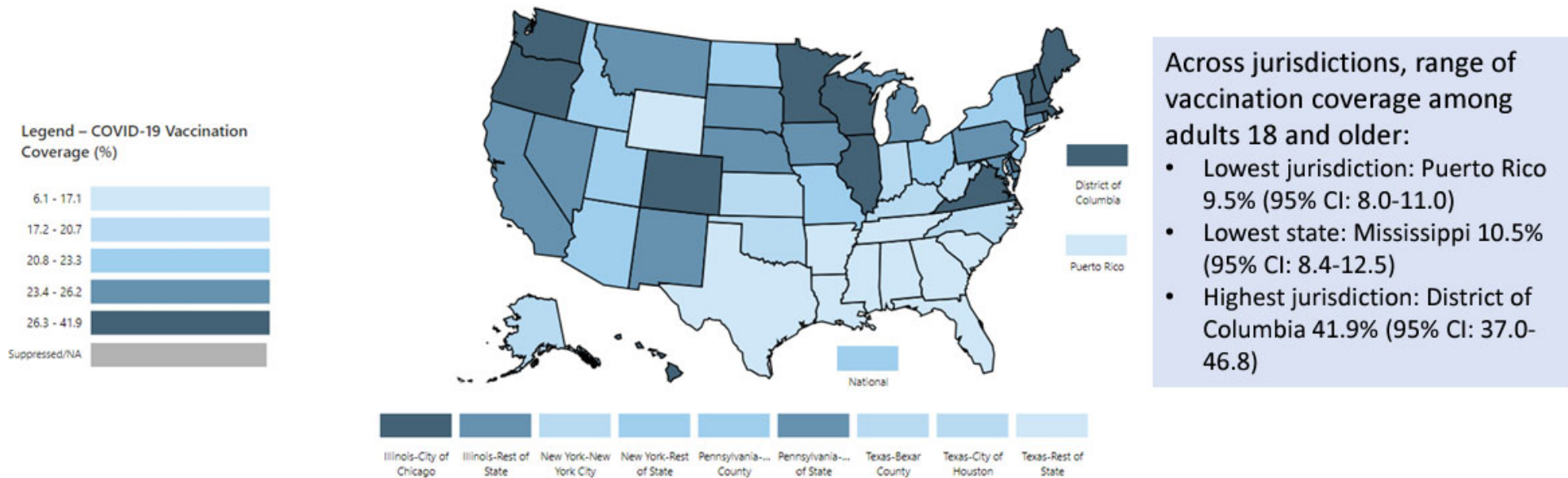
0%

blacks more than white

0%

COVID-19 vaccination status among adults ≥18 years by jurisdiction*

National Immunization Survey-Adult COVID Module (NIS-ACM)

