IMMUNIZATION UPDATE 2022

Sara Hicks, PharmD
Brooke Nibbelink, PharmD

DISCLOSURE STATEMENT

We have had no financial relationship over the past 24 months with any commercial sponsor with a vested interest in this presentation.

PHARMACIST LEARNING OBJECTIVES

1. Summarize recent updates to the immunization schedule.
2. Understand the guidance concerning contraindications and precautions related to influenza vaccinations.
3. Explain the "3 C's" of vaccine hesitancy.
4. Identify tools that can be used to determine which vaccinations an individual may be eligible to receive.

TECHNICIAN LEARNING OBJECTIVES

1. Explain recent updates to the immunization schedule.
2. Understand the screening process for influenza vaccinations.
3. Recognize the importance of identifying vaccine hesitancy.
4. Identify which routine vaccinations are covered by Medicare Part D.

ACIP IMMUNIZATION RECOMMENDATION UPDATES

HEPATITIS B VACCINE

- Hepatitis B is a vaccine-preventable, communicable disease of the liver caused by hepatitis B virus (HBV)
- HBV vaccinations have been shown to be safe & effective for over 40 years
- Vaccination is recommended for all ages, however, vaccine coverage among adults is low
  - Rate of acute hepatitis infection rate in adults >40 years of age has been on the rise since 2012

Reference: HHS.gov Viral Hepatitis

HEPATITIS B VACCINE

- ACIP updated Hepatitis B vaccination recommendations April 1, 2022
  - Recommends all adults 19–59 years old receive a hepatitis B vaccination series
  - Those 60 and older without known risk factors may also receive the vaccine
  - Updated recommendations removes the need for risk factor screening
- Available vaccine(s)
  - Recombivax, Engerix, Heplisav (adjuvanted)
    - Other combo vaccines exist (Pediarix, Twinrix)

Reference: MMWR Morb Mortal Wkly Rep 2022;71:229–233.

PNEUMOCOCCAL VACCINE

- ACIP updated pneumococcal recommendations in January 2022
  - Recommendations were "simplified" for healthcare providers
    - Includes both PCV20 and PCV15

Reference: MMWR Morb Mortal Wkly Rep 2022;71:109–117.

PNEUMOCOCCAL VACCINE

CDC recommends pneumococcal vaccination for adults:

- 19 through 64 years old who have certain chronic medical conditions or other risk factors
- All adults 65 years or older

New recommendations:

- Series completion can occur with the use of:
  - PCV20 alone or PCV15 in series with PPSV23

Reference: CDC Pneumococcal.

PREVNAR 20™
(PNEUMOCOCCAL 20-VALENT CONJUGATE VACCINE)

- Provides protection against the following *Streptococcus pneumoniae serotypes:*
  - 1, 3, 4, 5, 6A, 6B, 7F, 8, 9V, 10A, 11A, 12F, 14, 15B, 18C, 19A, 19F, 22F, 23F, and 33F
- Approved for adults ≥18 years

Reference: Pfizer.

VAXNEUVANCE™
(PNEUMOCOCCAL 15-VALENT CONJUGATE VACCINE)

- Provides protection against the following *Streptococcus pneumoniae* serotypes:
  - 1, 3, 4, 5, 6A, 6B, 7F, 9V, 14, 18C, 19A, 19F, 22F, 23F, and 33 F
- Approved for adults ≥18 years

Reference: Merck Sharp & Dohme Corp.

SEROTYPES IN PNEUMOCOCCAL VACCINATIONS

Reference: CDC Current Epidemiology.

VACCINE SCHEDULE

Vaccine-naive patients or **unknown vaccination history**

Adults 65 years and older

Adults 19 - 64 years with certain underlying medical conditions or risk factors

For those who have never received a pneumococcal vaccine or those with unknown vaccination history

Administer one dose of PCV15 or PCV20.

If **PCV20** is used, their pneumococcal vaccinations are complete.

PCV20

If **PCV15** is used, follow with one dose of PPSV23.
- The recommended interval is at least 1 year.
- The minimum interval is 8 weeks and can be considered in adults with an immunocompromising condition*, cochlear implant, or cerebrospinal fluid leak.
- Their pneumococcal vaccinations are complete.

PCV15 → At least 1 year apart (8 weeks can be considered) → PPSV23

Reference: CDC Pneumococcal Vaccine Timing for Adults-April 1, 2022

IMMUNOCOMPROMISED CONDITIONS

- Alcoholism
- Cerebrospinal fluid leak
- Chronic heart/liver/lung disease^
- Chronic renal failure*
- Cigarette smoking
- Cochlear implant
- Congenital or acquired asplenia*
- Congenital or acquired immunodeficiencies*
- Diabetes
- Generalized malignancy*
- HIV infection*
- Iatrogenic immunosuppression*
- Leukemia*
- Lymphoma*
- Multiple myeloma*
- Nephrotic syndrome*
- Sickle cell disease or other hemoglobinopathies*
- Solid organ transplants*

^Includes congestive heart failure and cardiomyopathies; chronic obstructive pulmonary disease, emphysema, and asthma

*considered an immunocompromised condition

Reference: CDC Pneumococcal Vaccine Timing for Adults-April 1, 2022

VACCINE SCHEDULE

No record of pneumococcal conjugate vaccine

Adults 65 years and older

Adults 19 - 64 years with certain underlying medical conditions or risk factors

For those who previously received PPSV23 but who have not received any pneumococcal conjugate vaccine (e.g., PCV13, PCV15, PCV20)

You may administer one dose of PCV15 or PCV20.

Regardless of which vaccine is used (PCV15 or PCV20):
- The minimum interval is at least 1 year.
- Their pneumococcal vaccinations are complete.

PPSV23 → At least 1 year apart → PCV15 or PCV20

Reference: CDC Pneumococcal Vaccine Timing for Adults-April 1, 2022

VACCINE SCHEDULE

- Pneumococcal vaccine timing for adults who previously received PCV13 but have not received all recommended doses of PPSV23

Adults 65 years or older without an immunocompromising condition, cerebrospinal fluid leak, or cochlear implant

PCV13 (at any age) → At least 1 year apart → PPSV23 (at ≥ 65 years)

CDC recommends 1 dose of PPSV23 at age 65 years or older.** Administer a single dose of PPSV23 at least 1 year after PCV13 was received. Their pneumococcal vaccinations are complete.

Reference: CDC Pneumococcal Vaccine Timing for Adults-April 1, 2022

Adults 19 years or older with a cerebrospinal fluid leak or cochlear implant

PCV13 (at any age) → At least 8 weeks apart → PPSV23 (at < 65 years) → At least 5 years apart → PPSV23 (at ≥ 65 years)

CDC recommends 1 dose of PPSV23 before age 65 years and 1 dose of PPSV23** at age 65 years or older.**
Administer a single dose of PPSV23 at least 8 weeks after PCV13 was received.
- If the adult is 65 years or older, their pneumococcal vaccinations are complete.
- If the adult was younger than 65 years old when the first dose of PPSV23 was given, then administer a final dose of PPSV23 once they turn 65 years old and at least 5 years have passed since PPSV23 was first given. Their pneumococcal vaccinations are complete.

Adults 19 years or older with an immunocompromising condition

PCV13 (at any age) → At least 8 weeks apart → PPSV23 (at < 65 years) → At least 5 years apart → PPSV23 (at < 65 years) → At least 5 years apart → PPSV23 (at ≥ 65 years)

CDC recommends 2 doses of PPSV23 before age 65 years and 1 dose of PPSV23** at age 65 years or older.**
Administer a single dose of PPSV23 at least 8 weeks after PCV13 was received.
- If the patient was younger than 65 years old when the first dose of PPSV23 was given and has not turned 65 years old yet, administer a second dose of PPSV23 at least 5 years after the first dose of PPSV23. This is the last dose of PPSV23 that should be given prior to 65 years of age.
- Once the patient turns 65 years old and at least 5 years have passed since PPSV23 was last given, administer a final dose of PPSV23 to complete their pneumococcal vaccinations.

** For adults who have received PCV13 but have not completed their recommended pneumococcal vaccine series with PPSV23, one dose of PCV20 may be used if PPSV23 is not available. If PCV20 is used, their pneumococcal vaccinations are complete.

Reference: CDC Pneumococcal Vaccine Timing for Adults-April 1, 2022

Number and timing of PPSV23 doses for patients who previously received PCV13
but who have not received all recommended doses of PPSV23, by medical condition

Underlying medical condition or other risk factor	PPSV23** at 19 through 64 years: Recommended	PPSV23** at 19 through 64 years: Revaccination	PPSV23** at ≥ 65 years: Recommended
None	Not recommended	Not recommended	✓ At least 1 year after PCV13 dose
Alcoholism; Chronic heart disease*; Chronic liver disease; Chronic lung disease†; Cigarette smoking; Diabetes mellitus; Cochlear implant	✓ At least 1 year after PCV13 dose if PCV13 was inadvertently given* or given as a child	Not recommended	✓ At least 1 year after PCV13 dose and at least 5 years after any PPSV23 dose at < 65 years
Cerebrospinal fluid leak	✓ At least 8 weeks after PCV13 dose	Not recommended	✓ At least 8 weeks after PCV13 dose and at least 5 years after last PPSV23 dose at < 65 years
Chronic renal failure*; Congenital or acquired asplenia*; Congenital or acquire immunodeficiency*†; Generalized malignancy*; HIV infection*; Hodgkin disease*; Iatrogenic immunosuppression*†; Leukemia*; Lymphoma*; Multiple myeloma*; Nephrotic syndrome*; Sickle cell disease/other hemoglobinopathies*; Solid organ transplant*†	✓ At least 8 weeks after PCV13 dose	✓ At least 5 years after first PPSV23 dose	✓ At least 8 weeks after PCV13 dose and at least 5 years after last PPSV23 dose at < 65 years

† PCV13 was never recommended for these populations

* Considered an immunocompromising condition
† Includes congestive heart failure and cardiomyopathies
‡ Includes chronic obstructive pulmonary disease, emphysema, and asthma
§ Includes B- (humoral) or T-lymphocyte deficiency, complement deficiencies (particularly C1, C2, C3, and C4 deficiencies), and phagocytic disorders (excluding chronic granulomatous disease)
¶ Includes diseases requiring treatment with immunosuppressive drugs, including long-term systemic corticosteroids and radiation therapy
** For adults who have received PCV13 but have not completed their recommended pneumococcal vaccine series with PPSV23, one dose of PCV20 may be used if PPSV23 is not available. If PCV20 is used, their pneumococcal vaccinations are complete.

