



# Adult Immunization in 2022

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# Disclosure



**Dr. John O'Neill :**

- has no financial or promotional relationship with any other entities producing, marketing, re-selling, or distributing health care goods or services, consumed by, or used on, patients.



# Objectives

- Review the significant changes in the **ACIP** recommendations for the **adult immunization schedule** over the past 5 years
- We will review some tools available to help us remember this
- We will not discuss COVID 19 or Monkeypox vaccines

# A bit of History...



- 1796: Edward Jenner injected exudate from **Cowpox** lesions into another person, providing protection against infection with **Smallpox** (“variolation ”)
- 1885: Louis Pasteur developed 1<sup>st</sup> **Rabies** vaccine: material from infected rabbit brain subjected to drying process.
- 1897: **animal serum** against tetanus toxin
- 1921: antitoxin vs **Toxoid**
- 1931: DPT



# A bit more History...



- **Polio**: 1952 US epidemic ~58,000 cases, ~3000 deaths
- 1953-5: Dr. Jonas Salk, IPVim; 1957: < 6,000 cases
- 1962: Dr. Albert Sabin, OPV, safer/more effective
- **Measles**: early 1960's 3-4 million US cases, 48,000 hospitalizations, 1000 encephalitis, 4 -500 dead
- 1963: John Enders, et al: 1<sup>st</sup> vaccine;  
1968: Edmonston -Enders strain in vax  
1998: 89 cases in US, no reported deaths
- 1979: **Smallpox** eradicated from the world

**Table 1** Recommended Adult Immunization Schedule by Age Group, United States, 2022

Vaccine	19–26 years	27–49 years	50–64 years	≥65 years
<b>Influenza inactivated (IIV4) or Influenza recombinant (RIV4)</b>	1 dose annually			
<b>Influenza live, attenuated (LAIV4)</b>	1 dose annually			
<b>Tetanus, diphtheria, pertussis (Tdap or Td)</b>	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			
<b>Measles, mumps, rubella (MMR)</b>	1 or 2 doses depending on indication (if born in 1957 or later)			
<b>Varicella (VAR)</b>	2 doses (if born in 1980 or later)		2 doses	
<b>Zoster recombinant (RZV)</b>	2 doses for immunocompromising conditions (see notes)		2 doses	
<b>Human papillomavirus (HPV)</b>	2 or 3 doses depending on age at initial vaccination or condition	27 through 45 years		
<b>Pneumococcal (PCV15, PCV20, PPSV23)</b>	1 dose PCV15 followed by PPSV23 OR 1 dose PCV20 (see notes)			1 dose PCV15 followed by PPSV23 OR 1 dose PCV20
<b>Hepatitis A (HepA)</b>	2 or 3 doses depending on vaccine			
<b>Hepatitis B (HepB)</b>	2, 3, or 4 doses depending on vaccine or condition			
<b>Meningococcal A, C, W, Y (MenACWY)</b>	1 or 2 doses depending on indication, see notes for booster recommendations			
<b>Meningococcal B (MenB)</b>	2 or 3 doses depending on vaccine and indication, see notes for booster recommendations			
	19 through 23 years			
<b>Haemophilus influenzae type b (Hib)</b>	1 or 3 doses depending on indication			

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, 2022

Vaccine	Pregnancy	Immuno-compromised (excluding HIV infection)	HIV infection CD4 percentage and count		Asplenia, complement deficiencies	End-stage renal disease, or on hemodialysis	Heart or lung disease; alcoholism <sup>1</sup>	Chronic liver disease	Diabetes	Health care personnel <sup>2</sup>	Men who have sex with men
			<15% or <200 mm <sup>3</sup>	≥15% and ≥200 mm <sup>3</sup>							
IIV4 or RIV4 <b>or</b> LAIV4	1 dose annually										
	Contraindicated					Precaution			<b>or</b> 1 dose annually		
Tdap or Td	1 dose Tdap each pregnancy	1 dose Tdap, then Td or Tdap booster every 10 years									
MMR	Contraindicated*	Contraindicated	1 or 2 doses depending on indication								
VAR	Contraindicated*	Contraindicated		2 doses							
RZV		2 doses at age ≥19 years			2 doses at age ≥50 years						
HPV	Not Recommended*	3 doses through age 26 years			2 or 3 doses through age 26 years depending on age at initial vaccination or condition						
Pneumococcal (PCV15, PCV20, PPSV23)		1 dose PCV15 followed by PPSV23 OR 1 dose PCV20 (see notes)									
HepA				2 or 3 doses depending on vaccine							
HepB	3 doses (see notes)	2, 3, or 4 doses depending on vaccine or condition									
MenACWY	1 or 2 doses depending on indication, see notes for booster recommendations										
MenB	Precaution	2 or 3 doses depending on vaccine and indication, see notes for booster recommendations									
Hib		3 doses HSCT <sup>3</sup> recipients only		1 dose							

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
  Precaution—vaccination might be indicated if benefit of protection outweighs risk of adverse reaction
  Contraindicated or not recommended—vaccine should not be administered.
  No recommendation/Not applicable

\*Vaccinate after pregnancy.



# Recommended Adult Immunization Schedule for ages 19 years or older

UNITED STATES  
**2022**

## How to use the adult immunization schedule

- 1** Determine recommended vaccinations by age (**Table 1**)
- 2** Assess need for additional recommended vaccinations by medical condition or other indication (**Table 2**)
- 3** Review vaccine types, frequencies, intervals, and considerations for special situations (**Notes**)
- 4** Review contraindications and precautions for vaccine types (**Appendix**)

### Vaccines in the Adult Immunization Schedule\*

Vaccine	Abbreviation(s)	Trade name(s)
<i>Haemophilus influenzae</i> type b vaccine	Hib	ActHIB® Hiberix® PedvaxHIB®
Hepatitis A vaccine	HepA	Havrix® Vaqta®
Hepatitis A and hepatitis B vaccine	HepA-HepB	Twinrix®
Hepatitis B vaccine	HepB	Engerix-B® Recombivax HB® Heplisav-B®
Human papillomavirus vaccine	HPV	Gardasil 9®
Influenza vaccine (inactivated)	IIV4	Many brands
Influenza vaccine (live, attenuated)	LAIV4	FluMist® Quadrivalent
Influenza vaccine (recombinant)	RIV4	Flublok® Quadrivalent
Measles, mumps, and rubella vaccine	MMR	M-M-R II®
Meningococcal serogroups A, C, W, Y vaccine	MenACWY-D MenACWY-CRM MenACWY-TT	Menactra® Menveo® MenQuadfi®
Meningococcal serogroup B vaccine	MenB-4C MenB-FHbp	Bexsero® Trumenba®
Pneumococcal 15-valent conjugate vaccine	PCV15	Vaxneuvance™
Pneumococcal 20-valent conjugate vaccine	PCV20	Prenar 20™
Pneumococcal 23-valent polysaccharide vaccine	PPSV23	Pneumovax 23®
Tetanus and diphtheria toxoids	Td	Tenivac® Tdvax™
Tetanus and diphtheria toxoids and acellular pertussis vaccine	Tdap	Adacel® Boostrix®
Varicella vaccine	VAR	Varivax®
Zoster vaccine, recombinant	RZV	Shingrix

