

Vaccinations

ESRD National Coordinating Center (NCC) Learning and Action Network (LAN)

September 10, 2024

ESRD = End Stage Renal Disease



Meeting Logistics



The call is being recorded.



All participants are muted upon joining the call.

We want to hear from you.

Type questions and comments in the “Chat” section, located in the bottom-right hand corner of your screen.



Meeting materials will be posted to the ESRD NCC website.

Ways to Spread Best Practices From Today's LAN

- Share your approaches and experiences via Chat.
- Identify how today's information could be used at your facility.
- Apply at least one idea from today's LAN at your facility.
- Commit to sharing your learnings and ideas with other colleagues.

LANs bring people together around a shared idea, opportunity, or challenge to offer and request information and experiences to improve the identified topic of discussion.

Immunizations in People with End Stage Renal Disease (ESRD)

September 10, 2024

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Thank you to Nancy LaVine MD for assistance with slides



Agenda

- Advisory Committee on Immunization Practices introduction (ACIP)
- How do we access recommendations?
- Case studies
- Questions & Answers

Learning Objectives

- Access the ACIP Recommendations.
- Review current ACIP recommendations for adult vaccinations in the US.
- Understand vaccination recommendations for select groups of patients.

Advisory Committee on Immunization Practices (ACIP)

- ACIP develops recommendations on how to use **Food and Drug Administration approved** vaccines to control disease in the United States.
- Committee of medical and public health experts who review current evidence.
- Recommendations are **forwarded to the Centers for Disease Control and Prevention (CDC)** for approval.
- ACIP considers **AGE** and other **MEDICAL FACTORS** when recommending vaccines.



Table 1 COVID-19 vaccination recommendations have changed. Find the latest recommendations at www.cdc.gov/covidschedule
Recommended Adult Immunization Schedule for ages 19 years or older, United States, 2023

Vaccine	19–26 years	27–49 years	50–64 years	≥65 years
COVID-19	2- or 3- dose primary series and booster (See Notes)			
Influenza inactivated (IIV4) or Influenza recombinant (RIV4)	1 dose annually			
or Influenza live, attenuated (LAIV4)	1 dose annually			
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)	1 dose PCV15 followed by PPSV23 OR 1 dose PCV20 (see notes)			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			
Meningococcal A, C, W, Y (MenACWY)	1 or 2 doses depending on indication, see notes for details			
Meningococcal B (MenB)	19 through 23 years	2 or 3 doses depending on vaccine and indication, see notes for details		
Haemophilus influenzae type b (Hib)	1 or 3 doses depending on indication			

Age Based

Table 2 Recommended Adult Immunization Schedule by Medical Condition or Other Indication, United States, 2023

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 ^a	Chronic liver disease	Diabetes	Health care personnel ^b	Men who have sex with men
			<15% or <200 mm ³	≥15% and ≥200 mm ³							
COVID-19		See Notes									
IIV4 or RIV4 or LAIV4					1 dose annually					1 dose annually	
Tdap or Td	1 dose Tdap each pregnancy				1 dose Tdap, then Td or Tdap						booster every 10 years
MMR	Contraindicated ^c	Contraindicated				1 or 2 doses depending on indication					
VAR	Contraindicated ^c	Contraindicated									2 doses
RZV		2 doses at age ≥19 years									2 doses at age ≥50 years
HPV	Not Recommended ^c	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, 3, or 4 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 ^e recipients only			1 dose						

Condition Based

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. ^aVaccinate after pregnancy.
No recommendation/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.

ACIP Recommendation Categories

- **Yellow:** Recommended vaccination for adults who meet age requirement, lack documentation of vaccination, or lack evidence of past infection
- **Purple:** Recommended vaccination for adults with an additional risk factor or another indication
- **Blue:** Recommended vaccination based on shared clinical decision-making

Vaccinations for People with ESRD

- Flu
- COVID
- Tetanus, Diphtheria, and Pertussis (Tdap), every 10 years
- Measles, Mumps, and Rubella (MMR) if not vaccinated in childhood
- Varicella if not vaccinated in childhood/immune
- Shingles x 2
- Pneumococcal (PCV20)
- Hepatitis B x 3 if not immune
- Human Papillomavirus (HPV) through age 26
- Hepatitis A, Haemophilus Influenzae B (Hib), Meningitis, Meningitis B if an indication

How do I access ACIP recommendations?

