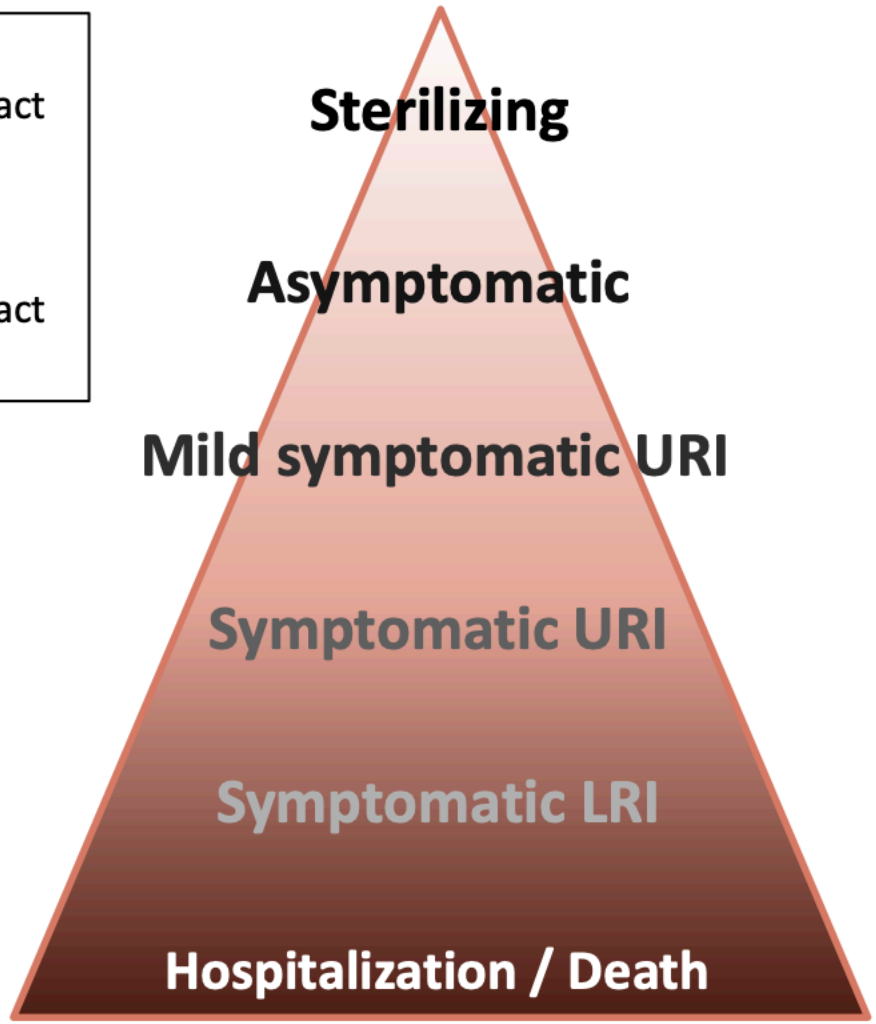
Boosters and Flu

Immunity is a gradient

URI – upper respiratory tract infection

LRI – lower respiratory tract infection

Levels of immunity



Contributors

- Antibody levels
- Antibody isotypes
- Antibody functionality (neutralizing / epitopes / affinity)
- Antibody location
- Number and specificity T cells
- T cell ratios

Current age-specific VE estimates for hospitalization

	VE for hospitalization				
Age Group	COVID-NET, April – August 2021[1]	Scobie *et al.*, June – July 2021[2]	VISION, June – August 2021[3]	IVY Network, July – August 2021[4]	Average VE for base case
18 – 29 years	94.7%	93%	85%	90%	90.7%
30 – 49 years	95.6%	93%	82%		90.2%
50 – 64 years	95.5%	91%	84%	94%	91.1%
≥65 years	95.2%	87%	73%	85%	85.1%

VE = vaccine effectiveness;

[1]https://www.medrxiv.org/content/10.1101/2021.08.27.21262356v1

[2]https://www.cdc.gov/mmwr/volumes/70/wr/mm7037e1.htm?s_cid=mm7037e1_w

[3]https://www.cdc.gov/mmwr/volumes/70/wr/mm7037e2.htm. Using Pfizer specific estimate.

[4]https://www.cdc.gov/mmwr/volumes/70/wr/mm7034e2.htm

Reporting rates of myocarditis following Pfizer-BioNTech vaccination (per million doses administered) by age and dose number, 7-day risk period[1]

	All		Males		Females	
Age group	Dose 1	Dose 2	Dose 1	Dose 2	Dose 1	Dose 2
18-29 years old	1.1	12.9	2.1	24.1	0.2	2.0
30-49 years old	0.6	3.1	0.9	5.6	0.4	1.4
50-64 years old	0.2	0.5	0.2	0.5	0.3	0.8
≥65 years old	0.2	0.3	0.2	0.4	0.2	0.4

[1]Data as of August 18, 2021. https://www.cdc.gov/vaccines/acip/meetings/downloads/slides-2021-08-30/03-COVID-Su-508.pdf