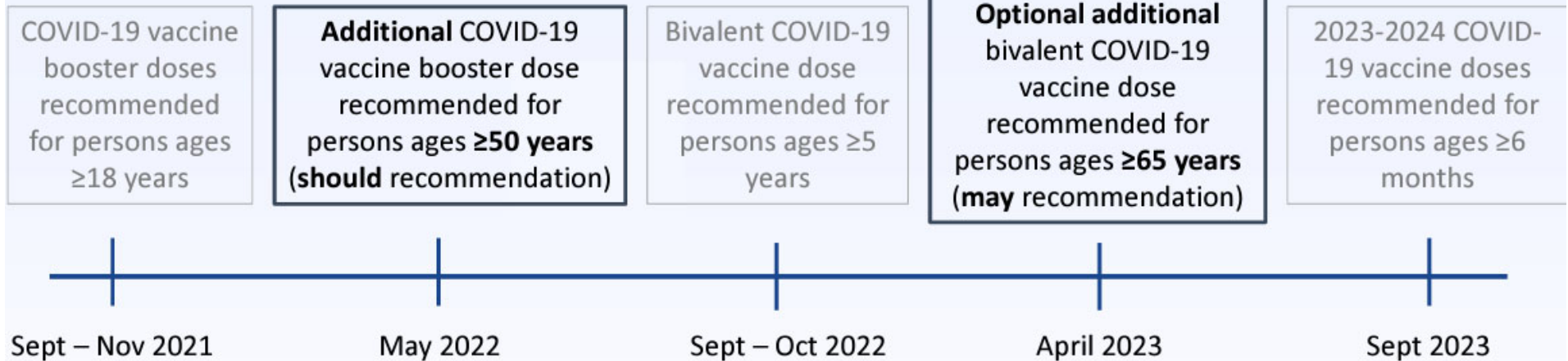


As of week ending 2/3/24

COVID vaccines

- ❖ 2 Primary vaccine dose under EUA
- ❖ Now part of ACIP recommendations
- ❖ Unvaccinated – 3 doses are recommended (give one dose 2024-25 now)
- ❖ Pfizer, Moderna (mRNA) and Novovax (protein sub-unit)
- ❖ Received any number of vaccines, then give one dose 8 weeks after last dose.

Timeline of additional dose recommendations



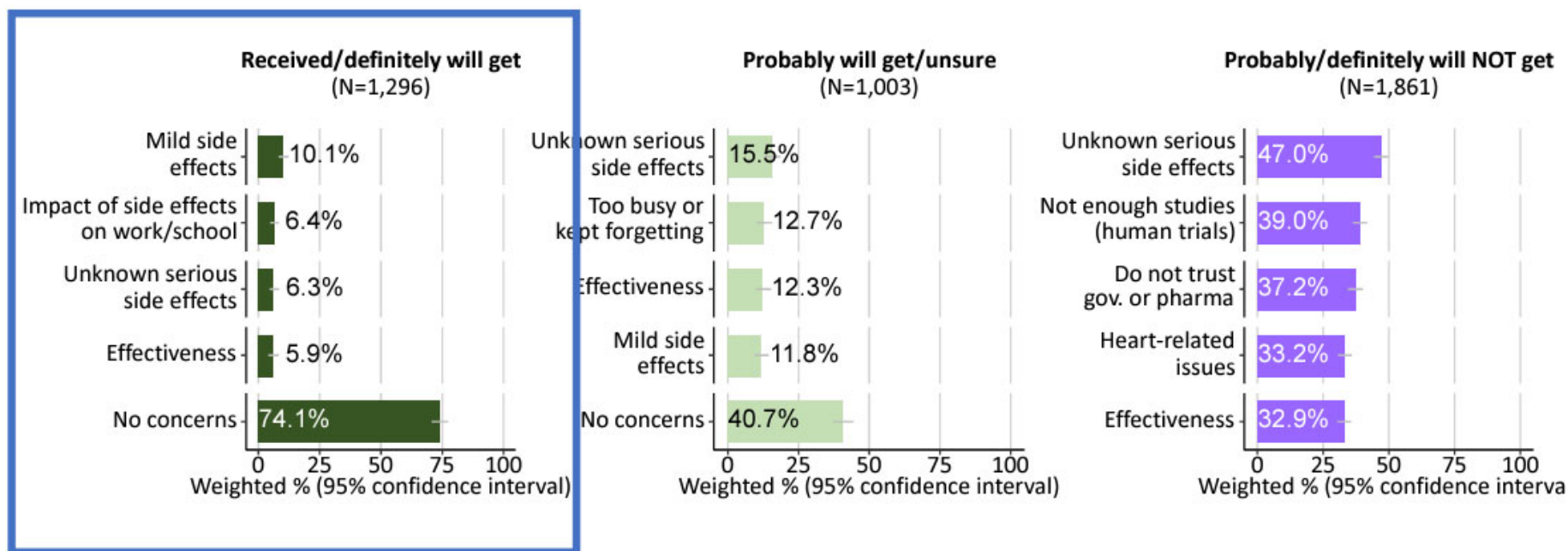
Vaccine administration

- ❖ Receive same manufacturer for 3 doses
- ❖ If need to switch- reason usually unavailability, unsure, side effects
- ❖ If m-RNA given from different manufacturers, complete 3 doses at least
- ❖ For people who received Dose 1 from one manufacturer but will receive subsequent dose(s) from a different manufacturer, administer:
 - Dose 2 at least 4 weeks after Dose 1.
 - Dose 3 at least; 4 weeks after Dose 2 for people 5 years of age and older.