\*Administer recommended vaccines if vaccination history is incomplete or unknown. Do not restart or add doses to vaccine series if there are extended intervals between doses. The use of trade names is for identification purposes only and does not

Recommended by the Advisory Committee on Immunization Practices ([www.cdc.gov/vaccines/acip](http://www.cdc.gov/vaccines/acip)) and approved by the Centers for Disease Control and Prevention ([www.cdc.gov](http://www.cdc.gov)), American College of Physicians ([www.acponline.org](http://www.acponline.org)), American Academy of Family Physicians ([www.aafp.org](http://www.aafp.org)), American College of Obstetricians and Gynecologists ([www.acog.org](http://www.acog.org)), American College of Nurse-Midwives ([www.midwife.org](http://www.midwife.org)), and American Academy of Physician Associates ([www.aapa.org](http://www.aapa.org)), and Society for Healthcare Epidemiology of America ([www.shea-online.org](http://www.shea-online.org)).

### Report


- Suspected cases of reportable vaccine-preventable diseases or outbreaks to the local or state health department
- Clinically significant postvaccination reactions to the Vaccine Adverse Event Reporting System at [www.vaers.hhs.gov](http://www.vaers.hhs.gov) or 800-822-7967

### Injury claims

All vaccines included in the adult immunization schedule except pneumococcal 23-valent polysaccharide (PPSV23) and zoster (RZV) vaccines are covered by the Vaccine Injury Compensation Program. Information on how to file a vaccine injury claim is available at [www.hrsa.gov/vaccinecompensation](http://www.hrsa.gov/vaccinecompensation).

### Questions or comments

Contact [www.cdc.gov/cdc-info](http://www.cdc.gov/cdc-info) or 800-CDC-INFO (800-232-4636), in English or Spanish, 8 a.m.–8 p.m. ET, Monday through Friday, excluding holidays.

 Download the CDC Vaccine Schedules app for providers at [www.cdc.gov/vaccines/schedules/hcp/schedule-app.html](http://www.cdc.gov/vaccines/schedules/hcp/schedule-app.html).

### Helpful information

- Complete Advisory Committee on Immunization Practices (ACIP) recommendations: [www.cdc.gov/vaccines/hcp/acip-recs/index.html](http://www.cdc.gov/vaccines/hcp/acip-recs/index.html)
- General Best Practice Guidelines for Immunization* (including contraindications and precautions): [www.cdc.gov/vaccines/hcp/acip-recs/general-recs/index.html](http://www.cdc.gov/vaccines/hcp/acip-recs/general-recs/index.html)
- Vaccine information statements: [www.cdc.gov/vaccines/hcp/vis/index.html](http://www.cdc.gov/vaccines/hcp/vis/index.html)
- Manual for the Surveillance of Vaccine-Preventable Diseases (including case identification and outbreak response): [www.cdc.gov/vaccines/pubs/surv-manual](http://www.cdc.gov/vaccines/pubs/surv-manual)
- Travel vaccine recommendations: [www.cdc.gov/travel](http://www.cdc.gov/travel)
- Recommended Child and Adolescent Immunization Schedule, United States, 2022: [www.cdc.gov/vaccines/schedules/hcp/child-adolescent.html](http://www.cdc.gov/vaccines/schedules/hcp/child-adolescent.html)
- ACIP Shared Clinical Decision-Making Recommendations: [www.cdc.gov/vaccines/acip/acip-scdm-faqs.html](http://www.cdc.gov/vaccines/acip/acip-scdm-faqs.html)

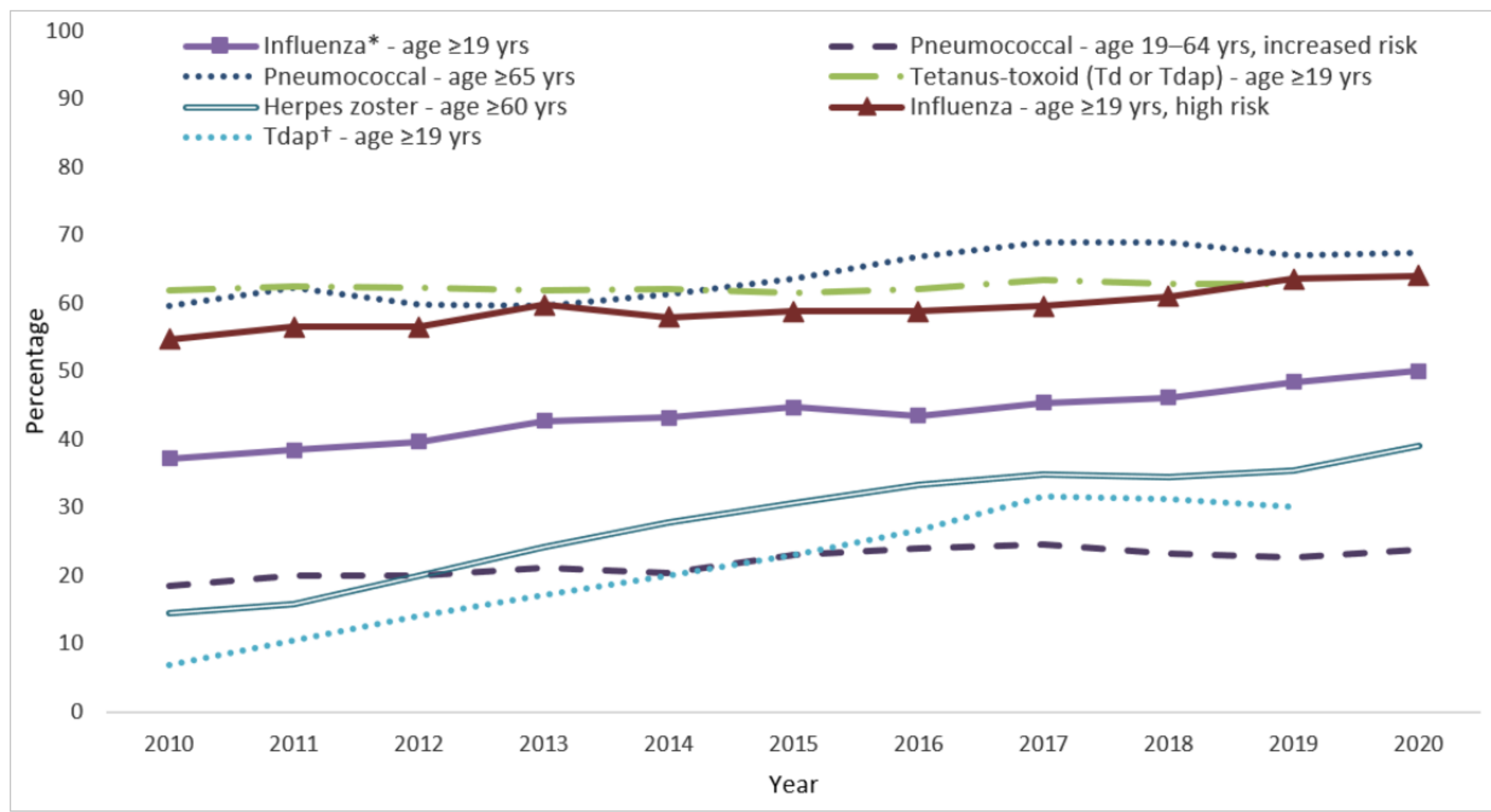
Scan QR code for access to online schedule



U.S. Department of Health and Human Services  
Centers for Disease Control and Prevention



FIGURE. Estimated proportion of adults aged ≥19 years who received selected vaccines, by age group and risk status — National Health Interview Survey, United States, 2010–2020



This...