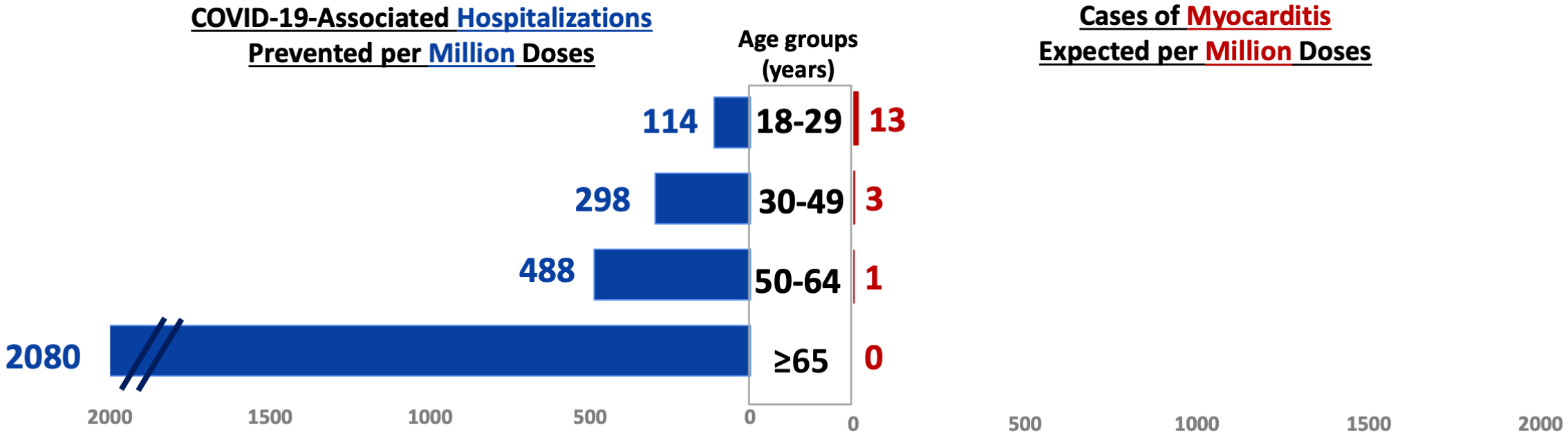
Benefits and risks after Pfizer-BioNTech COVID-19 booster dose

For every million doses of vaccine given

Scenario:

- VE for hospitalization averaged from four platforms
- Boost to 95% VE for hospitalization
- Myocarditis risk equivalent to after 2nd dose

Age Group	VE for hospitalization
18 – 29 years	90.7%
30 – 49 years	90.2%
50 – 64 years	91.1%
≥65 years	85.1%



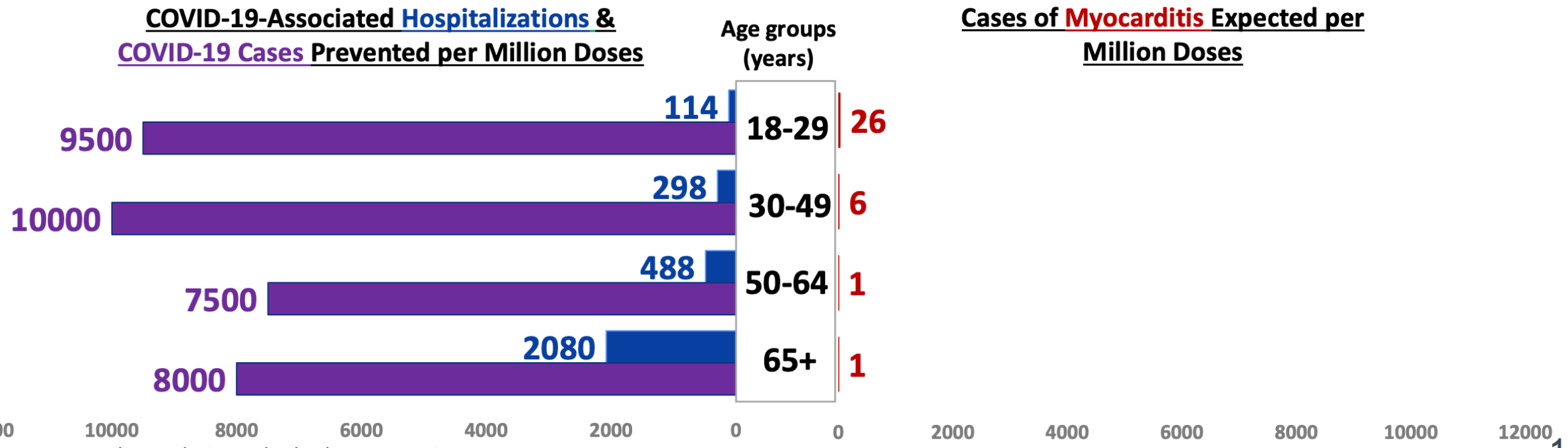
Benefits and risks after Pfizer-BioNTech COVID-19 booster