Reference: CDC Pneumococcal Vaccine Timing for Adults-April 1, 2022

PNEUMOCOCCAL VACCINE RESOURCES

The *PneumoRecs VaxAdvisor* mobile app* helps vaccination providers quickly and easily determine which pneumococcal vaccines a patient needs and includes ACIP recommendations for all ages.

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

*Mobile app and Desktop version maybe downloaded at:
https://www.cdc.gov/vaccines/vpd/pneumo/hcp/pneumoapp.html

Reference: CDC PneumoRecs VaxAdvisor Mobile App for Vaccine Providers

The tool is very easy to use. Follow the prompts and answer questions pertaining to your patient to receive a recommendation.

Recommendation

Give one dose of PCV15 or PCV20. If PCV20 is used, their pneumococcal vaccinations are complete. If PCV15 is used, follow with one dose of PPSV23 to complete their pneumococcal vaccinations. The recommended interval between PCV15 and PPSV23 is at least 1 year. The minimum interval is 8 weeks and can be considered in adults with immunocompromising conditions[1], cochlear implants, or cerebrospinal fluid leaks.

Patient Characteristics

Age:
19 through 64 years

Risk Factors:
Yes

PCV13:
No prior doses

PPSV23:
No prior doses

Reference: CDC PneumoRecs VaxAdvisor Mobile App for Vaccine Providers

PATIENT CASE #1

Patient is a 75 year old male who received PCV13 three years ago.
He is not immunocompromised.
He presents to your pharmacy today to pick up his prescriptions and mentions his provider said he is due for another pneumonia shot.

- Which (if any) pneumococcal vaccine will you give him today?

PATIENT CASE #1

- Patient would be due for PPSV23 today
- What if PPSV23 isn't available?
  - Per CDC guidance, can give one dose of PCV20 instead and series would still be considered complete

INFLUENZA VACCINE UPDATES

SUMMARY OF 2021-2022 FLU SEASON

- An estimated 175 million doses of influenza vaccine distributed in the U.S.
- No new safety concerns identified by the Vaccine Adverse Event Reporting System (VAERS)
- Slight increase in flu activity in 2021-2022 season versus the year prior, but hospitalization rates remain lower than in the four season preceding the pandemic
  - Rate was 5.2 hospitalizations per 100,000 individuals as of February 26, 2022
- The past two flu seasons have been described as "sporadic"
  - Hard to produce efficacy estimates due to historically low flu activity in recent years
  - Difficult to decide which strains to include in the vaccines
  - Uncertainty about what the coming flu season will bring

Reference: ACIP, Medscape

SUMMARY OF 2021-2022 FLU SEASON

- CDC flu burden estimates from October 1, 2021 to June 11, 2022
  - Flu illness: 8 to 13 million
  - Flu hospitalizations: 82,000 to 170,000
  - Flu deaths: 5,000 to 14,000
- Vaccine efficacy studies as of January 2022 do not show statistically significant evidence that the flu vaccine was effective (only ~14% effective against Flu A)
- Vaccination can decrease severe illness even if circulating viruses are different from the vaccine

Reference: CDC Flu Burden, Medscape, CDC Flu Dashboard

SUMMARY OF 2021-2022 FLU SEASON

- Flu vaccine coverage for certain patient populations
  - Children: 55.3%
  - Adults 18-49 years: 34.7%
  - Adults 50-64 years: 50.0%
  - Adults 65 years and older: 67.7%
- Rates have *decreased* by 2-9.5% from previous year depending on the patient population
  - Continued downward trend over past several years

Reference: CDC Flu Dashboard

FLU VACCINES 2022-2023

- Influenza vaccination is recommended for everyone $\geq$ 6 months without contraindications
  - Emphasis on vaccinating high-risk groups and their caregivers/close contacts
- All approved vaccines are quadrivalent
  - 2 strains of influenza A and 2 strains of influenza B
  - Strains were updated this year
- The live, quadrivalent, intranasal flu vaccine; FluMist (LAIV4) is endorsed by American Academy of Pediatrics
  - Approved only for use in children and adults ages 2 through 49 years

Reference: CDC ACIP Recommendations

FLU VACCINE STRAINS

Egg-based IIV4s and LAIV4	Cell-culture-based IIV4 and RIV4
A/Victoria/2570/2019 (H1N1)pdm09-like	A/Wisconsin/588/2019 (H1N1)pdm09-like
A/Darwin/9/2021 (H3N2)-like	A/Darwin/6/2021 (H3N2)-like
B/Austria/1359417/2021 (Victoria lineage)-like	B/Austria/1359417/2021 (Victoria lineage)-like
B/Phuket/3073/2013 (Yamagata lineage)-like	B/Phuket/3073/2013 (Yamagata lineage)-like

Reference: CDC ACIP Recommendations

Immunize.org

Manufacturer	Trade Name (vaccine abbreviation)[1]	How Supplied	Mercury Content (mcg Hg/0.5mL)	Age Range
AstraZeneca	FluMist (LAIV4)	0.2 mL (single-use nasal spray)	0	2 through 49 years
GlaxoSmithKline	Fluarix (IIV4)	0.5 mL (single-dose syringe)	0	6 months & older[3]
	FluLaval (IIV4)	0.5 mL (single-dose syringe)	0	6 months & older[3]
Sanofi	Flublok (RIV4)	0.5 mL (single-dose syringe)	0	18 years & older
	Fluzone (IIV4)	0.5 mL (single-dose syringe)	0	6 months & older[3]
		0.5 mL (single-dose vial)	0	6 months & older[3]
		5.0 mL multi-dose vial (0.25 mL dose)	25	6 through 35 months[3]
		5.0 mL multi-dose vial (0.5 mL dose)	25	6 months & older
	Fluzone High-Dose (IIV4-HD)	0.7 mL (single-dose syringe)	0	65 years & older
Seqirus	Afluria (IIV4)	5.0 mL multi-dose vial (0.25 mL dose)	24.5	6 through 35 months[3]
		5.0 mL multi-dose vial (0.5 mL dose)	24.5	3 years & older
		0.5 mL (single-dose syringe)	0	3 years & older[3]
	Fluad (aIIV4)	0.5 mL (single-dose syringe)	0	65 years & older
	Flucelvax (ccIIV4)	0.5 mL (single-dose syringe)	0	6 months & older[3]
		5.0 mL multi-dose vial (0.5 mL dose)	25	6 months & older[3]

FLU VACCINES 2022-23

- Change in age indication for Flucelvax Quadrivalent
  - Cell-culture based quadrivalent inactivated influenza vaccine (ccIIV4)
  - **Approved in October 2021 for ages ≥6 months**
- Now there is an egg-free vaccine available for those as young as 6 months of age

Reference: ACIP

FLU VACCINES 2022-23

- **Adults aged 65 years and older**
  - New recommendation from June 2022 ACIP meeting
  - Should receive one of the following enhanced influenza vaccinations (EIV):
    - Quadrivalent high-dose inactivated influenza vaccine (HD-IIV4)
      - Fluzone High-Dose Quadrivalent
    - Quadrivalent adjuvanted inactivated influenza vaccine (aIIV4)
      - Fluad Quadrivalent
    - Quadrivalent recombinant influenza vaccine (RIV4)
      - Flublok Quadrivalent
  - No preference for any one of these three vaccines over the other two
  - If none of these are available at an opportunity for vaccine administration, then **any other age-appropriate influenza vaccine should be used**

Reference: ACIP

FLU VACCINES 2022-23

- **Immunocompromised patients**
  - May receive any age-appropriate injectable flu vaccine
- **Severe egg allergy**
  - People with a history of egg allergy of any severity should receive any licensed, recommended, and age-appropriate influenza vaccine
  - Severe egg allergy is classified as symptoms more severe than hives
    - Can usually tolerate any flu vaccine but should receive in a medical setting with supervision
  - Flublok Quadrivalent and Flucelvax Quadrivalent are egg-free

Reference: CDC ACIP Recommendations

VACCINATION TIMING

- Timing of flu outbreaks is unpredictable
- Ideally administered by the end of October
  - Continue to offer as long as virus is circulating locally and vaccine is available
- Influenza vaccination during July and August should be avoided in non-pregnant adults unless there is concern that later vaccination might not be possible
  - Vaccination too early in the season may lead to suboptimal immunity later on, particularly among older adults
  - Not recommended to repeat a flu vaccine due to fears of waning from vaccinating early in the season

Reference: ACIP

VACCINE TIMING FOR CHILDREN

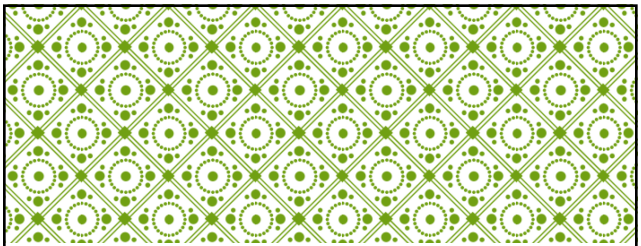
- Children 6 months to 8 years should receive two doses if they have not received at least two doses previously
- Should receive the first dose as soon as possible
  - Second dose should be given at least 4 weeks later
  - Does NOT have to be the same vaccine product for both doses
  - Pay attention to dose volume if vaccinating children 6 to 35 months
- For children who need two doses, if the child turns nine years old between doses one and two of the vaccine, two doses are still recommended
- Vaccination may occur as soon as vaccine is available
  - Less evidence to suggest that early vaccination is associated with waning immunity among children as compared with adults

Reference: ACIP, Michigan.gov

COADMINISTRATION OF COVID-19 AND INFLUENZA VACCINATIONS

- Current guidance indicates that the COVID-19 vaccines may be given with other vaccines
  - Encouraged by the CDC to avoid missed opportunities to vaccinate
- No data currently available concerning coadministration of authorized COVID-19 vaccines and influenza vaccines
  - Potential for increased reactogenicity
- If coadministered, COVID-19 vaccines and those that might be more likely to cause a local reaction (Fluad Quadrivalent or Fluzone High-Dose Quadrivalent) should be administered in *different* limbs, if possible

Reference: ACIP



COVID-19 VACCINE UPDATE

South Dakota

Reference: US DHHS. COVID-19 State Profile Report-South Dakota.