Abbreviations: Td = tetanus and diphtheria toxoids; Tdap = tetanus toxoid, reduced diphtheria toxoid, and acellular pertussis vaccine.

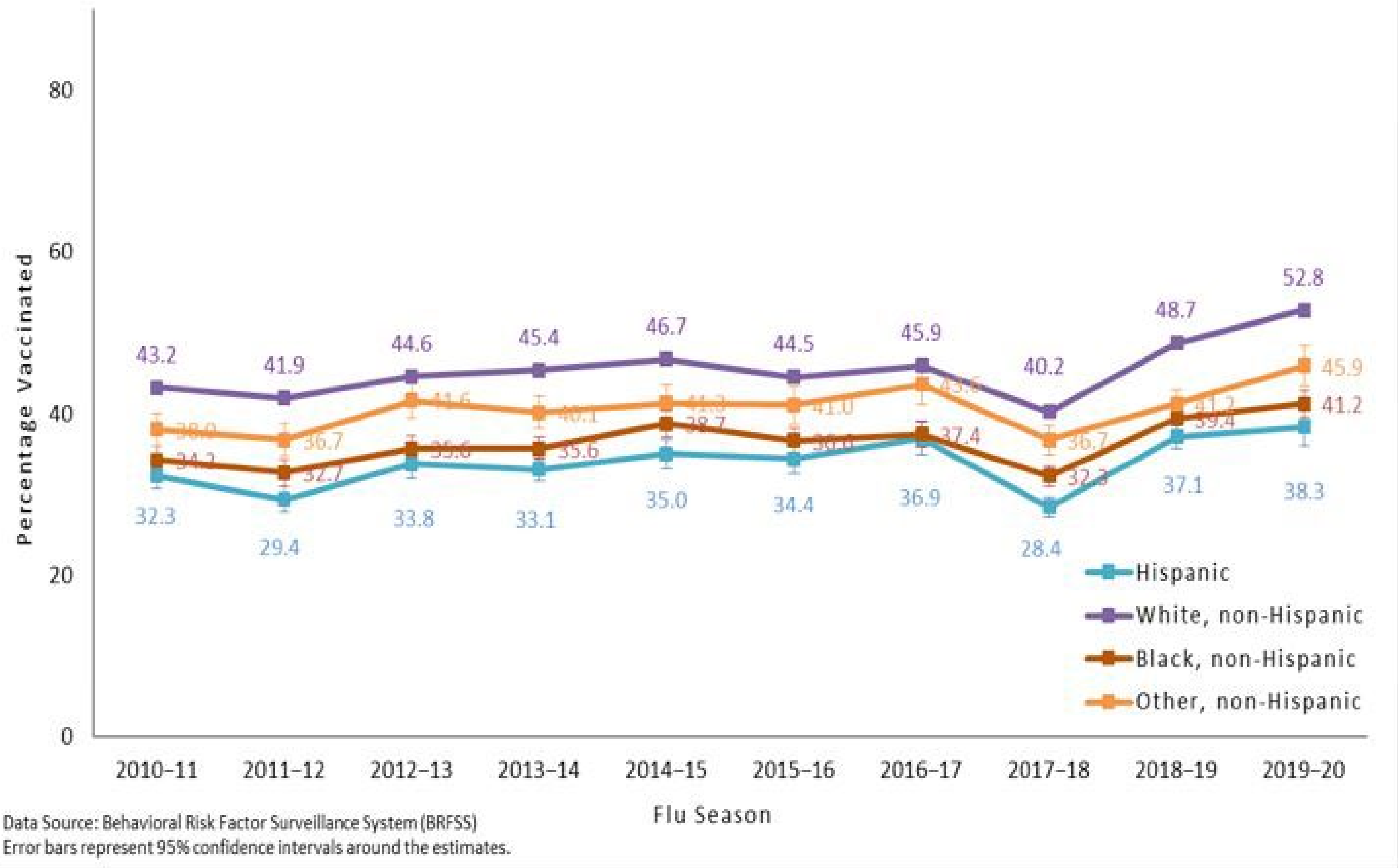
\* Estimates are season-specific. Year 2020 corresponds to the 2019-20 influenza season.

† Tdap vaccination coverage data among adults aged ≥65 years are available beginning in the NHIS 2012 survey.



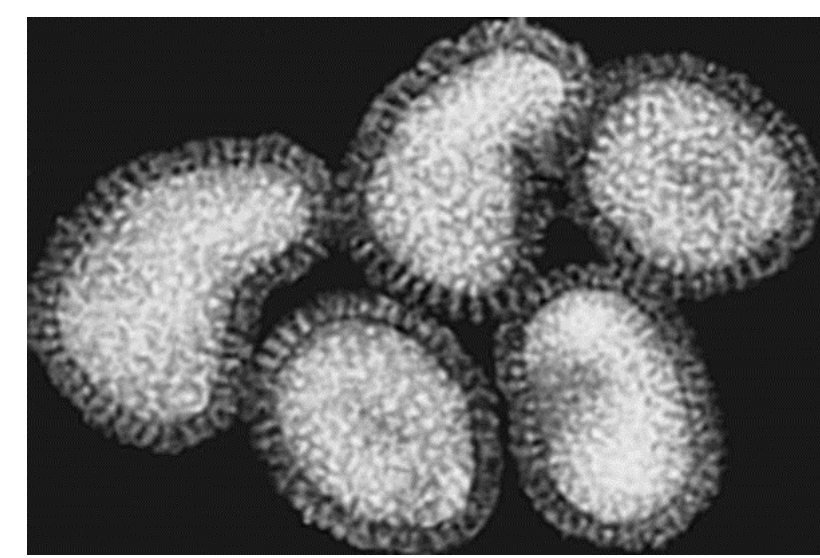
# Disparities

Figure 6. Flu Vaccination Coverage by Racial/Ethnic Group, Adults 18 years and older, United States, 2010–2020