- CDC Vaccine Schedules App:
 - Apple store link: <https://apps.apple.com/us/app/cdc-vaccine-schedules/id875273858?platform=iphone>
 - Android link: <https://play.google.com/store/apps/details?id=gov.cdc.ncird.vaccineschedule>

- ACIP Website:



COVID-19 Vaccine Products

- Original SARS-CoV-2 Virus Vaccine in 2020
- 2022-2023 Bivalent Vaccine
 - Replaced in **September 2022**, targeted both original SARS-CoV-2 virus and Omicron variants BA.4 and BA.5
- 2023-2024 Updated COVID-19 Vaccine
 - In **September 2023**, the vaccines were updated to more closely target the XBB lineage of the Omicron variant
- 2024-2025 Updated COVID-19 Vaccine
 - As of **August 2024**, the vaccines were updated to target KP.2 Omicron variant

COVID-19 Vaccine Products

- Two vaccines are available in the US in 2024-2025:
 - **Moderna and Pfizer-BioNTech** (mRNA vaccines)

*2023-2024 Novavax (protein subunit vaccine) no longer available in the US

<https://www.cdc.gov/covid/vaccines/how-they-work.html>

COVID-19 Vaccination

- 2024-2025 CDC recommendation for people aged 5 years and older:
 - **One dose of 2024-2025 Moderna or 2024-2025 Pfizer-BioNTech vaccine**
 - Includes adults aged 65 and older
 - Not affected by prior history of COVID-19 infection or vaccination
 - Excludes people with moderate to severe immunosuppression

COVID-19 Vaccination: Immunocompromised

- Active treatment for solid tumors
- Hematologic malignancies (e.g., chronic lymphocytic leukemia)
- Transplant patients
- Primary immunodeficiency disorders
- Advanced Human Immunodeficiency Virus (HIV) (e.g., cluster of differentiation 4 <200)
- Immunosuppressive therapy (e.g., steroids)

For people aged 6 months and older, 3 doses of 2024-2025 Moderna or Pfizer-BioNTech vaccines

More individualized recommendations based on age & vaccination history

<https://www.cdc.gov/vaccines/covid-19/clinical-considerations/interim-considerations-us.html>

Flu Vaccine Products

All flu vaccines in the US are **quadrivalent**

Preferred for
adults aged 65
years and older

- Standard dose without adjuvant (cell/egg based) – Intramuscular (IM)
- High dose egg based (contains 4 times antigen) – IM
- Standard dose, adjuvanted, egg based – IM
- Recombinant (contains 3 times antigen) – IM
 - Ages 18 years and older
- Live attenuated – nasal spray
 - Ages 2 years through 49 years
 - Contraindicated in pregnancy & immunosuppressed states

Flu Vaccination



Image source: CDC. Available at <https://www.cdc.gov/flu-resources/php/shareable-resources/index.html>.

CDC recommends all people aged **6 months and older** receive flu vaccine once every year.

<https://www.cdc.gov/flu/professionals/acip/2022-2023/acip-table.htm>

<https://www.cdc.gov/flu/prevent/flushot.htm#:~:text=There%20are%20different%20flu%20vaccine,Fluad%20Quadrivalent%20adjuvanted%20flu%20vaccine.>

Respiratory Syncytial Virus (RSV)

Vaccines - FOYSAL

CDC recommends a single dose of RSV vaccines for:

- All adults ages 75 and older
- Adults ages 60-74 who are at increased risk of severe RSV disease

In the USA, three RSV vaccines are approved for adults aged 60 and older:

**GlaxoSmithKline's
AREXVY**

Moderna's mRESVIA

Pfizer's ABRYSSVO

RSV Vaccines - FOYSAL

Adults aged 75 or older, and those 60-74 with specific risk factors, are more likely to experience severe RSV. Risk factors include:

- Cardiovascular disease (e.g., heart failure, coronary artery disease)
- Lung disease (e.g., COPD, asthma)
- End-stage renal disease or dialysis dependence
- Diabetes with end-organ damage
- Severe obesity (BMI ≥ 40 kg/m²)
- Liver disorders (e.g., cirrhosis)
- Neurologic or neuromuscular conditions
- Hematologic disorders (e.g., sickle cell disease)
- Moderate to severe immune compromise
- Risk factors that a healthcare provider determines might increase the risk of severe disease due to respiratory infection

Shingles Vaccines - FOYSAL

Shingles vaccination is the only way to protect against shingles and related complications from the disease. The vaccine is given as a two-dose series.

In the U.S., about 1 in 3 people will get shingles in their lifetime, with risk increasing with age. The recombinant shingles vaccine not only prevents shingles but also protects against postherpetic neuralgia (PHN), a severe, long-term nerve pain that can persist for months or years after the rash heals.

Adults 50 years and older	2 doses (separated by 2 to 6 months)
Adults 19 years and older with weakened immune system due to disease or therapy	2 doses (if needed, can get 2nd dose 1 to 2 months after 1st)

Pneumococcal Vaccine Products

Older Formulations

- Pneumovax 23/PPSV23
- Prevnar 13 (old formulation)

Newer Formulations

- Prevnar 20
- Prevnar 15

Vaccine	19-26 years	27-49 years	50-64 years	>65 years
Pneumococcal (PCV15, PCV20, PPSV23)		1 dose PCV25 followed by PPSV23 or 1 dose PCV20		See notes

Pneumococcal Vaccination

- **Age Adults 65+**
 - Without qualifying medical conditions
 - No previous history of vaccination

Pneumococcal Vaccination: Conditions (Ages 19-64) + Everyone 65+

Alcohol Use Disorder

Liver Disease

Heart Disease (not
hypertension)

Lung Disease

Chronic Renal Failure

Tobacco Use

Cochlear Implant

Asplenia

Cerebrospinal Fluid Leak

Diabetes

Malignancy
(generalized)

HIV

Immunodeficiency

Transplant

Sickle Cell

Pneumococcal Vaccination (no previous vaccine history)

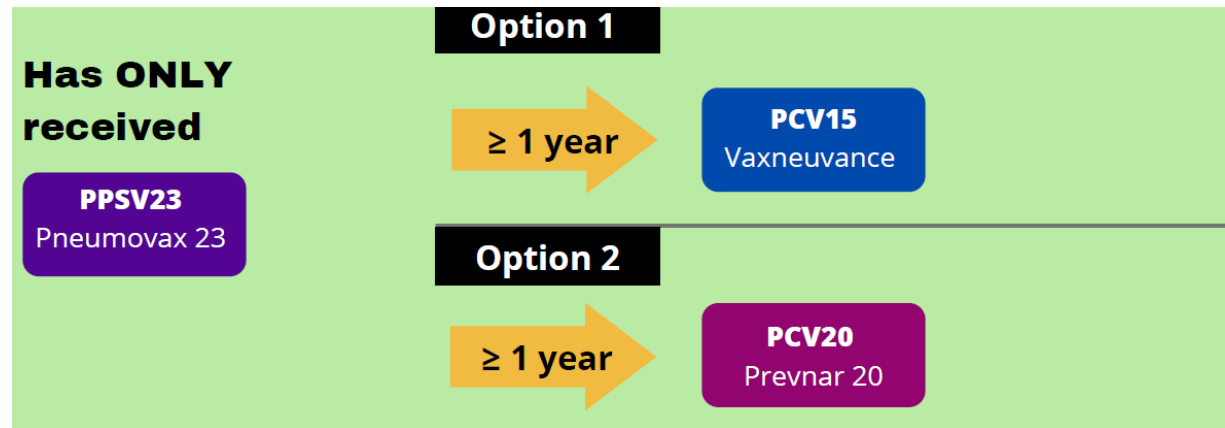
EASY!