For every million doses of vaccine given

Scenario:

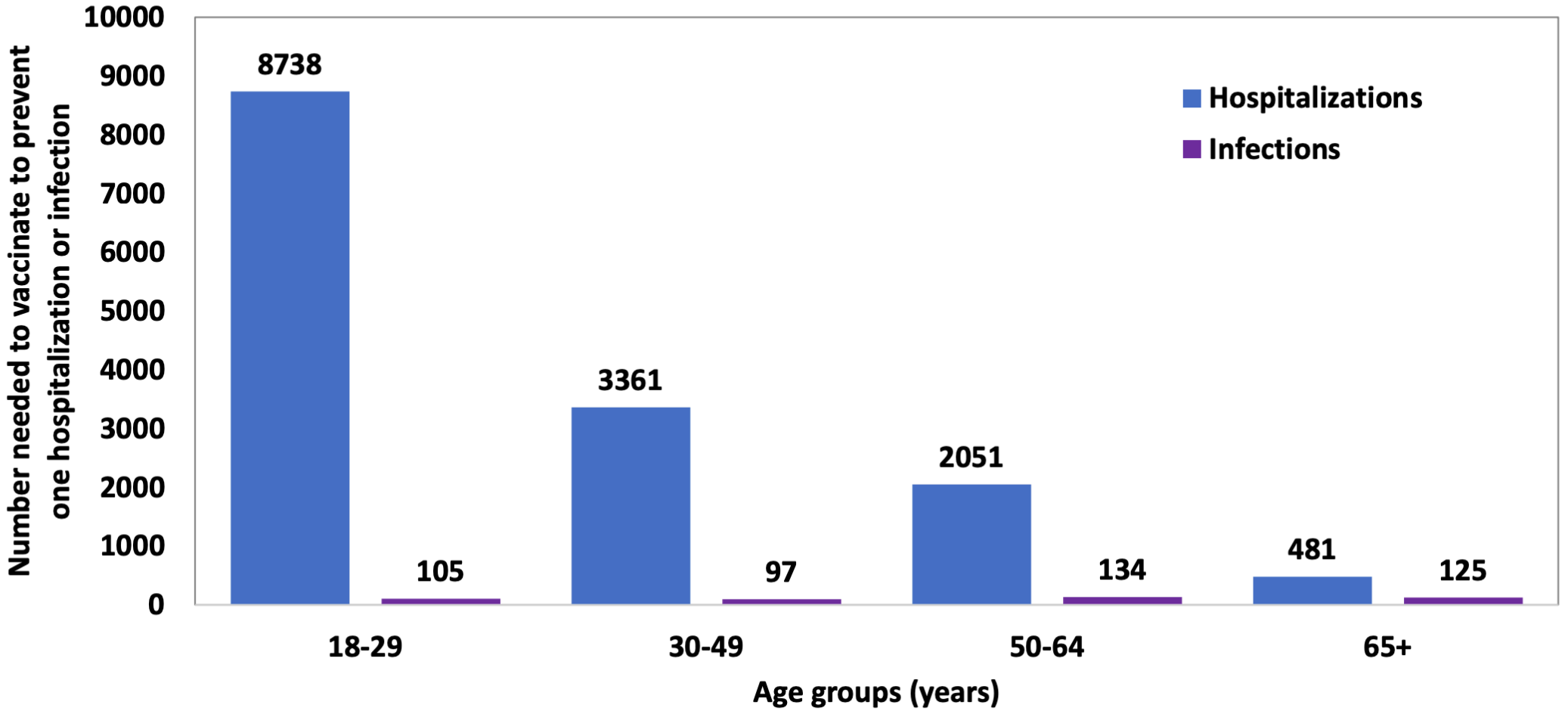
- VE for hospitalization averaged from four platforms
- **VE for infection estimates from Scobie *et al.*[1]**
- Boost to 95% VE for hospitalization, **90% VE for infection**
- Myocarditis risk equivalent to **2x risk of 2nd dose**

Age Group	VE for hospitalization	VE for infection
18 – 29 years	**90.9%**	**78%**
30 – 49 years	**90.2%**	**78%**
50 – 64 years	**90.2%**	**80%**
≥65 years	**85.1%**	**78%**