State Profile Report | 08.25.2022

State Vaccination Summary

Doses Delivered 2,128,765 240,631 per 100k **Doses Administered** 1,507,783 170,437 per 100k

Age Group	At Least One Dose	Fully Vaccinated	Booster Dose†
Total	699,563 (79.1%)	562,437 (63.6%)	248,112 (44.1%)
<5 years	2,348 (3.8%)	164 (0.3%)	N/A
5-11 years	29,289 (34.3%)	23,088 (27.0%)	2,605 (11.3%)
12-17 years	46,410 (65.8%)	36,099 (51.2%)	9,093 (25.2%)
18+ years	621,416 (93.1%)	503,072 (75.4%)	236,411 (47.0%)
65+ years	182,044 (95.0%)	150,956 (95.0%)	98,689 (65.4%)

National Picture: Vaccinations

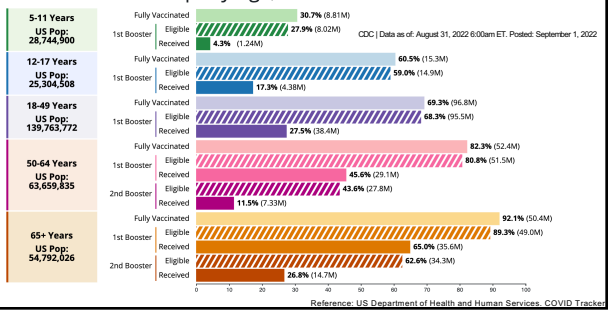
National COVID-19 Vaccine Summary as of 08/24

Doses Delivered 806,829,135 243,014 per 100k **Doses Administered** 608,937,334 183,410 per 100k

Age Group	At Least One Dose	Fully Vaccinated	Booster Dose†
Total	262,643,277 (79.1%)	223,914,723 (67.4%)	108,540,822 (48.5%)
<5 years	1,018,498 (5.2%)	221,851 (1.1%)	N/A
5-11 years	10,913,583 (38.0%)	8,774,347 (30.5%)	1,214,615 (13.8%)
12-17 years	17,865,954 (70.6%)	15,281,885 (60.4%)	4,409,197 (28.9%)
18+ years	232,674,052 (90.1%)	199,551,723 (77.3%)	102,915,219 (51.6%)
65+ years	57,449,108 (95.0%)	50,415,834 (92.0%)	35,599,077 (70.6%)

Reference: US Department of Health and Human Services. COVID Tracker.

Primary Series Completion, Booster Dose Eligibility, and Booster Dose Receipt by Age, United States



Reference: US Department of Health and Human Services. COVID Tracker.

COVID-19 VACCINE CDC RECOMMENDATIONS

- Not recommended to receive more than one series
- Considered fully vaccinated 2 weeks after series completion
- Administer as close to recommended interval as possible, but not earlier
  - If the second dose was given up to 4 days before or any time after the recommended interval, still considered fully vaccinated
- Primary series should be completed with the same product
  - If the vaccine previously given cannot be determined or is no longer available, any age-appropriate mRNA vaccine may be administered at least 28 days after the first dose
  - If a different mRNA COVID-19 vaccine is accidentally given for the primary series or additional primary dose, the dose is considered valid

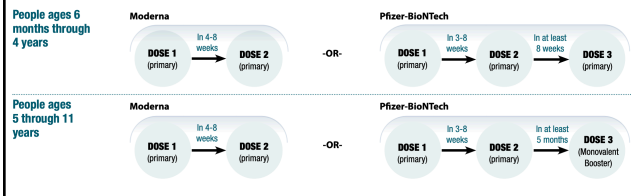
Reference: CDC Interim COVID-19 Immunization Schedule

COVID-19 VACCINE CDC RECOMMENDATIONS

- Age-appropriate mRNA vaccines and Novavax are preferred over the Janssen vaccine for all vaccine doses for all vaccine-eligible people 18 years of age and older
- Janssen COVID-19 vaccine should only be used in **limited** situations due to risk of thrombosis with thrombocytopenia syndrome (TTS)
- Vaccine should be given at least 2 weeks before initiation or resumption of immunosuppressive therapies
- Studies in adolescents and adults have shown the small risk of myocarditis associated with mRNA vaccines might be reduced and vaccine effectiveness increased with an interval longer than 4 weeks
  - **8-week interval** may be optimal for those who are not immunocompromised and ages 6 months–64 years, especially for males ages 12–39 years old

Reference: CDC Interim COVID-19 Immunization Schedule

COVID-19 VACCINE SCHEDULE

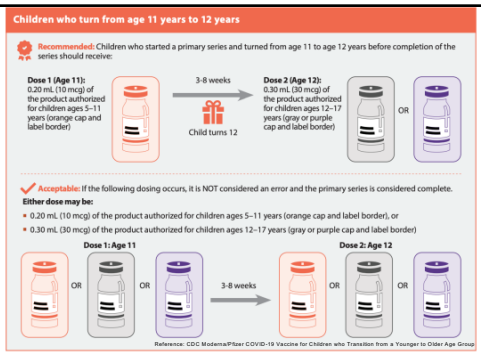


Reference: CDC At-A-Glance COVID-19 Vaccination Schedules

CHILDREN TRANSITIONING FROM A YOUNGER TO OLDER AGE GROUP

- CDC recommends children receive the age-appropriate vaccine product and dosage based on their age on **the day of vaccination**
  - If a child moves from a younger group to an older group during the primary series or between the primary series and booster, give the vaccine product and dosage for the older age group for all subsequent doses
  - If inadvertently continued with lower dose, it is NOT considered an error and the primary series is still considered complete
- Many caveats and gets confusing quickly
  - Use CDC recommendations to ensure the correct vaccine product and dose is used

Reference: CDC Moderna/Pfizer COVID-19 Vaccine for Children who Transition from a Younger to Older Age Group



COVID-19 VACCINE SCHEDULE

People ages 12 years and older

Moderna, Novavax, or Pfizer-BioNTech

DOSE 1 (primary) → In 3-8 weeks (Novavax, Pfizer) or in 4-8 weeks (Moderna) → **DOSE 2** (primary) → In at least 2 months → **Dose 3*** (Bivalent booster)

Reference: CDC At-A-Glance COVID-19 Vaccination Schedules

COVID-19 VACCINE SCHEDULE

People ages 18 years and older who previously received Janssen primary series dose†

DOSE 1 (primary) → In at least 2 months → **Dose 2*** (Bivalent booster)

ldh.la.gov

Multi-dose vial: 5 doses per vial
Dose: 0.5 mL
Dilution Required: No
Storage: Fridge up to 6 hours or room temp up to 2 hours

Reference: CDC At-A-Glance COVID-19 Vaccination Schedules, CDC Janssen COVID-19 Vaccine

PFIZER VACCINE PRODUCTS

Vial cap color	Maroon Cap	Orange Cap	Gray Cap	Purple Cap
Ages	**6 months through 4 years**	**5 through 11 years**	**12 years and older**	
Diluent*	2.2 mL per vial	1.3 mL per vial	No diluent	1.8 mL per vial
Beyond-use date/ time	Use within 12 hours after mixing.	Use within 12 hours after mixing.	Use within 12 hours after first puncture .	Use within 6 hours after mixing.

* Diluent: Use sterile 0.9% sodium chloride (normal saline, preservative-free) included in the ancillary supply kit. Do not use bacteriostatic 0.9% sodium chloride or any other diluent.

Dose: 3 µg (0.2 mL) | Dose: 10 µg (0.2 mL) | Dose: 30 µg (0.3 mL) | Dose: 30 µg (0.3 mL)

Reference: CDC Pfizer-BioNTech COVID-19 Vaccine Products At-A-Glance

MODERNA VACCINE PRODUCTS

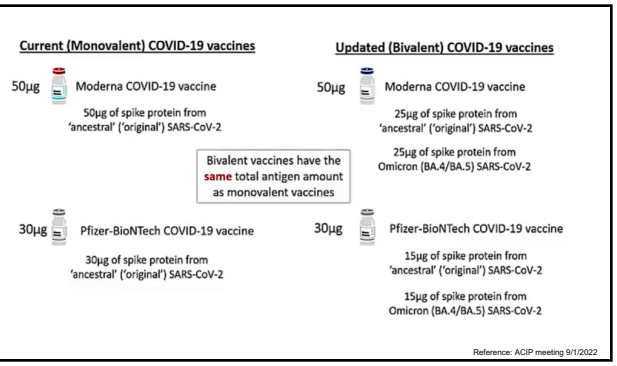
Authorized Age group	6 months–5 years (primary series)	• 6–11 years (primary series)	• 12 years and older (primary series)
Vial cap color	Dark blue	Dark blue	Red
Label border color	Magenta	Purple	Light blue
Dose (mRNA concentration)	25 mcg	50 mcg	100 mcg
Injection volume volume	0.25 mL	0.5 mL	0.5 mL(primary, age 12+);
Dilution required	No	No	No
Doses per vial	10	5	Maximum of 11

Reference: ACIP Interim Clinical Considerations Update

BIVALENT BOOSTER VACCINES

- The FDA approved bivalent COVID-19 booster vaccines on August 31, 2022
  - The ACIP followed with approval on September 1, 2022
- New boosters are **bivalent**, meaning "original" vaccine + an Omicron variant component
- Designed to generate immune responses to the original version of the coronavirus vaccine and to BA.5 (the Omicron subvariant that is now dominant)
- Inclusion of a second SARs-COV-2 variant into the vaccine broadens the antibody response
- As with monovalent, the bivalent boosters are interchangeable
  - May receive a Pfizer or Moderna booster that is different from the primary series or last booster dose
  - Cannot get a bivalent booster without first completing at least a primary series
- If recently had COVID, should wait at least until symptoms have resolved before getting a booster
  - May want to wait a full three months after COVID-19 infection

Reference: ACIP meeting 9/1/2022



Reference: ACIP meeting 9/1/2022

PFIZER-BIONTECH BIVALENT VACCINE

Authorization: for use in individuals **12 years of age and older** as a single booster dose administered at least **2 months** after either:
- Completion of primary vaccination with any monovalent COVID-19 vaccine, or
- Receipt of the most recent booster dose with any monovalent COVID-19 vaccine