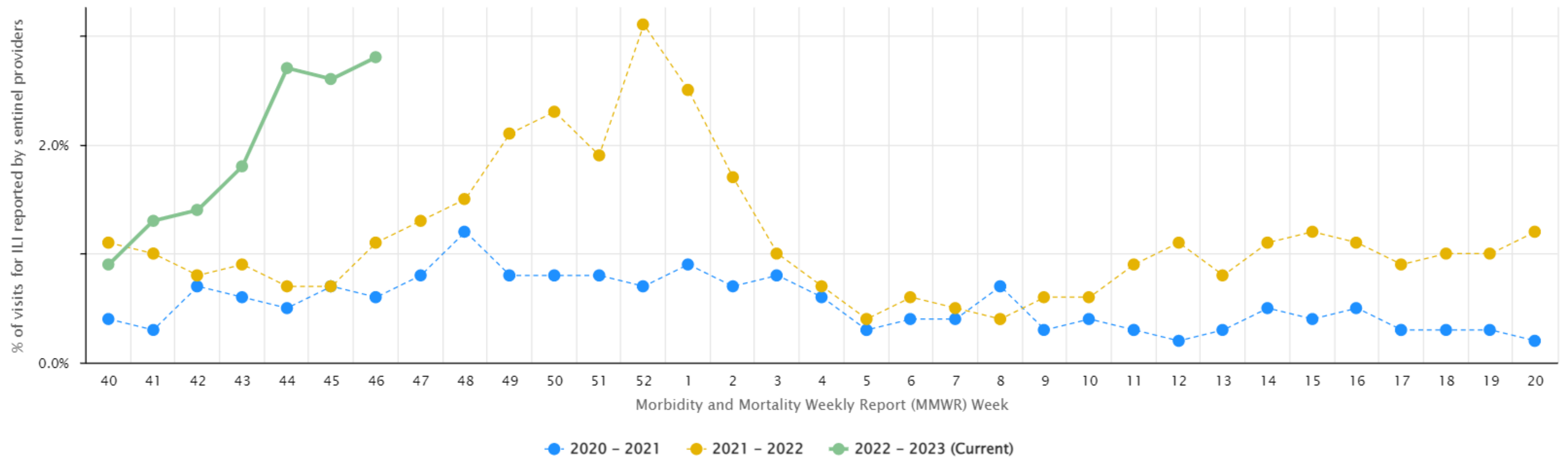
# Influenza vaccines



- Indicated **annually for all persons 6 mo and older** who have no contraindication ( eg: previous severe reaction to IIV, previous Guillain - Barre within 6 weeks of IIV, egg allergy more severe than “hives -only”)
- Given throughout the flu season, **usually 9/1 thru 3/31** (3<sup>rd</sup> trimester pregnant pt's and children ok in July/Aug)
- 1918 Spanish Influenza (H1N1)**pandemic** : up to 50 million people died worldwide, pandemics also in 1957, 1968, 1977, and 2009
- Annual US **hospitalizations** 140K-810K, **Deaths** 12K-61K in US (avg 133 children die/year), 2017 -18 USA: 79,900+ deaths attributed (H3N2 predom ., cdc.gov)

# Hospitalization Trends

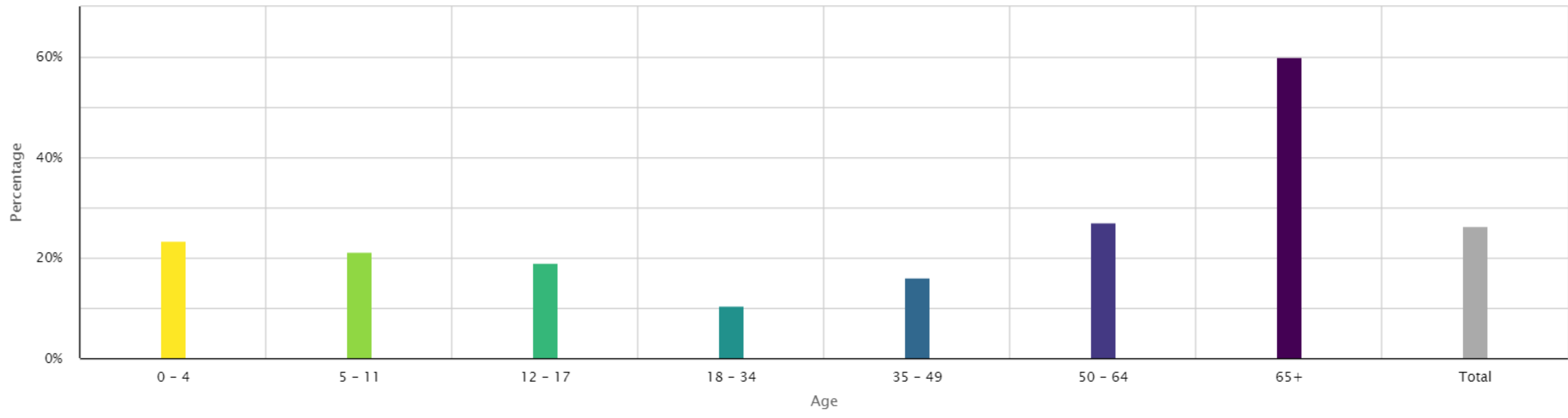
Percentage of visits for influenza-like illness (ILI) reported by sentinel providers