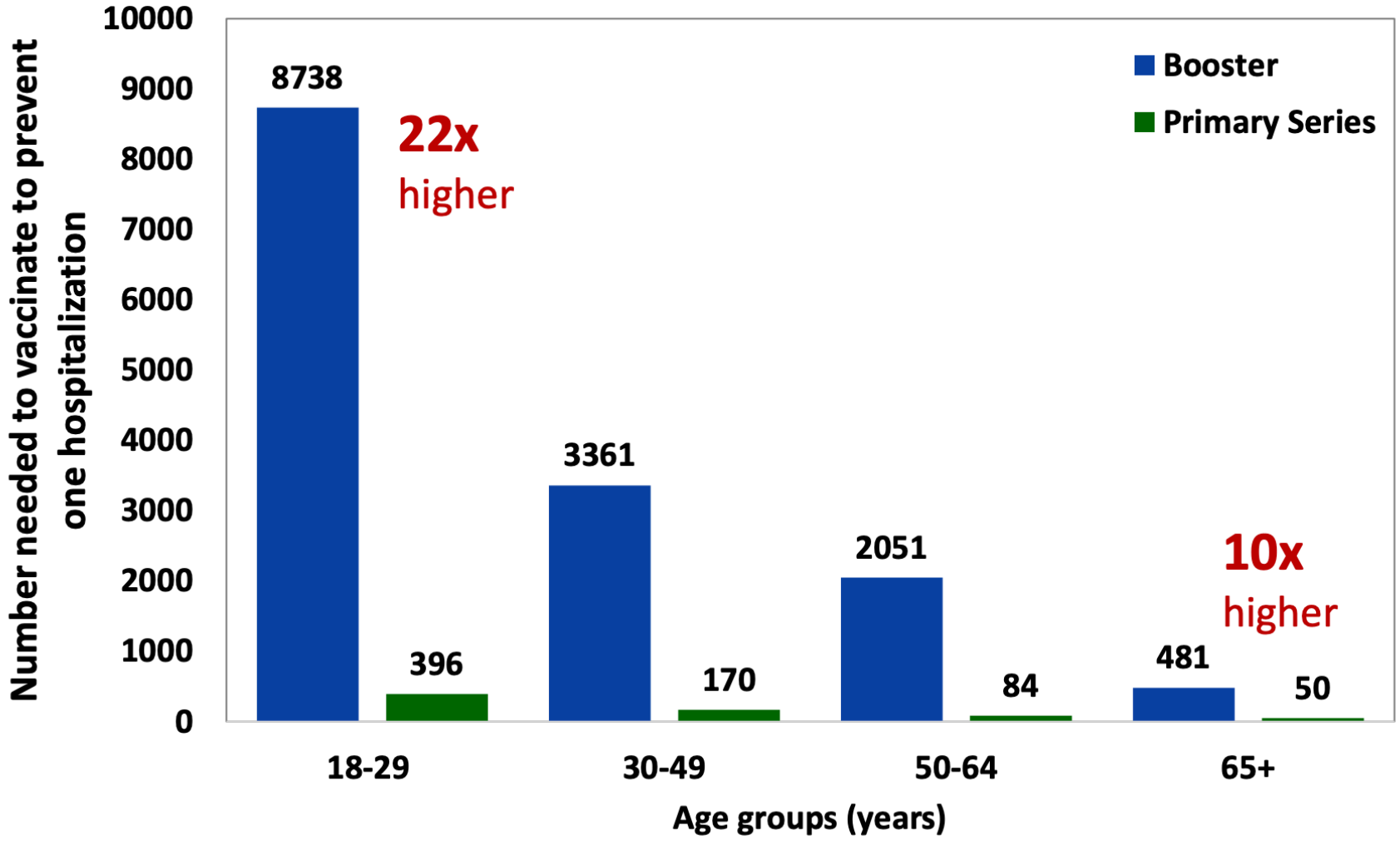


[1]https://www.cdc.gov/mmwr/volumes/70/wr/mm7037e1.htm?s_cid=mm7037e1_w.

Number needed to vaccinate with booster dose to prevent one hospitalization or infection over 6 months



Number needed to vaccinate to prevent one hospitalization over 6 months, booster versus primary series



CDC Recommendations – Who **should** get a Booster?

At least 6 months after Pfizer primary series

- People 65 years and older
- Residents in long-term care settings
- People aged 50 to 64 with certain underlying medical conditions

  -Cancer
  -Chronic Kidney Condition, Chronic Lung Disease, Chronic Heart Disease
  -Dementia and other neurological conditions
  -Diabetes
  -Downs Syndrome
  -Heart Conditions
  -HIV
  -Substance Use
  -Immunocompromised status
  -Sickle Cell
  -Solid Organ Transplant
  -Overweight or obese

CDC Recommendation—Who **may** get a booster

At least 6 months after Pfizer primary series

- People 18 to 49 who are at high risk for severe COVID-19 due to certain underlying medical conditions
- People aged 18-64 years who are at increased risk for COVID-19 exposure and transmission because of occupational or institutional settings, based on their individual benefits and risks
  - The Western Workgroup strongly endorses CDC's recognition that long-standing systemic health and social inequities have increased the risk of severe illness from COVID-19. The Workgroup therefore recommends that social determinants of vulnerability be included in the assessment of conditions that qualify individuals for booster doses.

Where to Get Vaccinated

- VaccinateLACounty.com. VacunateLosAngeles.com
- Call your local pharmacy or health care provider
- Bring your vaccination card (verify 2 doses of Pfizer vaccine give >6 months prior)
- Booster is free
- Similar side effects as with 2 dose primary series Fatigue and pain at the injection site were the most commonly reported side effects, and overall, most side effects were mild to moderate. However, serious side effects are rare
- Consider getting booster and flu vaccination together

COVID-19 Vaccine – Additional Doses and Booster Doses
Self-Attestation of eligibility

See next page for attestation for booster doses for people who have received 2 doses of Pfizer vaccine.