Vaccine hesitancy

- Vaccine hesitancy is refusal or reluctance to receive an available vaccine
- Vaccine hesitancy remains common among older adults—approximately 50% for flu, higher for COVID-19
- Lower education, lower income, and racial and ethnic differences relate to increased hesitancy
- Lower trust in science, government, and medicine relate to consumption of unregulated information sources, conspiratorial beliefs, and knowledge gaps each contribute to hesitancy

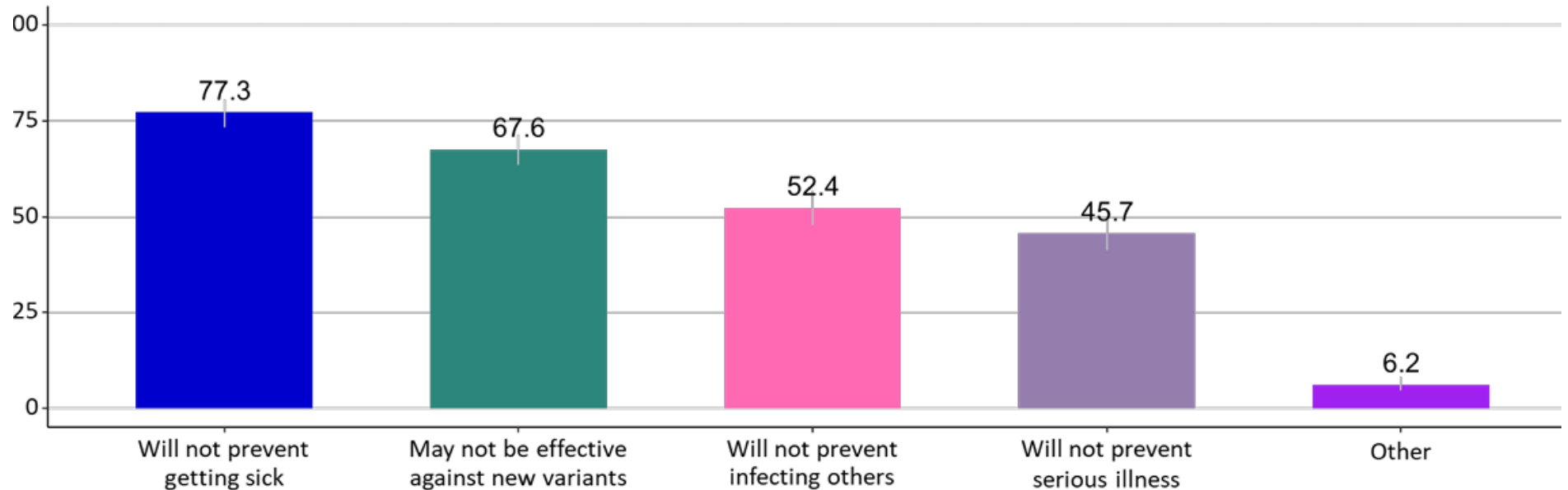
Most frequent COVID-19 vaccination concerns among adults ≥18 years by vaccination status/intent *(Omnibus Surveys January 5–29, 2024*)*



Sample size = 4,160

Specific concerns about effectiveness of updated COVID-19 Vaccines among adults ≥18 years who reported effectiveness as a concern