Dose: 0.3 mL

Storage:
- Thawed vials may be kept at refrigerated temps (35°F to 46°F) for up to 10 weeks prior to use
- May be stored at room temperature (46°F to 77°F) for a total of 12 hours prior to the first puncture
- After first puncture, vial should be held between 35°F to 77°F then discarded 12 hours after first puncture

Vials:
- Vials are multi-dose and contain 6 doses per vial (do **NOT** dilute)
- Pfizer bivalent vials have **GRAY** colored caps (same as the current monovalent product) but labels differentiate the formulations

Reference: Pfizer Bivalent EUA

MODERNA BIVALENT VACCINE

Authorization: for use in individuals **18 years of age and older** as a single booster dose administered at least **2 months** after either:
- Completion of primary vaccination with any monovalent COVID-19 vaccine, or
- Receipt of the most recent booster dose with any monovalent COVID-19 vaccine

Dose: 0.5 mL

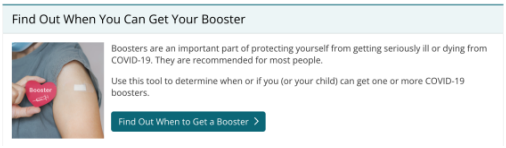
Storage:
- Store at refrigerated temperatures of 36°F to 46°F after thawing from frozen storage
- Vials may be stored refrigerated between 36°F to 46°F for up to 30 days prior to first use
- Punctured vials should be held at 46°F to 77°F and discarded 12 hours after the first puncture

Vials:
- Vials are multi-dose and contain 5 doses per vial (no dilution)
- Same size as previous Moderna vials and have a **dark blue** vial cap

Reference: Moderna Bivalent EUA

CDC COVID-19 VACCINE BOOSTER TOOL

- Quickly determine if a patient is eligible for a booster
  - Includes vaccine product option(s) and dosing intervals
  - https://www.cdc.gov/coronavirus/2019-ncov/vaccines/booster-shot.html#when-you-can-get-booster
- Scroll down and click "Find Out When to Get a Booster" link
  - Enter age, immunocompromised or not, and primary series information



Reference: CDC COVID-19 Vaccine Boosters

NOVAVAX COVID-19 VACCINE

- Novavax Inc.'s adjuvanted COVID-19 vaccine
- First protein-based COVID-19 vaccine authorized in the U.S.
- Two-dose primary series for those **12 years and older**
  - 0.5 mL given intramuscularly 21 days apart (no dilution)
  - Store in the refrigerator and discard vial 6 hours after first puncture
- 2 myocarditis cases across 2 study populations during trials
  - Since the trial, Novavax has reported 35 spontaneous reports of potential myocarditis or pericarditis from a total of 744,000 doses given worldwide
- Unclear how it will perform against the Omicron variant
- An option for those who were hesitant to get an mRNA or viral vector based vaccine

Reference: Novavax, Inc.; Pharmacy Times

MYOCARDITIS OR PERICARDITIS WITH MRNA VACCINE

- Precaution to a subsequent dose of any COVID-19 vaccine
  - If decision is made to receive another dose after risk assessment, wait until after the episode has resolved
- Males ages 18 years and older
  - If want to receive a subsequent dose, Janssen may be considered instead of mRNA vaccines
- History of myocarditis or pericarditis unrelated to mRNA COVID-19 vaccination may receive any age-appropriate vaccine after the episode has resolved

Reference: CDC Interim Clinical Considerations for Use of COVID-19 Vaccines Currently Authorized in the United States.

JANSSEN VACCINE CONSIDERATIONS

- Guillain-Barré syndrome (GBS)
  - A history of GBS is a precaution for Janssen vaccine (mRNA vaccine preferred)
  - Those who develop GBS within 6 weeks of vaccination should only receive an mRNA vaccine for subsequent doses
- Thrombosis with thrombocytopenia syndrome (TTS)
  - Rare (~4 cases per one million doses administered)
  - Causes blood clots in large blood vessels and low platelets
  - Should receive a dose of an mRNA vaccine as a booster dose at least 2 months after Janssen vaccine and after condition has stabilized
- Heparin-induced thrombocytopenia (HIT)
  - History of an episode of spontaneous or classic HIT should receive an mRNA vaccine

Reference: CDC Interim Clinical Considerations for Use of COVID-19 Vaccines Currently Authorized in the United States.

PRIOR OR CURRENT COVID-19 INFECTION

- Offer regardless of history of symptomatic/asymptomatic COVID-19 or exposure
  - Viral or serologic testing to assess for prior infection is not recommended
- Defer vaccination in those with an active infection until recovered
  - Those without any vaccine history OR
  - Those who are infected after the first dose of an mRNA vaccine
- May consider delaying primary series or booster by 3 months from symptom onset or positive test
- Vaccination is not recommended for post-exposure prophylaxis
- Vaccine can be given at any interval after receiving passive antibody therapy
  - Monoclonal antibodies or convalescent plasma

Reference: CDC Interim Clinical Considerations for Use of COVID-19 Vaccines Currently Authorized in the United States.

WHAT'S NEXT?

- Research and development for COVID-19 vaccines continues on
  - 137 COVID-19 vaccine candidates undergoing clinical trials and 194 candidates in pre-clinical development in January 2022
  - Some of the potential vaccine candidates undergoing trials include:
    - Oral bacterial vector vaccine that could have vaccine-like activity in the intestines
    - Intranasal vaccines
    - Self-amplifying nucleic acid vaccines
    - Many more

Reference: Gavi.org

PATIENT CASE #2

A 16 year old male presents to your pharmacy with his mother and requests a COVID-19 vaccination prior to the upcoming school year. He is not immunocompromised.

- Which vaccine(s) is he eligible to receive?

After administering the vaccine, the patient's mother raises concerns about myocarditis that she heard about on the news.

- How do you counsel the family?
- What dosing interval would you suggest to complete the series?

PATIENT CASE #2

Vaccine options:

- Moderna 2 dose series
- Pfizer 2 dose series
- Novavax 2 dose series
- Could also get **Pfizer** bivalent booster 2 months after completing primary series (regardless of which primary series is chosen)
  - Not Moderna since it's only approved for 18 years and older
  - No Novavax boosters currently available
- Cannot get J&J since he's not 18
  - Not a preferred option anyways

PATIENT CASE #2

- Myocarditis (inflammation of heart muscle) is a rare but serious potential side effect
- The benefits of getting the COVID-19 vaccination still outweigh the small potential risk of developing this condition
- Some studies have shown the small risk of myocarditis might be reduced and vaccine effectiveness may be increased with a longer interval between doses
- **Recommend an 8-week interval since the patient is a male between the age of 12-39 and is not immunocompromised**

OTHER VACCINE UPDATES

SHINGRIX (ZOSTER VACCINE RECOMBINANT, ADJUVANTED)

- FDA approved for prevention of herpes zoster in those ≥18 who are or will be at an increased risk due to immunosuppression or immunodeficiency caused by a known therapy or disease
- Shorter vaccine schedule may be recommended in some cases

Reference: GSK 2021, Hippensteele A.

IMMUNOCOMPROMISED CONDITIONS FOR SHINGRIX

- Hematopoietic cell transplant (HCT) recipients
- Solid organ transplant recipients
- Patients with cancer
- Persons living with human immunodeficiency virus (HIV)
- Patients with autoimmune and inflammatory conditions

Reference: CDC Clinical Considerations for Use of Recombinant Zoster Vaccine

HUMAN PAPILLOMAVIRUS (HPV)

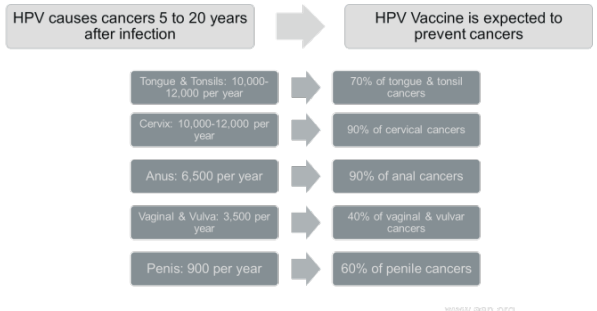
- HPV is a very common virus that can cause cancers later in life
  - HPV is transmitted through intimate skin-to-skin contact with an infected person
  - ~36,000 cancers are caused by HPV in the United States each year

Reference: CDC. Human Papillomavirus (HPV) Vaccination: What Everyone Should Know

HPV: BURDEN OF DISEASE

- HPV can cause cervical, vulvar, and vaginal cancer in females, penile cancer in males, and anal and oropharyngeal cancer in both females and males
  - HPV vaccination could prevent >90% of cancers caused by HPV from ever developing
  - This is an estimated 33,700 cases in the United States every year
- Cervical cancer is the only type of cancer caused by HPV with a recommended screening test for detection at an early stage
  - Other cancers may not be detected until they cause health problems

Reference: CDC. Human Papillomavirus (HPV) Vaccination Information for Clinicians



Reference: AAP HPV Fact Sheet

HPV PREVENTION

The HPV vaccines are prophylactic and can be considered **CANCER PREVENTION**

- The vaccine does not:
  - Prevent progression of HPV infection to disease
  - Decrease time to clearance of HPV infection
  - Treat HPV-related disease
- HPV vaccination has resulted in significant declines in prevalence of vaccine-type HPV infections, anogenital warts, and cervical precancers

Reference: HPV-Immunize.org

HPV VACCINE: GARDASIL®9

- Inactivated 9-valent vaccine (9vHPV)
  - Contains 7 cancer-causing HPV types (16, 18, 31, 33, 45, 52, and 58)
  - Two HPV types that cause most genital warts (6 and 11)
- Approved by the FDA in December 2014
  - Only HPV vaccine available in US market
- Licensed for females and males age 9 through 45 years

Reference: HPV-Immunize.org; Merck Vaccines

HPV VACCINE

HPV vaccine is not a "live" vaccine
- Administration of a different inactivated or live vaccine is acceptable at the same visit

Vaccine supplied as:
- Refrigerated vaccine
- Single-dose vial or prefilled syringe

Dosage and administration:
- Each dose is 0.5 mL
- Intramuscular (IM) injection to the deltoid area is preferred

Side effects:
- Syncope; other reactions include injection site reaction (redness, swelling), headache, and fever

Reference: Merck.com-Gardasil9 package insert

ACIP RECOMMENDATIONS FOR HPV VACCINE

- Routine HPV vaccination **initiated at age 11 or 12 years**
  - *May be started as early as 9 years of age*
- Also recommended for all people age 13 to 26 years who have not been vaccinated previously or who have not completed the vaccination series

Reference: Human Papillomavirus (HPV) ACIP Vaccine Recommendations

ACIP SCHEDULE FOR HPV VACCINE

For adolescents who start the vaccination series ***before* the 15th birthday**
- **2-dose** HPV vaccine schedule is recommended

For all people who start the series ***on or after* the 15th birthday** and for people with certain immunocompromising conditions (such as cancer, HIV infection, or taking immunosuppressive drugs)
- **3-dose** schedule is recommended

Reference: Human Papillomavirus (HPV) ACIP Vaccine Recommendations

ACIP SCHEDULE FOR HPV VACCINE

Patients ages 9 – 14		Patients ages 15 – 45*	
Regimen	Schedule	Regimen	Schedule
2-dose^	0, 6 to 12 months	3-dose	0, 2, 6 months
3-dose	0, 2, 6 months		

^If the second dose is administered earlier than 5 months after the first dose, administer a third dose at least 4 months after the second dose.