PEOPLE WHO HAVE A MODERATELY TO SEVERELY WEAKENED IMMUNE SYSTEM WHO HAVE ALREADY RECEIVED 2 DOSES OF PFIZER OR MODERNA VACCINE

If you meet the criteria outlined by the CDC, it is recommended that you get a 3rd dose of an mRNA (Pfizer or Moderna) vaccine at least 28 days after your 2nd dose of vaccine. When possible, you should receive the same vaccine. For example, if you got a series of Pfizer vaccine, try to get a Pfizer vaccine for your 3rd dose.

Talk to your doctor about the need to get an additional dose of COVID-19 vaccine. If you need a 3rd dose, ask about the best timing based on your current treatment plan. This is especially important if you are about to start or restart immunosuppressive treatment.

☐ **I attest that I am immunocompromised and am eligible for a third dose of vaccine based on the criteria below.**

- I received a second dose of Moderna or Pfizer vaccine at least 28 days ago, AND
- I am:
  - Receiving active cancer treatment for tumors or cancers of the blood, OR
  - Received an organ transplant and am taking medicine to suppress my immune system, OR
  - Received a stem cell transplant within the last 2 years or am taking medicine to suppress the immune system, OR
  - Moderate or severe primary immunodeficiency (such as DiGeorge syndrome, Wiskott-Aldrich syndrome), OR
  - Advanced or untreated HIV infection, OR
  - Active treatment with high-dose corticosteroids or other drugs that suppress my immune response

Signature: _____

Name: _____ **Date:** _____

It is important to continue to protect yourself after you get a 3rd dose of vaccine. This includes wearing a well-fitting mask, maintaining physical distance, avoiding crowded places or spaces with poor air flow, and washing hands often. Consider "double masking" (wearing a cloth face mask over surgical mask) or an N95 respirator for a higher level of protection.

For more information, see the Moderna or Pfizer Fact Sheets for Recipients and Caregivers and the CDC webpage COVID-19 Vaccines for Moderately to Severely Immunocompromised People.

See previous page for attestation for additional dose for people who are immunocompromised.

PEOPLE WHO ARE ELIGIBLE FOR A BOOSTER DOSE OF PFIZER VACCINE

☐ **I attest that I am eligible for a booster dose of vaccine based on the criteria below.**

- I received a second dose of Pfizer COVID-19 vaccine at least 6 months ago, AND
  - I am age 65 years or older, OR
  - I live in a long-term care setting, OR
  - I am age 18-64 and am at increased risk for COVID-19 exposure and transmission because of my work or institutional setting, OR
  - I am age 18-64 and I have one of the following underlying medical conditions:
    - Cancer
    - Chronic kidney disease
    - Chronic lung disease, including COPD (chronic obstructive pulmonary disease), asthma (moderate-to-severe), interstitial lung disease, cystic fibrosis, and pulmonary hypertension
    - Dementia or other neurological conditions
    - Diabetes (type 1 or type 2)
    - Down syndrome
    - Heart conditions (such as heart failure, coronary artery disease, cardiomyopathies or hypertension)
    - HIV infection
    - Immunocompromised state (weakened immune system)
    - Liver disease
    - Overweight or obesity (body mass index (BMI) over 25 kg/m2
    - Pregnant and recently pregnant (for at least 42 days following end of pregnancy)
    - Sickle cell disease or thalassemia
    - Smoker, current or former
    - Solid organ or blood stem cell transplant
    - Stroke or cerebrovascular disease, which affects blood flow to the brain
    - Substance use disorder

Signature: _____

Name: _____ **Date:** _____

If you have a condition that is not listed or have questions about the risks and benefits of booster dose, talk with your doctor. For more information, see the Pfizer Fact Sheet for Recipients and Caregivers and the CDC webpage Vaccines for COVID-19.

If you do not have access to a printer, you can write the attestation by hand.

COVID19 Boosters are Approved

- Booster recommendations refer only to those who got vaccinated with Pfizer.
- Third dose- refers to people who are immuno-compromised and may not have achieved a strong level of protection with 2 doses
  - 3rd doses will be give 28 days after 2nd dose
- Booster dose refers to those who completed their initial doses and are getting a “boost” because the protection is waning.
- Recommendations for Moderna and J&J are coming.