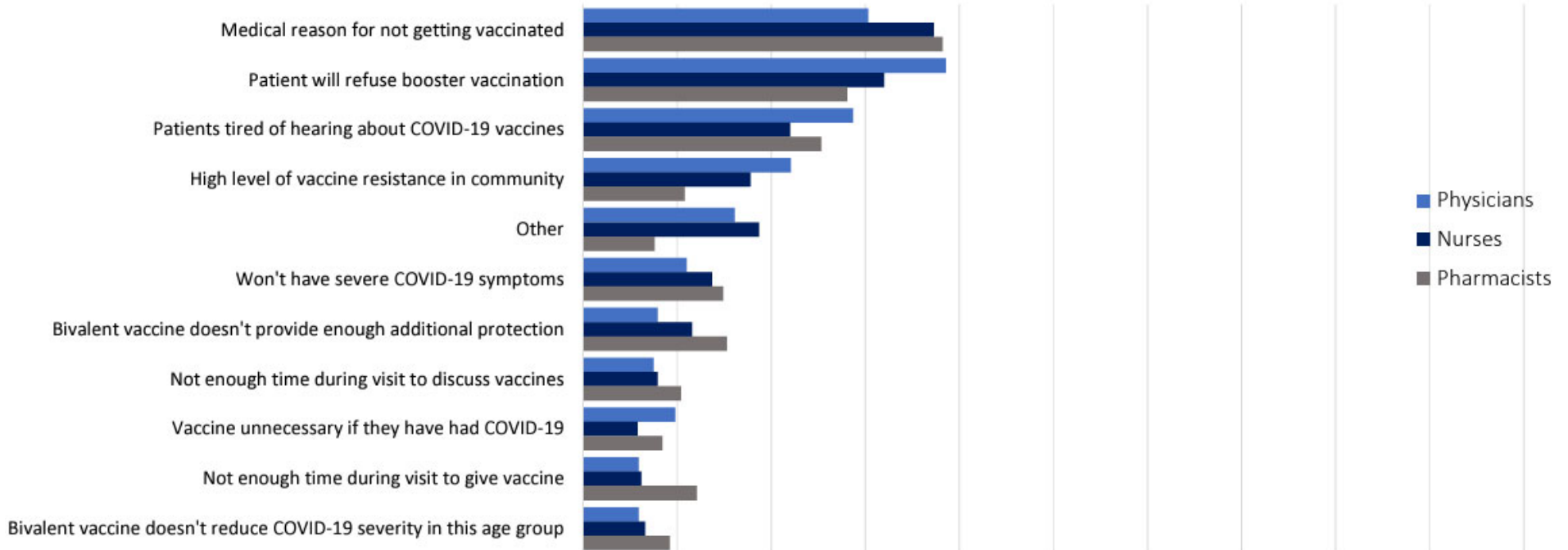
*Omnibus Surveys, January 5-29, 2024**



Reasons healthcare providers reported for NOT recommending COVID-19 bivalent boosters to eligible adult patients (CDC/RAND/Univ of Iowa Survey — February 2023)

% of respondents selecting response option (n=744)

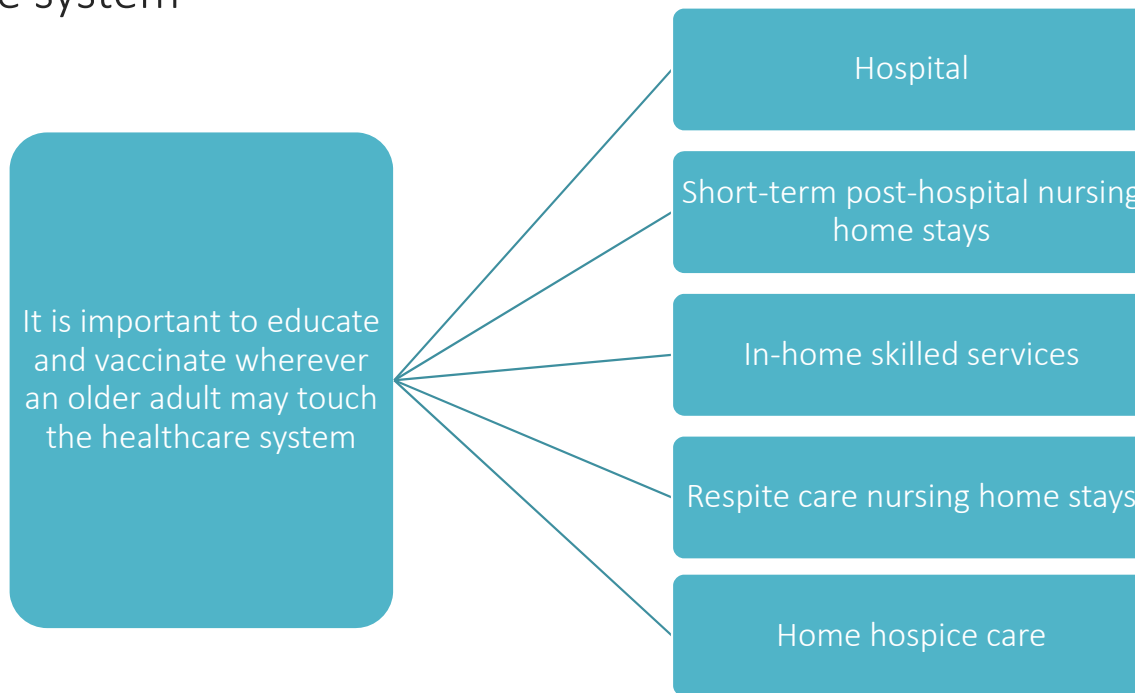
0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%