**Data note:** Weekly data points are released one week after the end of the week to enhance completeness.

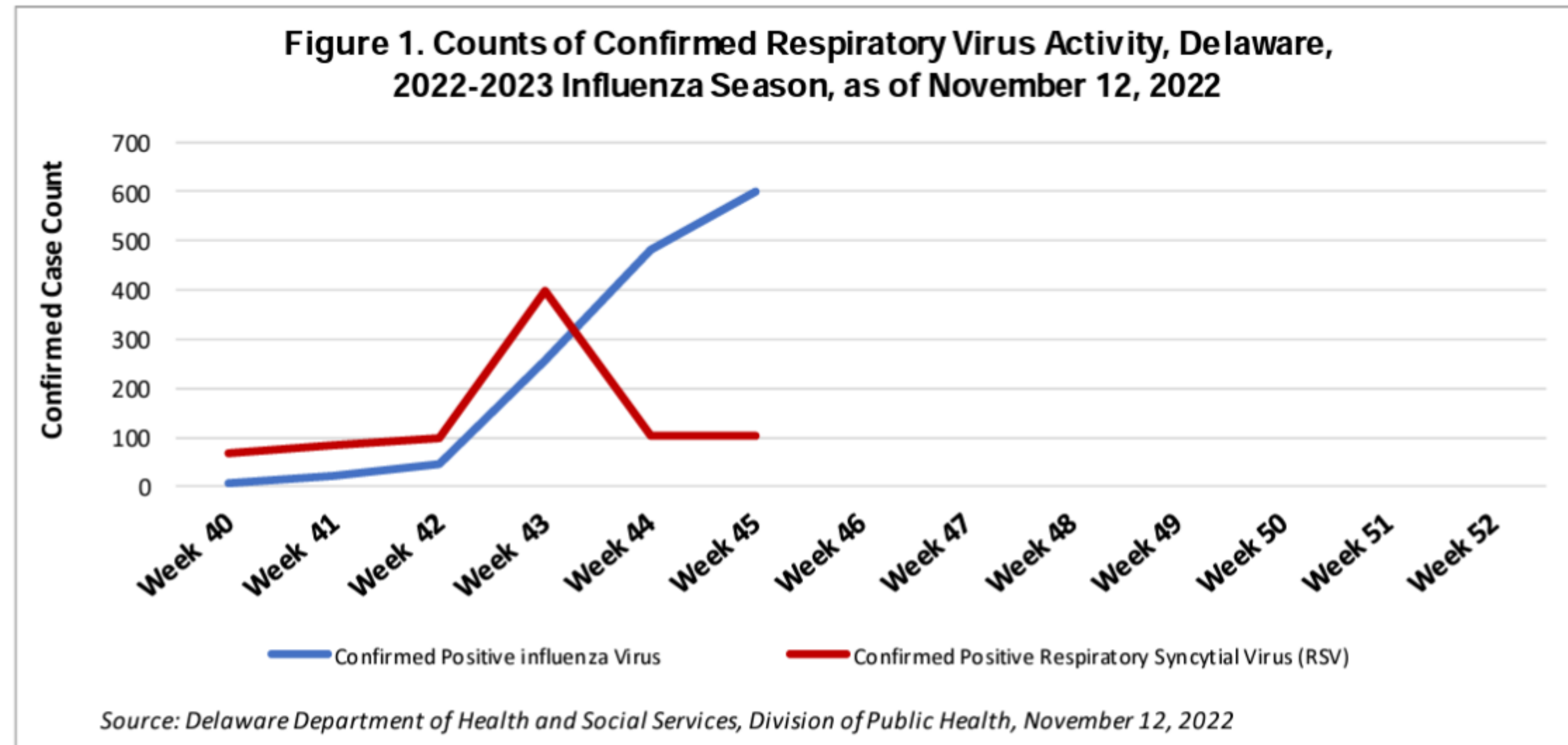


### Percentage Vaccinated in Delaware by Age who have recieved Flu Vaccination



Age	Total Count	% of demographic group vaccinated	% of all persons vaccinated
0 - 4	12,830	23.4%	5.0%
5 - 11	16,462	21.1%	6.4%

During MMWR week 45, there were **102** laboratory-confirmed cases of RSV reported among Delaware residents with **592** total cases for the 2022-2023 season.



\*RSV data is limited and is not representative of cases state-wide



# From IAC: [www.immunize.org](http://www.immunize.org)

## Influenza Vaccine Products for the 2022–2023 Influenza Season

Manufacturer	Trade Name (vaccine abbreviation) <sup>1</sup>	How Supplied	Mercury Content (mcg Hg/0.5mL)	Age Range	CVX Code	Vaccine Product Billing Code <sup>2</sup>
						CPT
AstraZeneca	FluMist (LAIV4)	0.2 mL (single-use nasal spray)	0	2 through 49 years	149	90672
GlaxoSmithKline	Fluarix (IIV4)	0.5 mL (single-dose syringe)	0	6 months & older <sup>3</sup>	150	90686
	FluLaval (IIV4)	0.5 mL (single-dose syringe)	0	6 months & older <sup>3</sup>	150	90686
Sanofi	Flublok (RIV4)	0.5 mL (single-dose syringe)	0	18 years & older	185	90682
	Fluzone (IIV4)	0.5 mL (single-dose syringe)	0	6 months & older <sup>3</sup>	150	90686
		0.5 mL (single-dose vial)	0	6 months & older <sup>3</sup>	150	90686
		5.0 mL multi-dose vial (0.25 mL dose)	25	6 through 35 months <sup>3</sup>	158	90687
		5.0 mL multi-dose vial (0.5 mL dose)	25	6 months & older	158	90688
Fluzone High-Dose (IIV4-HD)	0.7 mL (single-dose syringe)	0	65 years & older	197	90662	
Seqirus	Afluria (IIV4)	5.0 mL multi-dose vial (0.25 mL dose)	24.5	6 through 35 months <sup>3</sup>	158	90687
		5.0 mL multi-dose vial (0.5 mL dose)	24.5	3 years & older	158	90688
		0.5 mL (single-dose syringe)	0	3 years & older <sup>3</sup>	150	90686
	Fluad (aIIV4)	0.5 mL (single-dose syringe)	0	65 years & older	205	90694
	Flucelvax (ccIIV4)	0.5 mL (single-dose syringe)	0	6 months & older <sup>3</sup>	171	90674
		5.0 mL multi-dose vial (0.5 mL dose)	25	6 months & older <sup>3</sup>	186	90756

### NOTES

1. IIV4 = egg-based quadrivalent inactivated influenza vaccine (injectable); where necessary to refer to cell culture-based vaccine, the prefix "cc" is used (e.g., ccIIV4); RIV4 = quadrivalent recombinant hemagglutinin influenza vaccine (injectable); aIIV4 = adjuvanted quadrivalent inactivated influenza vaccine.

2. An administration code should always be reported in addition to the vaccine product code. Note: Third party payers may have specific policies and guidelines that might require providing additional information on their claim forms.

3. Dosing for infants and children age 6 through 35 months:

- Afluria 0.25 mL
- Fluarix 0.5 mL
- Flucelvax 0.5 mL
- FluLaval 0.5 mL
- Fluzone 0.25 mL or 0.5 mL

4. Afluria is approved by the Food and Drug Administration for intramuscular administration with the PharmaJet Stratis Needle-Free Injection System for persons age 18 through 64 years.





## Quadrivalent IIV 2022 -23 (a Hemagglutinin antigen (HA) from egg -based vaccines)

- influenza A/Victoria/2570/2019 (H1N1)pdm09 -like virus (for egg -based vaccines)
- influenza A/Darwin/9/2021 (H3N2) -like virus (for egg -based vaccines), \*new strain
- influenza B/Austria/1359417/2021 (Victoria lineage) -like virus, \*new strain
- influenza B/Phuket/3073/2013 (Yamagata lineage) -like virus





# Cell -culture and Recombinant derived IIV's for 2022 -23

- influenza A/Wisconsin/588/2019 (H1N1)pdm09 -like virus
- influenza A/Darwin/6/2021 (H3N2) -like virus
- Same 2 influenza B virus strains as for the egg based IIV's



# Fluvax : patients over 65

**ACIP** recommends that adults aged  $\geq 65$  years preferentially receive any one of the following higher dose or adjuvanted influenza vaccines:

- quadrivalent **high -dose inactivated** influenza vaccine (HD-IIV4),
- quadrivalent **recombinant** influenza vaccine (RIV4), or
- quadrivalent **adjuvanted** inactivated influenza vaccine (aIIV4, contains MF59 adjuvant)