1. Currently no shortage of vaccine
2. Many pharmacies and doctors can provide booster

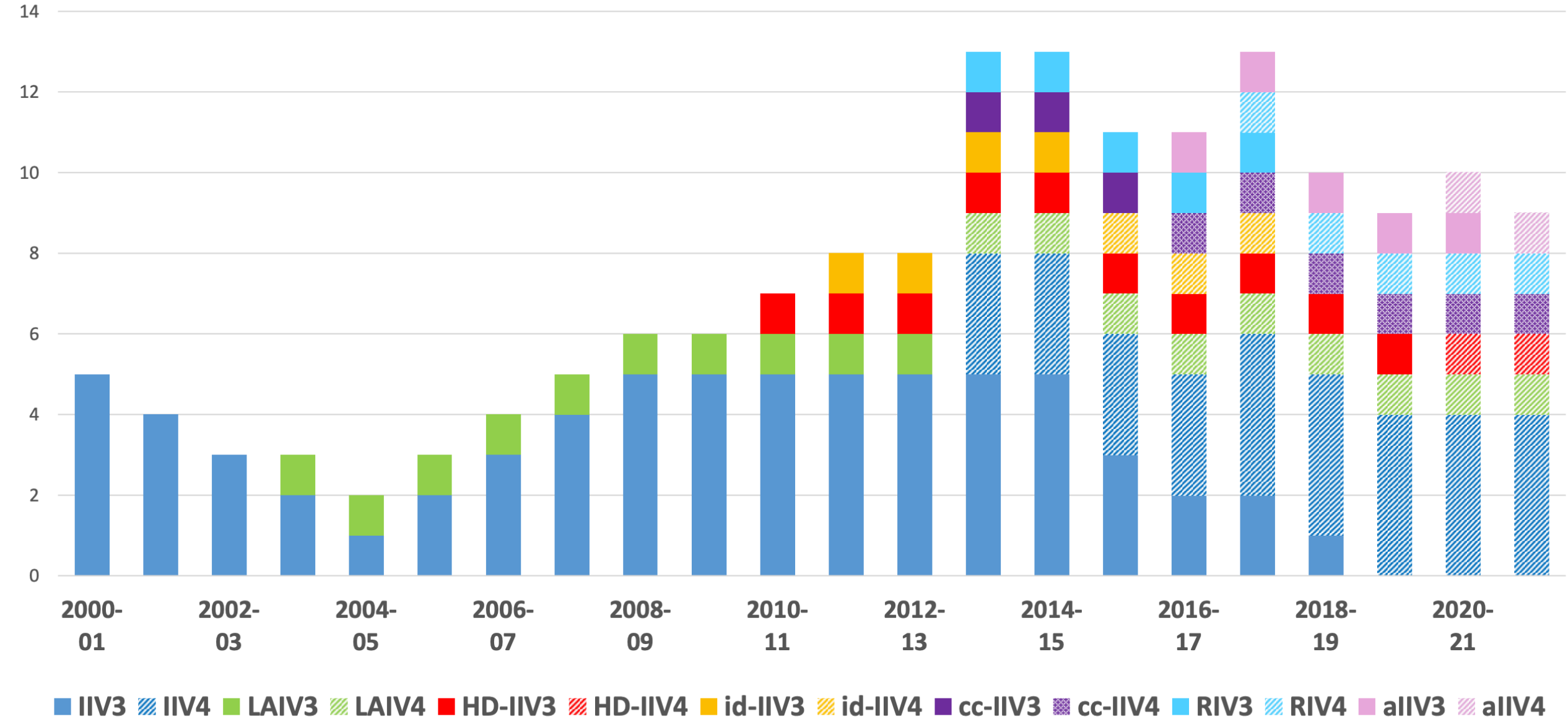
Resources

- CDC: https://www.cdc.gov/coronavirus/2019-ncov/vaccines/booster-shot.html
- Booster toolkit: https://publichealthcollaborative.org/resources/resource-covid-19-booster-dose-messaging-and-outreach-tools/
- Fatigue and pain at the injection site were the most commonly reported side effects, and overall, most side effects were mild to moderate. However, as with the 2-shot primary series, serious side effects are rare
- Information always chainging - Stay updated at VaccinateLACounty.com

Flu vaccines

U.S. Seasonal Influenza Vaccines Since 2000-2001

Number of unique products available by season



Influenza Vaccines Expected to be Available by Age Indication, United States, 2021–22 Influenza Season

Vaccine type		0 through 6 months	6 through 23 months	2 through 17 years	18 through 49 years	50 through 64 years	≥65 years
IIV4s	Standard-dose, unadjuvanted inactivated (IIV4)		Afluria Quadrivalent Fluarix Quadrivalent FluLaval Quadrivalent Fluzone Quadrivalent				
	Cell culture-based inactivated (ccIIV4)			Flucelvax Quadrivalent			
	Adjuvanted inactivated (aIIV4)						Fluad Quadrivalent
	High-dose inactivated (HD-IIV4)						Fluzone High-Dose Quadrivalent
RIV4	Recombinant (RIV4)				Flublok Quadrivalent		
LAIV4	Live attenuated (LAIV4)			FluMist Quadrivalent			

IIV4=quadrivalent inactivated influenza vaccine **RIV4**=quadrivalent recombinant influenza vaccine **LAIV4**=quadrivalent live attenuated influenza vaccine

Not approved for age group *Egg-based* *Not egg-based*

All vaccines expected for 2021-22 are quadrivalent (i.e., contain hemagglutinin derived from four viruses: one influenza A(H1N1), one influenza A(H3N2), one influenza B/Victoria and one influenza B/Yamagata.