* Catch-up vaccinations for those 26 years old and older are not recommended, however, shared clinical decision making is appropriate for adults aged 27-45 who may not be adequately vaccinated.

Reference: Human Papillomavirus (HPV) ACIP Vaccine Recommendations

HPV & IMMUNIZE SD

- *"2 by 10" HPV Vaccination Project* through ImmunizeSD
  - Project goal is to increase HPV vaccination rates in children aged 9 and 10 in South Dakota
- Strategies
  - Provider education
  - Community awareness
    - Parents and guardians
- More information at https://www.immunizesd.org

MONKEYPOX

- Virus
  - "cousin" to smallpox
  - Discovered in 1958
- Source of disease is unknown
  - Possible rodent carrier
  - Previous outbreak in US tied to importation of animals for pets
  - There are two types of monkeypox virus:
    - Clade I
    - Clade II
- Current 2022 outbreak
  - West African Clade II

Reference: CDC. Monkeypox

MONKEYPOX

- Burden of disease
  - Rarely fatal
- Symptoms
  - Fever
  - Headache
  - Muscle aches/backache
  - Swollen lymph nodes
  - Respiratory symptoms (sore throat, nasal congestion, cough)
  - **Rash** (*hallmark* symptom)
    - Pimples or blisters that appears on the face, inside the mouth, and on other parts of the body, like the hands, feet, chest, genitals, or anus
    - Rash will go through various stages, typically last 2 to 4 weeks
- Spread
  - From person to person through direct contact with the infectious rash, scabs, or body fluids
  - Respiratory secretions during prolonged face-to-face contact or during intimate physical contact

Reference: CDC. Monkeypox

MONKEYPOX

- Treatment
  - No treatments specific for monkeypox
  - Antivirals used to treat smallpox may be used
- Vaccination
  - Vaccines designed for smallpox may be used
  - Routine vaccination for smallpox ended in 1970s
  - 2015 – ACIP – pre-exposure prophylaxis with ACAM2000
  - 2022 – ACIP – JYNNEOS pre-exposure prophylaxis as an alternative to ACAM2000 for certain persons at risk for exposure to orthopoxviruses
- Who should get vaccinated?
  - People who have been exposed to monkeypox or may be more likely to get monkeypox

Reference: CDC. Monkeypox ACIP - MMWR

MONKEYPOX VACCINES

ACAM2000

- FDA approved for smallpox
- Does not contain smallpox virus, but a "live" vaccinia virus
- Special Considerations for Administration
  - Two-pronged stainless steel (or bifurcated) needle is dipped into the vaccine solution and the skin is pricked several times in the upper arm with a droplet of the vaccine
  - Virus begins growing at the injection site causing a localized infection or "pock" to form
- Side Effects and Considerations
  - Contraindicated in pregnancy, immunocompromised, skin conditions
    - Can be "spread"
  - Side effects: itching, sore arm, fever, headache, body ache, mild rash, fatigue, myocarditis/pericarditis
- Vaccine is **not** commercially available

Reference: CDC. Monkeypox. FDA. ACAm2000 package insert

MONKEYPOX VACCINES

JYNNEOS

- FDA approved for prevention of smallpox and monkeypox in 2019
- EUA approval August 2022 for those determined to be at *high risk* for infections
  - 18+ intradermal
  - <18 subcutaneous
- Dosage and Administration
  - 2 dose series; 0.5 mL per dose, 28 days apart
  - Given subcutaneously in the upper arm (deltoid)
  - **LIVE**-attenuated vaccine
- Side Effects and Considerations
  - No severe adverse events in immunocompromised patients
  - Should not receive if you have had allergic reaction after a previous dose, or have a history of allergic reaction to gentamicin, ciprofloxacin or chicken/egg protein
  - Side effects: redness and itching at the spot where the vaccine is given as well as headache, tiredness, nausea, chills, and muscle aches
  - Safer administration, no "special" needle necessary
  - COVID-19 vaccines may be delayed by 4 weeks if the JYNNEOS vaccine is given first

Reference: CDC. Monkeypox. FDA. Jynneos package insert

VACCINES IN PREGNANCY

VACCINES IN PREGNANCY

- No evidence of risk to the fetus from vaccinating pregnant women with inactivated virus or bacterial vaccines or toxoids
- Live vaccines pose a theoretical risk to the fetus
  - Live, attenuated virus and live bacterial vaccines generally are contraindicated during pregnancy
    - Live attenuated influenza vaccine (LAIV), MMR, Varicella
- *MotherToBaby* website has vaccine-related resources for those who are pregnant or breastfeeding

Reference: ACOG, MotherToBaby, CDC Guidelines for Vaccinating Pregnant Women

INFLUENZA

- May receive any age-appropriate injectable flu vaccine regardless of thimerosal content
- Vaccination *soon after vaccine becomes available* may be considered during the third trimester
  - Shown to reduce risk of influenza illness of their infants during the first months of life

Reference: CDC ACIP Recommendations

COVID-19 AND PREGNANCY

- Growing body of evidence on the safety and effectiveness of COVID-19 vaccination shows the benefits of vaccination outweigh any known or potential risks during pregnancy
- V-Safe pregnancy registry did not find an increased risk of miscarriage with vaccination in early pregnancy
- No known evidence of fertility problems in men or women
- Acetaminophen should be recommended if a pregnant patient experiences a fever, for any reason, due to potential for adverse outcomes

Reference: CDC-COVID-19 Vaccines While Pregnant or Breastfeeding, ACOG, Mayo Clinic

COVID-19 AND BREASTFEEDING

- Vaccination is recommended by the CDC
  - Limited data on safety and effects of vaccination on milk production or babies
- COVID-19 vaccines cannot cause infection in the mother or their children
  - The vaccine is effective at preventing COVID-19 in mothers who are breastfeeding
- Mothers who received mRNA COVID-19 vaccines have been found to have antibodies in their breast milk which could provide protection for babies
  - More data is needed to identify what protection may be provided

Reference: CDC-COVID-19 Vaccines While Pregnant or Breastfeeding, ACOG

TDAP

- CDC recommends all women receive a Tdap vaccine during the 27th through 36th week of each pregnancy
  - Preferably during the earlier part of this time period
- Protects against whooping cough, which can be deadly in infants

Reference: National Center for Immunization and Respiratory Diseases

Vaccine*	Indicated During Every Pregnancy	May Be Given During Pregnancy in Certain Populations	Contraindicated During Pregnancy	Can Be Initiated Postpartum or When Breastfeeding or Both
Inactivated influenza	X[1,1,2]			X[1]
Tetanus toxoid, reduced diphtheria toxoid and acellular pertussis (Tdap)	X[1,3,4]			X[1]
Pneumococcal vaccines		X[1,5,6]		X[1,5,6]
Meningococcal conjugate (MenACWY) and Meningococcal serogroup B		X[1,7]		X[1,7]
Hepatitis A		X[1,8]		X[1,8]
Hepatitis B		X[1,9,10]		X[1,9,10]
Human papillomavirus (HPV)**				X**[1,11,12]
Measles–mumps–rubella			X[1,13,14]	X[1]
Varicella			X[1,13,15,16]	X[1]

*An "X" indicates that the vaccine can be given in this window. See the corresponding numbered footnote for details.

Reference: ACOG Maternal Immunization

PATIENT CASE #3

Patient is a 67 year old female with diabetes. She comes to your pharmacy asking if she is up-to-date on her vaccinations. When you look up her vaccine history in SDIIS, you see the following information:

Influenza (Fluzone Quad)	11/4/21	
COVID-19 (Janssen)	2/3/21	11/20/21
Tdap	7/10/10	
Shingrix	4/12/21	
Zostavax	2/10/10	

Is she up to date on her vaccinations?

If not, which vaccine(s) do you recommend?

PATIENT CASE #3

- COVID-19
  - Due for a booster
    - Recommend a bivalent mRNA booster
- Influenza
  - Recommend an enhanced influenza vaccine (if available)
    - Fluzone HD, Fluad, Flublok
- Pneumococcal
  - Pneumococcal naive, over 65 years old, and has diabetes
    - PCV20 alone OR PCV15 followed by PCV23 given at least 1 year later

PATIENT CASE #3

- Tdap
  - Update every 10 years
- Shingrix
  - Due for second dose, no need to restart series
- Hepatitis B
  - Per updated recommendations, no screening required even if patient is not at high risk
  - Shared clinical decision-making

ADDRESSING VACCINE HESITANCY

ADULT VACCINATION RATES IN THE U.S.