# Pneumococcal Vaccines

- **New conjugated pneumococcal vaccines PCV15 and PCV20 (2022) rec:** All pt's 65 y/o and older, should receive **PCV15** or **PCV20** once (if they haven't already received PCV13). If PCV15 given, follow in 2 - 12 months with PPSV23 (the "old" Pneumovax). PCV13 no longer available.
- **Special indications** for **PCV** @age **19-64** y/o: in immunosuppressed patients, HIV, functional or anatomic asplenia, cochlear implant, CSF leak, and chronic heart/lung/liver/kidney disease, diabetes mellitus, smoking, alcoholism
- If pt already had PPSV23, give PCV20 one year later. If not, PCV is given first.
- US Burden of pneumococcal disease: Pneumonia/IPD 320,000 cases/year, 150,000 hospitalizations, >5000 deaths (> 65 y/o at highest risk)

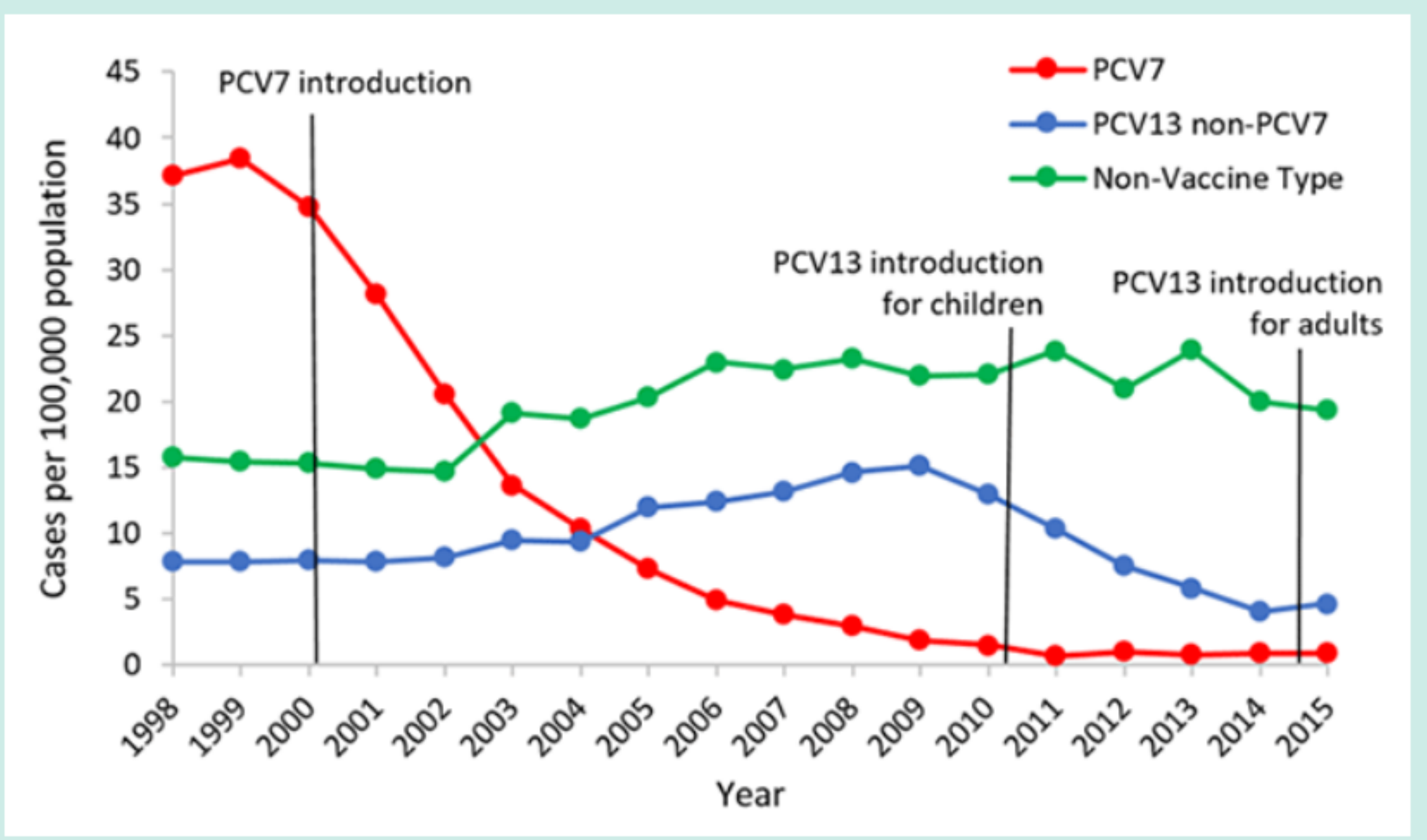


Figure 2. Rates of invasive pneumococcal disease among U.S. adults >65 years of age, 1998–2015[3]

At the same time, increases in disease caused by serotypes not included in PCV7 (i.e., replacement disease) were observed among children and adult populations, although these increases were small in magnitude compared with the overall reduction in disease. [12,17] After the introduction of PCV13 in 2010, cases of invasive disease due to the six additional serotypes covered by the vaccine saw a decrease similar to what was observed post-PCV7.[16,18] In 2007–08 (pre-PCV13), rates of PCV13-type IPD among children <5 years of age were around 14 cases per 100,000. In 2014–15 (post-PCV13), rates of PCV13-type disease had decreased by 87% (Figure 1).[3] After introduction of PCV13 in children, older adults also saw reductions in IPD through herd protection, In 2007–08, rates of PCV13-type IPD among adults >65 years of age were around 14 cases per 100,000. In 2014–15, rates of PCV13-type disease had decreased by 87% (Figure 1).



# Pneumococcal Vaccines

- **PPSV23**: pneumococcal polysaccharide vaccine (since about 1983)
- Give PPSV23 once after age 65, if **PCV15** (or PCV13, but not PCV20) has already been given [2 - 12 months after the PCV]
- Also indicated for **19-64 y/o**, following **PCV15 (or 13)** pt with: chronic heart, lung, liver or kidney disease, Diabetes, active smokers, alcoholism, and **Special indications shared with PCV's** for **<65 y/o** : in immunosuppressed patients, HIV, functional or anatomic asplenia, cochlear implant, CSF leak
- **NEW** re: Boosters: with **shared decision making**, consider a booster of **PCV20** 5 years after the last pneumococcal vax





# 2022 New pneumococcal recs

## Booster for PCV: 3 scenarios

- Adult, w/immunocompromise, or cochlear implant, or csf leak, who have previously received PCV13 + PPSV23, can receive **PCV20, or PPSV23**, 5 years after their last pneumococcal vax.
- Adult > 65, previous PCV13 + PPSV23, with SDM, can receive **PCV20**, 5 years after their last pneumococcal vax.
- Adults, previous PCV13 only, can receive **PCV20 or PPSV23** at least 1 year after their PCV13.