Response options receiving <5% for at least one provider group not presented

How to improve vaccination rates

It remains important to vaccinate older adults at every point of contact with the healthcare system



- Successful interventions are multifaceted and include direct communication, particularly to specific groups
- Practical tips involve asking questions to understand the why of hesitancy
- Organizing communication across health care teams to present a unified message is recommended—even if staff are hesitant
- Ask patients if willing to hear more, continue conversation—especially if nonverbal signals show lack of receptivity

Table 1

Influenza Vaccination FAQs

Question	Answer
I have an egg allergy. Can I get a flu vaccine?	Yes, you can get a flu vaccine that contains egg proteins even if you have a severe egg allergy. Only people with a history of severe allergic reaction to a non-egg component of the vaccine should not get a flu vaccine.
I have never had the flu. Doesn't that mean I am healthy and won't get sick?	Even though you have not had the flu in the past, everyone has some risk of catching the influenza virus. The Centers for Disease Control and Prevention and the American Academy of Family Physicians recommend that you get a flu vaccine every year to protect you against infection. If you do end up getting sick, being vaccinated can reduce the severity of your illness.
I always feel sick after getting a flu vaccine. Did the shot make me sick?	No, the flu shot does not contain any active influenza virus, so it cannot give you the flu. After you get vaccinated, your body may have an immune response as it is developing antibodies to prevent a future infection. Some people have mild symptoms that may include a low-grade fever, body aches and fatigue. These usually only last a few days and get better with hydration, rest and use of an over-the-counter medicine such as acetaminophen or ibuprofen (if you are able to take these medicines).
I got vaccinated, so why did I get the flu?	Unfortunately, not everyone who gets a flu vaccine has a strong immune response. Also, the seasonal flu vaccine does not always provide a high match for all the strains of influenza virus circulating in a given year. But even if the vaccine is not a perfect match, it can still reduce the severity of your illness. It may also protect you from other strains of the influenza virus that could make you sick.
I am immunocompromised. Is it safe for me to get a flu vaccine?	Yes, the flu vaccine is safe for people who are immunocompromised, and it is especially important for you to protect yourself by getting vaccinated. This year, the CDC recommends that solid organ transplant recipients 18 to 64 years of age who are taking immunosuppressive medications should get either a high-dose or adjuvanted vaccine. It will provide more protection than the standard

I am immunocompromised. Is it safe for me to get a flu vaccine?

Yes, the flu vaccine is safe for people who are immunocompromised, and it is especially important for you to protect yourself by getting vaccinated. This year, the CDC recommends that solid organ transplant recipients 18 to 64 years of age who are taking immunosuppressive medications should get either a high-dose or adjuvanted vaccine. It will provide more protection than the standard dose.

I already had the flu this season. Should I still get vaccinated?

Yes! Each year, multiple strains of the influenza virus are circulating. Even if you have already been infected this season, vaccination can protect you from other strains you may not have encountered yet.

Isn't the flu vaccine something for older people? Do children really need to get a flu vaccine?