Prevnar 20

-OR-

Prevnar 15 + PPSV23 (1 year later)

Previous Pneumococcal Vaccines?



PneumoRecs Vax Advisor

Android: <https://play.google.com/store/apps/details?id=gov.cdc.ncird.pneumorecs>

Apple Store: <https://apps.apple.com/us/app/pneumorecs-vaxadvisor/id1440647099>

Kobayashi M, Farrar JL, Gierke R, et al. Use of 15-Valent Pneumococcal Conjugate Vaccine and 20-Valent Pneumococcal Conjugate Vaccine Among U.S. Adults: Updated Recommendations of the Advisory Committee on Immunization Practices — United States, 2022. MMWR Morb Mortal Wkly Rep 2022;71:109–117. DOI: <http://dx.doi.org/10.15585/mmwr.mm7104a1>

Tdap Vaccine - Lauren

Tdap or Td

1 dose Tetanus and Diphtheria (Td)/Tdap for wound management

1 dose Tdap, then Td or Tdap booster every 10 years

- Adacel & Boostrix are common brands
- Pertussis especially recommended for those in contact with babies
- Medicare typically reimburses for Tdap, Shingrix at pharmacy only

Hepatitis B Vaccine - Lauren

Group	Recombivax HB*			Engerix-B±		
	Dose	Volume	Schedule	Dose	Volume	Schedule
Patients aged > 20 years						
Predialysis†	10 µg	1.0 ml	0, 1, 6 months	20 µg	1.0 ml	0, 1, 6 months
Dialysis-dependent	40 µg	1.0 ml#	0, 1, 6 months	40 µg	2 x 1.0 ml	0, 1, 2, 6 months
Patients aged < 20 years§	5 µg	0.5 ml	0, 1, 6 months	10 µg	0.5 ml	0, 1, 6 months
Staff members aged > 20 years	10 µg	1.0 ml	0, 1, 6 months	20 µg	1.0 ml	0, 1, 6 months

*Merck & Company. Inc.

±GlaxoSmithKline Biologicals, Inc.

†Immune response can depend on the degree of renal insufficiency.

#Special formulation

§Doses for persons aged < 20 years approved by the US FDA; for haemodialysis patients higher doses may be more immunogenic

Note: All doses should be administered intramuscularly in the deltoid

- For those who are not immune or acutely infected with hepatitis B
- Check hepatitis B surface antibody to determine immune status

Shingrix/Recombinant Zoster Vaccine

- **Immuno-competent adults ≥ 50 years**
 - History of shingles does not matter
 - Two doses 2-6 months apart
- **Immunodeficient (inc. HIV, regardless of T cells) or immunosuppressed adults ≥ 19**

* *Zostavax (LIVE vaccine): OFF THE MARKET as of July 2020*

Transplant Patients

- Avoid **LIVE** vaccines:
 - MMR
 - Varicella
 - Live influenza
 - HPV

Case

- A 65 year old retired woman with ESRD on hemodialysis. Her last Tdap was 6 years ago. She reports having a PNEUMOVAX 23 shot at age 60 because she is a smoker. She had her routine childhood vaccines but no other vaccines in a long time. What vaccines would you recommend?

Summary

- Patients with ESRD are at increased risk of infection.
- Vaccines can reduce morbidity and mortality.
- Vaccine recommendations change regularly.
- Review AGE and CONDITION based vaccine recommendations with your patients.
- When in doubt, consult ACIP or CDC guidance.

Lady Mary Wortley Montague

Advocate for the introduction of smallpox inoculation to England in 1717. Inoculation was practiced in the Ottoman empire in the 16th century.

Edward Jenner underwent smallpox inoculation in England as a child in 1757. He later published his work on using cowpox (aka *vaccinia*) inoculation as prevention against Smallpox – and coined the term “vaccination”.

QUESTIONS?



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