Dengue	+
Diphtheria	+
Flu (Influenza)	+
Hepatitis A	+
Hepatitis B	+
Hib	+
Human Papillomavirus (HPV)	+
Measles	+
Meningococcal	+
Mumps	+
<b>Pneumococcal</b>	-

What Everyone Should Know  
For Healthcare Professionals

Polio	+
Rotavirus	+
Rubella	+

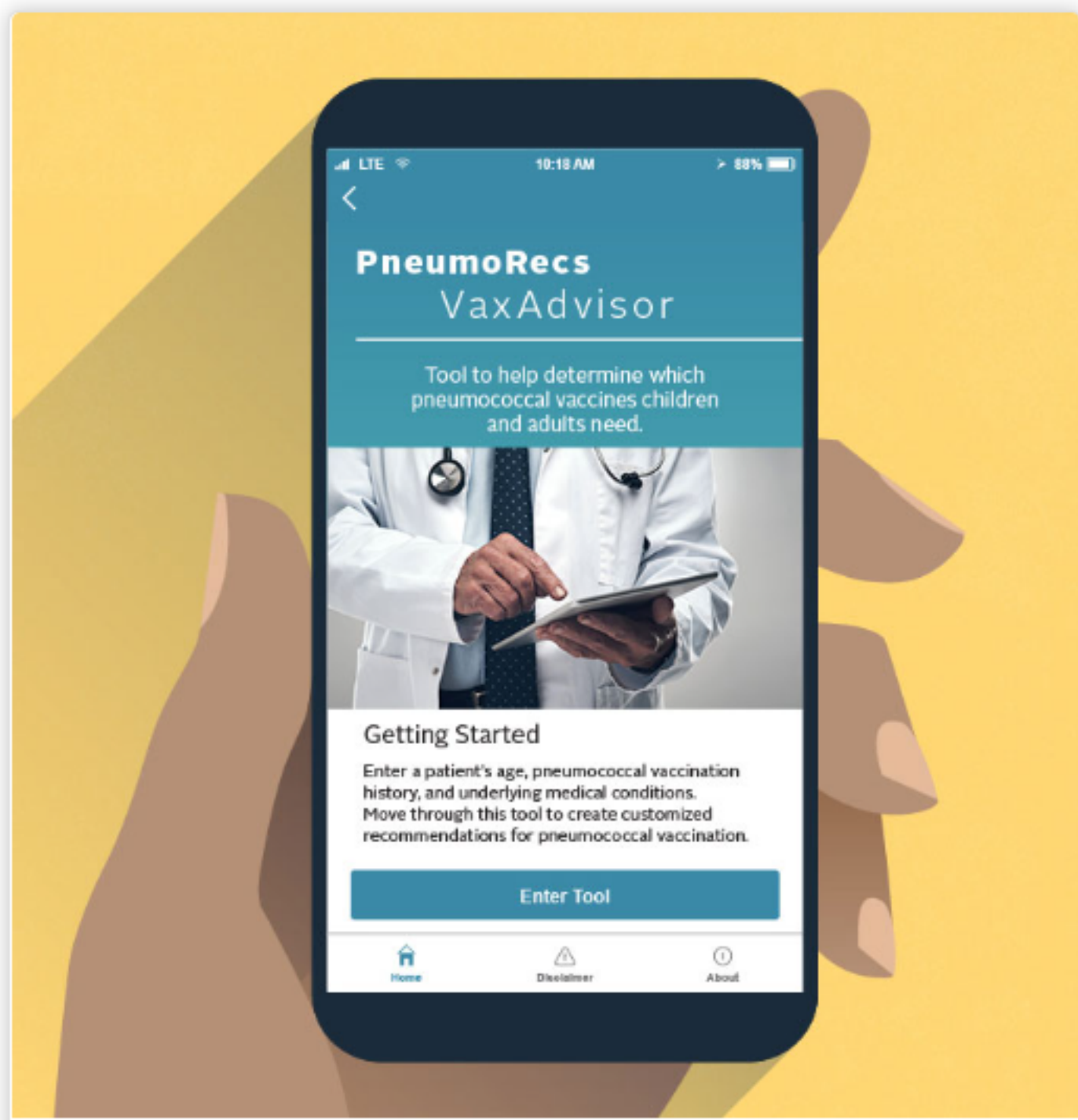
**i** The PneuMoRecs VaxAdvisor Mobile App was updated on September 15, 2022, to reflect CDC's new pediatric pneumococcal vaccination recommendations.

The *PneuMoRecs VaxAdvisor* mobile app helps vaccination providers quickly and easily determine which pneumococcal vaccines a patient needs and when. The app incorporates recommendations for all ages so internists, family physicians, pediatricians, and pharmacists alike will find the tool beneficial.

Users simply:

- Enter a patient's age.
- Note if the patient has specific underlying medical conditions.
- Answer questions about the patient's pneumococcal vaccination history.

Then the app provides patient-specific guidance consistent with the immunization schedule recommended by the U.S. Advisory Committee on Immunization Practices (ACIP).



PneuMoRecs VaxAdvisor is available for download on iOS and Android mobile devices.

## Download the mobile app or use the web version

Download "PneuMoRecs VaxAdvisor" free for [iOS](#) and [Android](#) devices.







# Hepatitis B: Vaccination and Screening

*Ann Intern Med.* 2017; 167(11):794-804. doi: 10.7326/M17 -1106

- Prevalence of **HepB** in US population is **0.3%**, but 3-5% in foreign born persons ( **70%** of Hep B cases in US)
- 2/3 of persons with Hep B don't know they have it, and **only 10 - 15%** of those who do know are referred for Tx
- **Annals HVC paper** : stresses importance of screening, vaccination, and linkage to care
- New Hep B vaccine approved by FDA 11/2017: recombinant HbsAg with TLR-9 agonist adjuvant, **two** dose regimen, 6 months apart, improved efficacy in DM





# 2022 New Hep B vax rec's

- **Simpler: HepB Vaccine** series indicated for **all persons age 19 -59** who have not previously had it, **or**, over age 60 with special risk factors, or pt prefers to receive it.
- For pt's over 65, the risk factors are indications, or shared decision making for concerned persons



# special Hepatitis B vax indications (>age 60)

- Blood and Body Fluid exposure: HCW, public service wkr, IVDU
- Sexual history: >1 partner in 6 mo, MSM
- DM, age 19-59 (and >60 if higher risk), ok if pregnant and high risk for exposure
- ESRD/HD, HIV, Chronic Liver Disease (consider Twinrix hepA + hepB)
- Household and sexual contacts of HBsAg positive patients
- Clients and staff at institutions for persons with developmental disabilities
- Travelers to regions with intermediate to high prevalence of chronic Hep B infx
- 3 shot series: 0, 1 and 6 months (Recombivax HB, EngerixB) or HeplisavB (2 shots)
- HD or immunosuppressed pts who receive Engerix B get Two 20mcg/ml injections on a four dose regimen, at 0, 1, 2 and 6 months.