- Article published in May 2021 in the Morbidity and Mortality Weekly Report reviewed vaccination rates during certain time periods:
  - August 2017 to June 2018 for influenza vaccination
  - January 2018 to December 2018 for pneumococcal, herpes zoster, tetanus, and diphtheria (Td/Tdap), hepatitis A, hepatitis B, and human papillomavirus (HPV) vaccination
- Coverage appears to have increased from 2010 to 2018 for most vaccines
  - Influenza (adults aged ≥19 years: 46%)
  - Pneumococcal (adults aged ≥65 years: 69%)
  - Herpes zoster (adults aged ≥50 years and aged ≥60 years: 24% and 35%, respectively)
  - Tetanus (adults aged ≥19 years: 62.9%)
  - Tdap (adults aged ≥19 years: 31.2%)
  - Hepatitis A (adults aged ≥19 years: 12%)
  - HPV (females aged 19-26 years: 53%)

Reference: Lu PJ, US Pharmacist

VACCINE HESITANCY

- Vaccine hesitancy is a delay in acceptance or a refusal of vaccines despite the availability of vaccination services
- WHO defines it as **indecision about vaccine acceptance**
  - Has been identified as a major threat to global health
  - Complex mix of cultural, psychosocial, spiritual, political, and cognitive factors
  - Varies across time, place & vaccines

Shixin (Cindy) Shen, Vinita Dubey: Addressing vaccine hesitancy.

VACCINE HESITANCY

- Hesitancy is **not** new
  - Has increased over the years due to many diseases being almost eradicated with the use of vaccinations
  - Emotional/cognitive response to assessment of risk/benefit of immunization
- COVID-19 vaccines are among the highest regarding hesitancy
  - Possibly causing more hesitancy to "spill" over to other vaccinations
  - Vaccines for Children (VFC) program has noticed a decrease in vaccine order levels & childhood vaccination rates

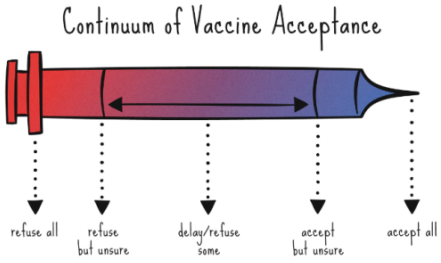
Shixin (Cindy) Shen, Vinita Dubey: Addressing vaccine hesitancy.

VACCINE HESITANCY

- Can be an uncomfortable topic, not only with patients, but also family, friends, and colleagues
- Hesitancy has a broad spectrum
  - Attitudes towards vaccines fall on a *continuum*
  - Be prepared to adapt to different thoughts and modify conversations
  - Important to target and address attitudes, social processes, motivation, and access and other structural issues to nudge individuals toward vaccine acceptance

> *The more you try to insert information and advice into others, the more they tend to back off and resist.*
>
> *Stephen Rollnick, co-founder of Motivational Interviewing*

Reference: BMJOpen, When Vaccine Apathy, Not Hesitancy, Drives Vaccine Disinterest



Reference: Building Trust in Vaccination

VACCINE HESITANCY AND *THE "3 C'S"*

1. **Confidence**
   - A lack of trust in:
     - The effectiveness and safety of vaccines
     - The system that delivers vaccines (healthcare professional, health system, etc.)
     - Motivations of policy-makers who make determinations about vaccines
2. **Complacency**
   - Low perceived risk of vaccine-preventable diseases and therefore it is assumed vaccines are not needed
     - Other issues are considered more important
3. **Convenience**
   - Degree to which the comfort, convenience, time, place, and quality of a vaccine affects uptake of the vaccine
     - Total acceptance to complete refusal

Reference: Vaccine Practice for Health Professionals

ADDRESSING VACCINE HESITANCY

- Start early (postnatal visits)
- Presenting vaccination as the default approach (presumptive)
- Build trust
  - Listen to & acknowledge concerns
  - Provide education to help answer questions
- Be honest about side effects & provide reassurance on vaccine safety (VAERS)
- Focus on protection of the child and community
  - Facts or statistics may be presented
- Tell personal stories
  - Personal statements by healthcare professional and about what you would do for your own family/children
  - Personal experiences with other patients

Reference: Addressing Vaccine Hesitancy

COMMUNICATION APPROACHES

Presumptive vs. Participatory Approach

- Lead the conversation with a statement instead of a question
  - Tell patients they need a vaccine(s)
  - Works well for most vaccinations, especially routine vaccinations or series vaccinations
  - Has increased vaccine acceptance rates when coming from HCP

"You need XYZ vaccine today" vs. "Do you want XYZ vaccine today?"

"Today we are going to give you/your child the recommended vaccines to keep you/your child healthy"

Reference: PMD, Addressing Vaccine Hesitancy

COMMUNICATION APPROACHES

Start with presumptive approach	"Today we are going to give your child the recommended vaccines to keep the child healthy"
If still unsure, address concerns and make a strong recommendation	"I strongly recommend your child receives these vaccines today" "These shots are very important for protecting your child from serious diseases"
Describe benefits of vaccines	"Vaccines work. Serious diseases can occur if your child is not immunized"
Describe side effects	"There is a risk with vaccines just as with everything we do in life, like driving a car or riding a bike"

Reference: Addressing Vaccine Hesitancy

MOTIVATIONAL INTERVIEWING: O.A.R.S

- Ask **Open-ended Questions**
  - Gives patient the opportunity to "tell their story" without leading in a specific direction
  - Questions that do not "lead" but require more than a "yes" and "no" response
  - Words like "How", "What", "Tell me.."
- Make **Affirmations**
  - Recognize positive behaviors, help build confidence & rapport
- Use **Reflection**
  - Listen to understand/clarify patient questions and concerns
  - Listener to reflect on words spoken, emotions and/or behaviors
- **Summarize**
  - Reinforces what has been discussed and ensures clear communication
  - Use summaries throughout conversation (may help to shift direction of conversation) and at conclusion of visit to confirm both listener and patient understanding

Reference: Motivational Interviewing: The Basics, OARS, nicic.gov

O.A.R.S EXAMPLES

- Open-ended Questions
  - Help me understand….?
  - What… brings you to the pharmacy today?
  - Who… have you talked to about immunizations?
  - How… have you made decisions before about immunizations?
- Affirmations
  - It's great that you are here today…
  - It sounds like you've been really thoughtful about your decision
  - It is good to ask questions about…
- Reflection
  - Words: Some of what I heard you say…
  - Emotions: You seem to be feeling [sad, frustrated, excited, confused]
  - Behavior: I noticed… [you smiled when…, you frowned when…]
- Summarize
  - Let's go over what we have talked about so far…
  - So you've just described your plan. We're always here to help in any way. What other questions do you have before you leave today?

Reference: Motivational Interviewing: Preparing People for Change

BOOSTING VACCINATION RATES

Immunize at EVERY opportunity

- Consider every patient encounter a potential vaccination opportunity

Use reminder & recall systems

- Text messages, email, letters, postcards, and health system app(s)

Implement standing orders

- Allow for assessment and vaccination of the patient by an authorized healthcare professional (pharmacist) without need for clinician examination or direct order from provider at the time of interaction

Review patient vaccination history

- Review your patient's immunization record (both your internal medical record and information available in the immunization registry) and flag the patient's profile/chart if your patient is due for vaccine(s)

Educate

- Build trust in vaccines
- Vaccine-hesitant parents who are on the fence far outnumber vaccine refusers so counseling this group might be more effective

Reference: Building Trust in Vaccination, *J Am Pharm Assoc*

COADMINISTRATION OF VACCINES FOR ADULTS

- With a few rare exceptions, all vaccines can be administered at the **same** visit
- No upper limit for the number of vaccines that can be administered during a visit
- ACIP and AAP recommend that **all** needed vaccines be administered during a visit
  - Vaccination should *not* be deferred because multiple vaccines are needed
- All live vaccines can be given at the same visit, if indicated
  - MMR, varicella, live attenuated influenza, yellow fever, and oral typhoid
  - If live vaccines are not administered during the same visit, they should be separated by *at least* 4 weeks

Reference: IAC, CDC Interim Clinical Considerations for Use of COVID-19 Vaccines Currently Authorized in the United States

COADMINISTRATION OF VACCINES FOR ADULTS

- When giving several injections at a single visit, separate IM vaccines by at least 1 inch if possible and document the location of each injection
- Administer the COVID-19 vaccines and vaccines that may be more likely to cause a local reaction in different limbs, if possible
  - Ex. tetanus-toxoid-containing and adjuvanted vaccines
- Consider implementing a vaccine screening form at your pharmacy to aid in identifying which vaccines a patient is eligible for when they present

Reference: IAC, CDC Interim Clinical Considerations for Use of COVID-19 Vaccines Currently Authorized in the United States

FREQUENTLY ASKED QUESTIONS

"CAN I STILL GET A VACCINE TODAY IF I HAVE A COUGH?"

- Administer vaccines to patients with mild acute illness
  - Avoid missed opportunities to vaccinate
  - Mild acute illness with or without fever is *not* a contraindication to vaccination
- Consider delaying vaccination with moderate to severe illness
  - Vaccination side effects may make it difficult to assess management of acute illness
- Delay vaccination in those with suspected or confirmed COVID-19 infection
  - Wait until patients are no longer acutely ill to avoid exposing healthcare personnel and other patients
  - Remind patients to return for vaccination once recovered

Reference: CDC ACIP Recommendations

"CAN I STILL GET A VACCINE TODAY IF I'M ON AN ANTIBIOTIC?"

- People with mild illnesses can be vaccinated
- CDC specifically states not to withhold vaccination if a person is taking antibiotics

Reference: CDC Prevaccination Checklist

"HOW WILL MY PROVIDER KNOW I RECEIVED THIS VACCINE?"

SDIIS South Dakota Immunization Information System

- Computer software system that allows health care providers to share immunization records
  - Cannot be accessed by the general public
- Pharmacies are not required to send a copy of vaccine records to providers
- Pharmacies are required to report all administered immunizations to SDIIS within 14 days of the immunization per South Dakota administrative rule

Reference: SD Department of Health, SD Administrative Rule 20:51:28:05

"WHAT DO YOU MEAN I HAVE A COPAY?"

Vaccines Covered by Medicare Part B (no copay)

- COVID-19
- Influenza
- Pneumococcal
- Hepatitis B (if intermediate to high risk)
- Vaccines related to treatment of injury or direct exposure (tetanus, rabies)

Vaccines Covered by Medicare Part D (***may*** have a copay)

- Vaccines not covered by Part B, including:
  - Shingles
  - Tdap
  - Hepatitis A (when medically necessary)
  - Varicella (chicken pox)

Reference: Medicare Interactive, MN Department of Health

LEARNING ASSESSMENT QUESTIONS

PHARMACIST QUESTIONS

1. True or False: PCV13 continues to be recommended by the CDC as a routine pneumococcal vaccination for adults.

PHARMACIST QUESTIONS

1. False: It is now only recommended for use in all babies and children younger than 2 years old and children 2 through 18 years old with certain medical conditions.