Influenza Vaccine Types—2021-22 U.S. Season

Intramuscular Vaccines

Inactivated Influenza Vaccines (IIV4s)

- Contain inactivated virus (split or subunit)
- Most are egg-based (one is cell culture-based—ccIIV4)
- Most contain 15 mcg of hemagglutinin per virus (one contains 60 mcg per virus—HD-IIV4)
- Most are unadjuvanted (one contains the adjuvant MF59—aIIV4)

Recombinant influenza vaccine (RIV4)

- No viruses used in production
- 45 mcg HA per virus
- Contains HA made through recombinant methods

Intranasal Vaccine

Live attenuated influenza vaccine (LAIV4)

- Egg-based
- Contains live, attenuated influenza viruses which must replicate in the nasopharynx in order to promote an immune response
  - Attenuated—to not cause clinical illness
  - Cold adapted—grow best at 25°C
  - Temperature sensitive—growth restricted at 37°-39°C
- For ages 2 through 49 years

Vaccination of Specific Populations—Egg Allergy

- Most influenza vaccines (except for ccIIV4 and RIV4) contain viruses that have been propagated in eggs and might contain trace amounts of egg protein.
- History of severe allergic reaction to vaccine components (including egg, if applicable, is a labeled contraindication in packaged inserts for egg-based vaccines.
- However, ACIP recommends that all persons with egg allergy receive influenza vaccine.
  - Those with a history of severe allergic reaction to egg (any symptom other than hives) should be vaccinated in a medical setting, supervised by a provider who can recognize and manage a severe allergic reaction, if a vaccine other than ccIIV4 or RIV4 is used.

Timing and Spacing of Vaccine Doses: Guidance with COVID-19 Vaccines

- COVID-19 vaccines and other vaccines **may be administered without regard to timing**
  - It is not known if the reactogenicity of COVID-19 vaccines is increased with coadministration, including with vaccines known to be more reactogenic, such as adjuvanted vaccines or live vaccines.
- Coadministration considerations
  - Patient is behind or at risk of becoming behind on recommended vaccines
  - Patient's risk of vaccine-preventable disease (e.g., during an outbreak or occupational exposure)
  - Reactogenicity profile of the vaccines
- Extensive experience with non-COVID-19 vaccines indicates immunogenicity and adverse event profiles are generally similar when vaccines are administered simultaneously as when they are administered alone.

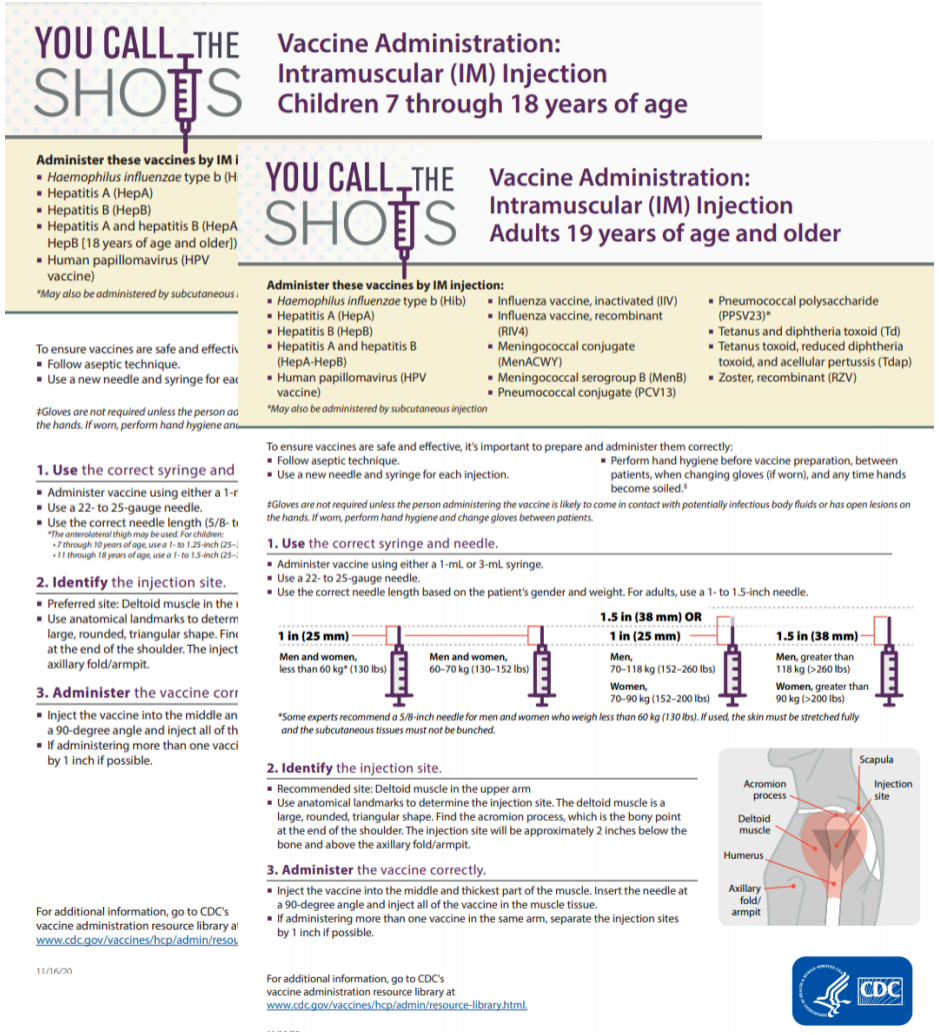
Interim Clinical Considerations for Use of COVID-19 Vaccines | CDC