# Hep B Vax and DM

- 10/25/2011: **ACIP work group rec**: all previously unimmunized Diabetics, age 19-59, should receive a Hepatitis B Vaccine series (cat A. type 2 evidence). > age 60, physician judgement after shared decision making.
- Multivariate analysis: **2.1 times risk** for diabetics to develop acute Hep B compared to non -DM. Also noted: NASH is more common in DM, increased risk of Hep B associated M/M
- NHANES: Hep B seroprevalence is 60% higher in diabetics than non -DM.
- Estimated cost per QALY \$71,500 for Hep B immunization of DM pts





# Hepatitis A Vaccine

- Vax travelers to endemic areas, 1 month prior to leaving. Can give a 6 month Booster, Or, accelerated Twinrix (+hepB) at 0, 7d, 21-30d, then booster at 12 mo
- MSM, IVDU/non -IVDU, homeless, Chronic liver diseases (including persistent ALT > 2x ULN), coagulation factor concentrate recipient. OK in pregnancy if high risk.
- Workers with HAV -infected primates, research lab settings
- Unvaccinated person who will have close contact with international adoptee for 1<sup>st</sup> 60 d in country.
- Health Care Setting w/ increased risk exposures (grp home, day care, drug tx)
- Not at risk but want protection: 2 doses separated by 6 months, or as part of Twinrix



# Herpes Zoster Vaccine

- Zoster vaccine: **RZV** (recombinant, “subunit”) approved by FDA October 2017
- ~90% effective in preventing HZ, PHN, even in patients > 80 y/o
- ACIP: pt’s over age 50 receive **two** doses of RZV IM inject, separated by 2 -6 months
- **New 2022** : now indicated for immunosuppressed pt age 19-49, and all immunosuppressed pt’s > age 50, 2 doses over 2-6 months
- Local adverse reaction, mild -mod, in 79%
- Storage: 36-45 degrees F, like other vax’s

# RZV Data: ZOE 50 and ZOE 70

- ZOE 50, NEJM 5/28/15
- RPCT, over mean 3.2yr
- 15,411 pts, > 50 y/o
- 97.2% effective in preventing HZ, similar in all ages (96.6 - 97.9%)
- Injection site rxn 81.5% (11.9% placebo, 17% mod)
- Systemic rxn 66% (29.5 pl.)

- ZOE 70, NEJM 9/15/16
- RPCT, over ~3.8yrs
- 13,900 pts, > 70 y/o
- 89.8% effective in preventing HZ (90.0 in 70-79, 89.1 in >80)
- 88.8% effective in preventing PHN
- 79% w/adverse rxn's





# HPV9 vaccine: cancer prevention

**HPV** strains 16, 18 cause 65% cases cervix CA, strains 6, 11 cause 90% cases of anogenital warts

- HPV9: in 2014, five additional oncogenic strains added (31,33,45,52,58, cause an additional 16% of cervix cancer cases)
- HPV9 vax, for all female or male up to age 26, start age 9 -14 y/o: give 2 doses, at least 5 months apart; if HIV, or if started series at 15-26, give 3 doses (0, 1, 6 mo)
- Ages 27-45: shared decision making based on risk
- If pregnant, postpone HPV9 until after delivery



# MenACWY and MenB

- **MenACWY (3 brands)**: **2 doses** (8 wks apart), then boost q5 yr for anatomical or functional Asplenia, HIV, terminal complement deficiencies (persistent); **or 1 dose** for 1<sup>st</sup> yr college dorm, or military recruits, eculizumab or ravulizumab Tx, microbiologist w/exposure, traveler to endemic area (booster in 5 yr if ongoing risk)
- **MenB indication** : age 16-23 **shared decision making** , **and pt's w/ increased risk** : microbiologist w/exposure, Asplenia, terminal Complement deficiency, eculizumab/ ravul. Tx (outbreaks: see cdc.gov)

**MenB-4C (Bexsero)**, a 2 shot series (1mo) [three recombinant proteins and outer membrane vesicles] (not interchangeable with...)

**MenB-FHbp (Trumenba)** a 2 shot series (0, 6 mo) for avg risk pt with exposure; **3 shots for increased risk** [two purified recombinant lipidated factor H binding protein antigens]

# MMR (live attenuated)



- **Routine 1 dose** : all adults not immune “ANI” (“no evidence of immunity” ): Who are born on/after 1957, or with **no** lab evidence of immunity, or no hx prior MMR (“hx of measles” is not evidence).
- **Routine 2 doses** (at least 1 month apart): **ANI** who are students in post-secondary educational institutions, international travelers, or household contact of immunocompromised, HIV with CD4>200, healthcare workers. If born before 1957 and no lab evidence immunity, give 1 shot if in 1 of these groups.

**If Mumps outbreak** : 1 (“3<sup>rd</sup>”) dose of a mumps -containing vax for adults previously vaccinated with 0 -2 doses of mumps -containing vaccine, if mumps exposure (determined by a PHA)





# The ones we left out...

- Tdap/Td vaccine
- Varicella vaccine
- Hemophilus influenza B vaccine

# Free CDC App, for iOS and Android

## CDC Vaccines Schedules App

Quick access from CDC to ACIP-recommended immunization schedules, complete with footnotes.





<https://www.cdc.gov/vaccines/hcp/admin/storage/toolkit/storage-handling-toolkit.pdf>

The screenshot shows a web browser window with the following elements:

- Browser Tabs:** Three tabs are visible: "drjho7@verizon.net - Yahoo Mail", "CDC Vaccines Storage and Handling T...", and "storage-handling-toolkit.pdf".
- Address Bar:** The address bar shows the URL: <https://www.cdc.gov/vaccines/hcp/admin/storage/toolkit/storage-handling-to>. A search engine extension is also visible.
- PDF Viewer Header:** The header of the Adobe Acrobat viewer includes the text "Adobe Acrobat storage-handling-toolkit" and various tool icons (text, comment, highlight, eraser, crop, download, print, search, and "Open in desktop app").
- PDF Content:** The main content area displays a graphic with various medical and storage icons (vaccine vials, storage units, syringes, a person icon) overlaid on a background of glowing circles. Below the graphic, the title "Vaccine Storage and Handling Toolkit" is displayed in a large, dark font. Underneath the title, smaller text reads: "Updated with COVID-19 Vaccine Storage and Handling Information" and "Addendum added April 12, 2022".
- Color Palette:** A vertical color palette with three swatches (purple, teal, brown) is visible on the left side of the PDF content area.
- Footer:** The bottom right corner of the page features the "tianaCare™" logo.



# In Summary



- Use the **ACIP** Adult Immunization Schedule published annually in Annals of Internal Medicine, in March (and @**cdc.gov** )
- Download the free **CDC Immunization App** on your Cell Phone
- Check out the **IAC** website at [www.immunize.org](http://www.immunize.org) for everything immunization, including VIS and standing orders
- Check out the **Immunization Coalition of Delaware** (ICD) website at <https://immunizedelaware.org/>

Thank you for attending!

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