Children have some of the strongest immune responses to the flu vaccine. This means that getting vaccinated helps protect them from illness. It also helps protect others in the community who may not be able to achieve a strong response to vaccination, such as grandparents and people who are immunocompromised.

Isn't the flu vaccine always just a guess of what viruses will be circulating during flu season?

Each year, the flu vaccine is based on experts' predictions of what dominant strains of influenza virus will circulate during the upcoming flu season. While it may not be perfect, the seasonal vaccine usually provides reasonable protection against the circulating influenza viruses each year.

Can I get the flu vaccine and other recommended vaccines, such as vaccines for COVID-19 and respiratory syncytial virus, at the same time?

Yes. The flu vaccine is safe and effective when given with other vaccines, such as those for RSV and COVID-19. After getting the flu vaccine, you do not have to wait for a certain amount of time before getting another vaccine. You could even get it as soon as later that day or the next day.

Resources



Download the App

Note: If you previously downloaded the app, check that you have version 8.0.1 with 2021 schedules and footnotes.

Download “CDC Vaccine Schedules” free for iOS and Android devices.

Product Specs

Version: 9.0.1

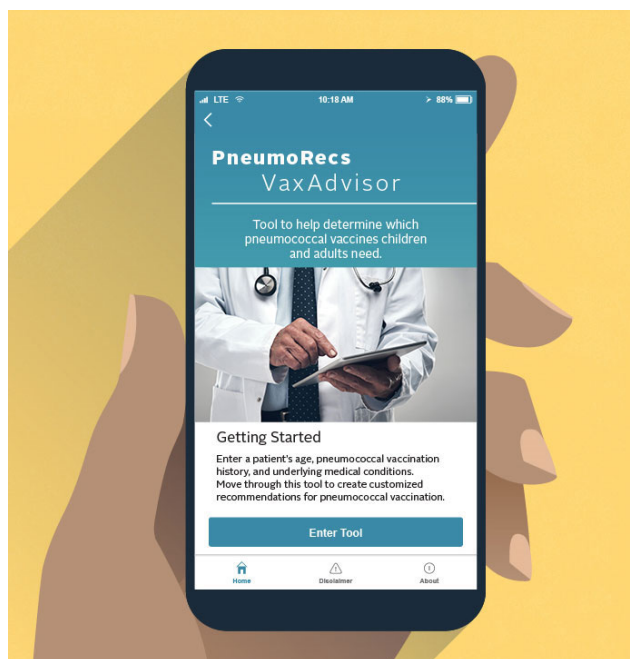
Requirements: Requires iOS 11.0 or later and Android 5.1 or later; optimized for tablets and useful on smartphones.

Updates: Changes in the app are released through app updates.

Download app free for **iOS**

[Download app free for **Android**](#)

PneumoRecs updated Sept 2024



Others

Epidemiology and Prevention of Vaccine-Preventable Diseases

The Pink Book: Course Textbook - 14th Edition (2021)



Chapters

Appendices

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Clinic Tools

Helpful Resources for Your Immunization Practice


This section is a one-stop source of practical information for immunization providers. You will find "how-to" information about providing vaccinations in a medical office or non-traditional setting.

- ➔ Administering Vaccines
- ➔ Adolescent Vaccination
- ➔ Adult Vaccination
- ➔ Documenting Vaccinations
- ➔ Scheduling Vaccines
- ➔ Screening for Contraindications
- ➔ Storage & Handling
- ➔ Vaccination and COVID-19
- ➔ Vaccine Recommendations

Partner Resources

This section offers visitors a collection of essential vaccination resources such as staff education and training materials, tool kits, official vaccine recommendations, and much more.

Centers for Disease Control & Prevention

- ➔ [ACIP Vaccine Recommendations](#)
CDC's home page for ACIP recommendations
- ➔ [General Best Practice Guidelines for Immunization: Best Practices Guidance of ACIP](#)
HTML | PDF
- ➔ [Epidemiology and Prevention of Vaccine Preventable Diseases \(The Pink Book\)](#)
 CDC textbook with comprehensive information on routinely used vaccines and the diseases they prevent

Related Materials from IAC