PHARMACIST QUESTIONS

2. **True or False:** Egg allergy is a contraindication to receiving an influenza vaccination.

PHARMACIST QUESTIONS

2. **False:** Reported egg allergy is not a contraindication to flu vaccination.

PHARMACIST QUESTIONS

3. When addressing vaccine hesitancy using the "3 C's" (confidence, convenience, and complacency), confidence refers to:

A. Access, affordability, and willingness to pay for vaccines and services
B. Lack of trust in safety and efficacy of vaccine and/or competence of healthcare professionals, health system, and policy makers
C. The perceived risk of disease is low, thus need to vaccinate is low
D. A decision made on social responsibility

PHARMACIST QUESTIONS

3. **B:** Lack of trust in safety and efficacy of vaccine and/or competence of healthcare professionals, health system, and policy makers

PHARMACIST QUESTIONS

4. Which of the following are tools that can be used to verify which vaccinations an individual has already received?

A. Online immunization information systems
B. Electronic medical records
C. Patient-reported vaccination history
D. All of the above

PHARMACIST QUESTIONS

4. **D:** All of the above

TECHNICIAN QUESTIONS

1. **True or False**: Only adults over the age of 65 are eligible to receive a pneumococcal vaccination.

TECHNICIAN QUESTIONS

1. False: Pneumococcal vaccination, depending on which vaccine is used, is recommended for use in ages ranging from infants to elderly.

TECHNICIAN QUESTIONS

2. **True or False**: If you are 65 or older, you can receive a standard quadrivalent influenza vaccine.

TECHNICIAN QUESTIONS

2. **True**: The CDC continues to recommend vaccinating against the flu with any available flu vaccine. Any flu vaccine is better than no vaccination.

TECHNICIAN QUESTIONS

3. **True or False:** Vaccine hesitancy is a new issue facing healthcare today.

TECHNICIAN QUESTIONS

3. **False**: Vaccine hesitancy has existed for decades and will continue to be an obstacle for healthcare professionals.

TECHNICIAN QUESTIONS

4. Which of the following vaccinations is covered by Medicare Part D?

A. Pneumococcal
B. Hepatitis B
C. Influenza
D. Tdap

TECHNICIAN QUESTIONS

4. **D:** Tdap

REFERENCES

ACIP-WG Considerations and Proposed Influenza Vaccine Recommendations, 2022-23. June 2022.

FDA Committee Recommends 2022–2023 Influenza Vaccine Strains - Medscape - Mar 07, 2022. https://www.medscape.com/viewarticle/969810#vp_2

Influenza Work Group: Summary and Proposed Recommendations for the 2022-23 Influenza Season. ACIP. Centers for Disease Control and Prevention, National Center for Immunization and Respiratory Diseases (NCIRD). June 22, 2022. https://www.cdc.gov/vaccines/acip/meetings/downloads/slides-2022-06-22-23/04-influenza-grohskopf-508.pdf

CDC FluView. Updated July 1, 2022. https://www.cdc.gov/flu/weekly/index.htm

CDC Flu Burden. 2021-2022 U.S. Flu Season: Preliminary In-Season Burden Estimates. Updated June 17, 2022. https://www.cdc.gov/flu/about/burden/preliminary-in-season-estimates.htm

CDC Weekly Flu Vaccination Dashboard. Updated April 22, 2022. https://www.cdc.gov/flu/fluvaxview/dashboard/vaccination-dashboard.html

Centers for Disease Control and Prevention. COVID Data Tracker. Atlanta, GA: US Department of Health and Human Services, CDC; 2022, July 06. https://covid.cdc.gov/covid-data-tracker

U.S. Department of Health & Human Services. COVID-19 State Profile Report - South Dakota. Heathdata.gov. https://healthdata.gov/Community/COVID-19-State-Profile-Report-South-Dakota/4q57-igvb

CDC COVID-19 Vaccine Interim COVID-19 Immunization Schedule for 6 Months of Age and Older. June 29, 2022. https://www.cdc.gov/vaccines/covid-19/downloads/COVID-19-immunization-schedule-ages-6months-older.pdf

CDC At-A-Glance COVID-19 Vaccination Schedules. June 16, 2022. https://www.cdc.gov/vaccines/covid-19/downloads/COVID-19-vacc-schedule-at-a-glance-508.pdf

CDC Summary Document for Interim Clinical Considerations. June 23, 2022. https://www.cdc.gov/vaccines/covid-19/downloads/summary-interim-clinical-considerations.pdf

ACIP Interim Clinical Considerations Update: Moderna COVID-19 Vaccine for Children Ages 6−17. June 24, 2022. https://www.cdc.gov/vaccines/acip/meetings/downloads/slides-2022-06-22-23/07-COVID-Hall-508.pdf

CDC Pfizer-BioNTech COVID-19 Vaccine Products At-A-Glance. June 24, 2022. https://www.cdc.gov/vaccines/covid-19/info-by-product/pfizer/administration.html

REFERENCES

CDC Janssen COVID-19 Vaccine (Johnson & Johnson) Vaccine Preparation and Administration Summary. April 6, 2022. https://www.cdc.gov/vaccines/covid-19/info-by-product/janssen/downloads/Janssen-Prep-and-Admin-Summary.pdf

CDC Summary Document for Interim Clinical Considerations for Use of COVID-19 Vaccines Currently Authorized or Approved in the United States. June 23, 2022. https://www.cdc.gov/vaccines/covid-19/downloads/summary-interim-clinical-considerations.pdf

CDC Prevaccination Checklist for COVID-19 Vaccines Information for Healthcare Professionals. June 24, 2022. https://www.cdc.gov/vaccines/covid-19/downloads/pre-vaccination-guidelines.pdf

Moderna, Inc. Moderna Announces Omicron-Containing Bivalent Booster Candidate Mrna-1273.214 Demonstrates Superior Antibody Response Against Omicron. June 8, 2022. https://investors.modernatx.com/news/news-details/2022/Moderna-Announces-Omicron-Containing-Bivalent-Booster-Candidate-mRNA-1273.214-Demonstrates-Superior-Antibody-Response-Against-Omicron/default.aspx

Pfizer Inc. Pfizer and BioNTech Announce Omicron-Adapted COVID-19 Vaccine Candidates Demonstrate High Immune Response Against Omicron. June 25, 2022. https://www.pfizer.com/news/press-release/press-release-detail/pfizer-and-biontech-announce-omicron-adapted-covid-19

Gavi The Vaccine Alliance. How Next-Generation Covid-19 Vaccines Could Help To End The Pandemic. November 30, 2021. https://www.gavi.org/vaccineswork/how-next-generation-covid-19-vaccines-could-help-end-pandemic?gclid=CjwKCAjwiJqWBhBdEiwAtESPaImXxcfc0NkMqSCm4E6ErQjFR8J9JCdiNF3vZTRrSJtQe_S6Eka5jBoCGZ8QAvD_BwE

Gavi The Vaccine Alliance. The Covid-19 Vaccine Race. January 12,. 2022. https://www.gavi.org/vaccineswork/covid-19-vaccine-race?gclid=CjwKCAjwiJqWBhBdEiwAtESPaDHHz3yyZ7I3VcRu-EwIZYPa6Z3JaoxUplDJg-hMur7TaZZg5FjohRoCY3UQAvD_BwE

National Center for Immunization and Respiratory Diseases, Division of Bacterial Diseases. Get the Whooping Cough Vaccine During Each Pregnancy. June 10, 2021. https://www.cdc.gov/pertussis/pregnant/mom/get-vaccinated.html

Michigan Department of Health and Human Services – Division of Immunization. 2021-22 Seasonal Influenza Vaccine Dose Volumes for Children. August 31, 2021. https://www.michigan.gov/-/media/Project/Websites/mdhhs/Folder2/Folder46/Folder1/Folder146/Peds_Flu_Dosage.pdf?rev=7d02fd4eb16a46819d8369f224addb0b

CDC. Moderna COVID-19 Vaccine for Children who Transition from a Younger to Older Age Group. June 23, 2022. https://www.cdc.gov/vaccines/covid-19/downloads/Moderna-Child-Age-Transition-508.pdf

CDC. Pfizer COVID-19 Vaccine for Children who Transition from a Younger to Older Age Group. June 29, 2022. https://www.cdc.gov/vaccines/covid-19/downloads/Pfizer-Child-Age-Transition-508.pdf

REFERENCES

CDC. Covid-19 Vaccine Boosters. June 24, 2022. CDC Summary Document for Interim Clinical Considerations for Use of COVID-19 Vaccines Currently Authorized or Approved in the United States. June 23, 2022. https://www.cdc.gov/vaccines/covid-19/downloads/summary-interim-clinical-considerations.pdf

Novavax, Inc. U.S. FDA Grants Emergency Use Authorization for Novavax COVID-19 Vaccine, Adjuvanted for Individuals Aged 18 and Over. July 13, 2022. https://ir.novavax.com/2022-07-13-U-S-FDA-Grants-Emergency-Use-Authorization-for-Novavax-COVID-19-Vaccine,-Adjuvanted-for-Individuals-Aged-18-and-Over

Pharmacy Times. FDA Grants EUA to Novavax COVID-19 Vaccine for Individuals 18 Years of Age and Older. July 14, 2022. https://www.pharmacytimes.com/view/fda-grants-eua-to-novavax-covid-19-vaccine-for-individuals-18-years-of-age-and-older-

Sanofi. Press Release: Sanofi-GSK first to report a successful efficacy study against Omicron with COVID-19 Beta-containing vaccine. June 24, 2022. https://www.sanofi.com/en/media-room/press-releases/2022/2022-06-24-05-29-02-2468538

Sanofi. Sanofi and GSK to seek regulatory authorization for COVID-19 vaccine. February 23, 2022. https://www.sanofi.com/en/media-room/press-releases/2022/2022-02-23-10-15-00-2390091

South Dakota Department of Health. Immunization Program. Accessed July 17, 2022. https://doh.sd.gov/family/childhood/immunization/

South Dakota Legislature Administrative Rule 20:51:28:05. Accessed July 17, 2022. https://sdlegislature.gov/Rules/Administrative/10515

Medicare Interactive. Part D-Covered Vaccinations. Accessed July 18, 2022. https://www.medicareinteractive.org/get-answers/medicare-prescription-drug-coverage-part-d/medicare-part-d-costs/part-d-covered-vaccinations

MN Department of Health. Medicare Coverage of Immunizations. Accessed July 18, 2022. https://www.health.state.mn.us/people/immunize/hcp/uuav/medicareimm.html

CDC. National Center for Immunization and Respiratory Diseases. COVID-19 Vaccines While Pregnant or Breastfeeding. July 14, 2022. https://www.cdc.gov/coronavirus/2019-ncov/vaccines/recommendations/pregnancy.html

American College of Obstetricians and Gynecologists. ACOG and SMFM Recommend COVID-19 Vaccination for Pregnant Individuals. July 30, 2021. https://www.acog.org/news/news-releases/2021/07/acog-smfm-recommend-covid-19-vaccination-for-pregnant-individuals

Mayo Clinic. COVID-19 vaccines for kids: What you need to know. Accessed July 18, 2022. https://www.mayoclinic.org/diseases-conditions/coronavirus/in-depth/covid-19-vaccines-for-kids/art-20513332.

REFERENCES

CDC. Clinical Considerations for Use of Recombinant Zoster Vaccine (RZV, Shingrix) in Immunocompromised Adults Aged ≥19 Years. January 20, 2022. https://www.cdc.gov/shingles/vaccination/immunocompromised-adults.html

Pfizer. Prevnar 20 (Pneumococcal 20-valent Conjugate Vaccine), suspension for intramuscular injection [package insert]. https://www.fda.gov/media/149987/download. Revised June 2021. Accessed July 21, 2022.

Merck Sharp & Dohme Corp. Vaxneuvance (Pneumococcal 15-valent Conjugate Vaccine) [package insert]. https://www.fda.gov/media/150819/download. Accessed July 21, 2022.

CDC-National Center for Immunization and Respiratory Diseases. Current Epidemiology of Pneumococcal Disease, United States-2019 updates. https://www.cdc.gov/vaccines/acip/meetings/downloads/slides-2021-06/02-Pneumococcal-Gierke-508.pdf. Accessed July 21, 2022.

GSK. 26 July 2021. Shingrix approved in the US for prevention of shingles in immunocompromised adults. [press release]. https://www.gsk.com/en-gb/media/press-releases/shingrix-approved-in-the-us-for-prevention-of-shingles-in-immunocompromised-adults/.

Hippensteele A. FDA Approves Expansion of Shingrix for Prevention of Herpes Zoster in Immunocompromised Adults. July 26, 2021. https://www.pharmacytimes.com/view/fda-approves-expansion-of-shingrix-for-prevention-of-herpes-zoster-in-immunocompromised-adults.

US Pharmacist. Even Before COVID-19 Outbreak, U.S. Adult Vaccination Rates Remained Low. June 10, 2021. https://www.uspharmacist.com/article/even-before-covid19-outbreak-us-adult-vaccination-rates-remained-low?wc_mid=6220:660083&wc_rid=6220:14287303

Lu PJ, Hung MC, Srivastav A, et al. Surveillance of Vaccination Coverage Among Adult Populations -United States, 2018. MMWR Surveill Summ. 2021;70(3):1-26. Published 2021 May 14.

Immunization Action Coalition (IAC). Ask the Experts: Administering Vaccines. Updated February 19, 2021. https://www.immunize.org/askexperts/administering-vaccines.asp

CDC Guidelines for Vaccinating Pregnant Women. August 2016. https://www.cdc.gov/vaccines/pregnancy/hcp-toolkit/guidelines.html#18

American College of Obstetricians and Gynecologists. Maternal Immunization. June 2018. https://www.acog.org/clinical/clinical-guidance/committee-opinion/articles/2018/06/maternal-immunization

MotherToBaby. Vaccines. August 1, 2021. https://mothertobaby.org/fact-sheets/vaccines-pregnancy/

REFERENCES

HHS.gov http://www.hhs.gov/hepatitis/index.html Viral Hepatitis Accessed 6/21/22

CDC. Pneumococcal. www.cdc.gov/pneumoccocal/vaccination.html Accessed 7/7/2022

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

CDC. Pneumococcal Vaccine Timing for Adults-April 1, 2022 https://www.cdc.gov/vaccines/vpd/pneumo/downloads/pneumo-vaccine-timing.pdf accessed 7/07/2022

CDC. PneumoRecs VaxAdvisor Mobile App for Vaccine Providers https://www.cdc.gov/vaccines/vpd/pneumo/hcp/pneumoapp.html Accessed 7/7/202

Advisory Committee on Immunization Practices Recommended Immunization Schedule for Adults Aged 19 Years or Older — United States, 2022. MMWR Morb Mortal Wkly Rep 2022;71:229–233. DOI: http://dx.doi.org/10.15585/mmwr.mm7107a1

CDC. Human Papillomavirus (HPV) Vaccination: What Everyone Should Know https://www.cdc.gov/vaccines/vpd/hpv/public/index.html Accessed 7/14/2022

CDC. Human Papillomavirus (HPV) Vaccination Information for Clinicians. https ://www.cdc.gov/vaccines/vpd/hpv/hcp/index.html Accessed 7/14/2022

CDC. Human Papillomavirus (HPV) ACIP Vaccine Recommendations. https://www.cdc.gov/vaccines/hcp/acip-recs/vacc-specific/hpv.html Accessed 7/14/2022

AAP_factsheetHPVvaccine_2021 Printable Resources: HPV Vaccine is Important to Give to Children https://www.aap.org/en/patient-care/immunizations/human-papillomavirus-and-other-vaccines-recommended-for-adolescents/ Accessed 7/14/2022

Merck Vaccines.com. Gardasil9. https://www.merckvaccines.com/gardasil9/ Accessed 7/14/2022

REFERENCES

American Academy of Pediatrics. https://coronavirus.jhu.edu/vaccines/report/building-trust-in-vaccination. Accessed 7/19/22

Immunize.org. Ask the Experts: HPV. https://www.immunize.org/askexperts/experts_hpv.asp. Accessed 7/14/2022

Shixin (Cindy) Shen MD MPH CCFP Vinita Dubey MD MPH CCFP FRCPC. Addressing vaccine hesitancy Clinical guidance for primary care physicians working with parents Vol 65: MARCH | MARS 2019 | Canadian Family Physician

Vaccine Practice for Health Professionals: 1st Canadian Edition by Oona St-Amant; Jennifer Lapum; Vinita Dubey; Karen Beckermann; Che-Sheu Huang; Carly Weeks; Kate Leslie; and Kim Englis accessed 5/27/22 https://ecampusontario.pressbooks.pub/immunizations/chapter/license/

Lu PJ, Hung MC, Srivastav A, Williams WW, Dooling KL. Shingles Vaccination of U.S. Adults Aged 50-59 Years and ≥60 Years Before Recommendations for Use of Recombinant Zoster Vaccine. Am J Prev Med. 2020 Jul;59(1):21-31. doi: 10.1016/j.amepre.2020.01.017. Epub 2020 May 7. PMID: 32389533; PMCID: PMC9196997.

Merck Vaccines.com Vaccine Hesitancy. https://www.merckvaccines.com/vaccine-resources-tools/vaccine-hesitancy/reflective-listening/ Accessed 7/19/22

Opel DJ, Mangione-Smith R, Robinson JD, Heritage J, DeVere V, Salas HS, Zhou C, Taylor JA. The Influence of Provider Communication Behaviors on Parental Vaccine Acceptance and Visit Experience. Am J Public Health. 2015 Oct;105(10):1998-2004. doi: 10.2105/AJPH.2014.302425. Epub 2015 Mar 19. PMID: 25790386; PMCID: PMC4566548.

Stacy Wood, PhD; Kevin Schulman, MD When Vaccine Apathy, Not Hesitancy, Drives Vaccine Disinterest June 2, 2021 https://jamanetwork.com/journals/jama/fullarticle/2780792

Motivational Interviewing: The Basics, OARS (Adapted from handouts by David Rosengren and from Miller & Rollnick, Motivational Interviewing, 2nd Edition, 2002) Accessed 5/27/2022. https://iod.unh.edu/sites/default/files/motivational_interviewing_tips_for_working_with_youth-oars.pdf

Oduwole EO, Pienaar ED, Mahomed H, et al. Current tools available for investigating vaccine hesitancy: a scoping review protocol, BMJ Open 2019;9:e033245. doi: 10.1136/bmjopen-2019-033245

REFERENCES

Top-ten-ways-to-improve-immunization-rates.pdf https://hpvroundtable.org/wp-content/uploads/2022/04/top-ten-ways-to-improve-immunization-rates.pdf Accessed 7/20/22

Limaye R, Sauer M. Building Trust In Vaccination. Johns Hopkins University of Medicine. Accessed 7/20/22 https://coronavirus.jhu.edu/vaccines/report/building-trust-in-vaccination

Lan LM, Veettil SK, Donaldson D, et al. The impact of pharmacist involvement on immunization uptake and other outcomes: an updated systematic review and meta-analysis. J Am Pharm Assoc. Published online June 24, 2022. doi:10.1016/j.japh.2022.06.008

Motivational Interviewing Network of Trainers (MINT) https://motivationalinterviewing.org/understanding-motivational-interviewing Accessed 7/20/22

Miller, W.R., & Rollnick, S.; Motivational Interviewing: Preparing People for Change, 2nd Edition. New York: Guilford Press, 2002. https://www.ahrq.gov/evidencenow/tools/oars-model.html

Novavax EUA fact sheet, August 19, 2022. https://www.fda.gov/media/159897/download

ACIP Presentation Slides September 1-2, 2022. https://www.cdc.gov/vaccines/acip/meetings/slides-2022-09-01-02.html

Pfizer Bivalent Booster EUA, August 31, 2022. https://www.fda.gov/media/161327/download

Moderna Bivalent Booster EUA, August 31, 2022. https://eua.modernatx.com/covid19vaccine-eua/bivalent-dose-HCP.pdf

CDC Monkeypox, August 24, 2022. https://www.cdc.gov/poxvirus/monkeypox/index.html

ACAM2000 Package Insert 3/18. https://www.fda.gov/files/vaccines%2C%20blood%20%26%20biologics/published/Package-Insert---ACAM2000.pdf

Jynneos Package Insert 4/22, https://www.fda.gov/media/131078/download

QUESTIONS?