Timing and Spacing of Vaccine Doses: Guidance with COVID-19 Vaccines

- Label each syringe.
- Separate injection sites by 1 inch or more, if possible.
- There are no requirements which vaccine is administered first.
- Administer the COVID-19 vaccine and vaccines that may be more likely to cause a local reaction in different limbs, if possible.

[Immunization Administration Resources | CDC]

[Interim Clinical Considerations for Use of COVID-19 Vaccines | CDC]



YOU CALL THE SHOTS

Vaccine Administration:
Intramuscular (IM) Injection
Children 7 through 18 years of age

Administer these vaccines by IM i
- *Haemophilus influenzae* type b (H
- Hepatitis A (HepA)
- Hepatitis B (HepB)
- Hepatitis A and hepatitis B (HepA HepB [18 years of age and older])
- Human papillomavirus (HPV vaccine)

*May also be administered by subcutaneous

To ensure vaccines are safe and effecti
- Follow aseptic technique.
- Use a new needle and syringe for ea

‡Gloves are not required unless the person ad the hands. If worn, perform hand hygiene and

1. Use the correct syringe and
- Administer vaccine using either a 1-r
- Use a 22- to 25-gauge needle.
- Use the correct needle length (5/8- t

*The anterolateral thigh may be used. For children:
- 7 through 10 years of age, use a 1- to 1.25-inch (25–
- 11 through 18 years of age, use a 1- to 1.5-inch (25–

2. Identify the injection site.
- Preferred site: Deltoid muscle in the
- Use anatomical landmarks to determ large, rounded, triangular shape. Fin at the end of the shoulder. The inject axillary fold/armpit.

3. Administer the vaccine corr
- Inject the vaccine into the middle an a 90-degree angle and inject all of th
- If administering more than one vacci by 1 inch if possible.

For additional information, go to CDC's vaccine administration resource library a www.cdc.gov/vaccines/hcp/admin/resou

11/16/20

YOU CALL THE SHOTS

Vaccine Administration:
Intramuscular (IM) Injection
Adults 19 years of age and older

Administer these vaccines by IM injection:
- *Haemophilus influenzae* type b (Hib)
- Hepatitis A (HepA)
- Hepatitis B (HepB)
- Hepatitis A and hepatitis B (HepA-HepB)
- Human papillomavirus (HPV vaccine)
- Influenza vaccine, inactivated (IIV)
- Influenza vaccine, recombinant (RIV4)
- Meningococcal conjugate (MenACWY)
- Meningococcal serogroup B (MenB)
- Pneumococcal conjugate (PCV13)
- Pneumococcal polysaccharide (PPSV23)*
- Tetanus and diphtheria toxoid (Td)
- Tetanus toxoid, reduced diphtheria toxoid, and acellular pertussis (Tdap)
- Zoster, recombinant (RZV)

*May also be administered by subcutaneous injection

To ensure vaccines are safe and effective, it's important to prepare and administer them correctly:
- Follow aseptic technique.
- Use a new needle and syringe for each injection.
- Perform hand hygiene before vaccine preparation, between patients, when changing gloves (if worn), and any time hands become soiled.‡

‡Gloves are not required unless the person administering the vaccine is likely to come in contact with potentially infectious body fluids or has open lesions on the hands. If worn, perform hand hygiene and change gloves between patients.

1. Use the correct syringe and needle.
- Administer vaccine using either a 1-mL or 3-mL syringe.
- Use a 22- to 25-gauge needle.
- Use the correct needle length based on the patient's gender and weight. For adults, use a 1- to 1.5-inch needle.

1 in (25 mm) — Men and women, less than 60 kg* (130 lbs)
1 in (25 mm) — Men and women, 60–70 kg (130–152 lbs)
1.5 in (38 mm) OR 1 in (25 mm) — Men, 70–118 kg (152–260 lbs); Women, 70–90 kg (152–200 lbs)
1.5 in (38 mm) — Men, greater than 118 kg (>260 lbs); Women, greater than 90 kg (>200 lbs)

*Some experts recommend a 5/8-inch needle for men and women who weigh less than 60 kg (130 lbs). If used, the skin must be stretched fully and the subcutaneous tissues must not be bunched.

2. Identify the injection site.
- Recommended site: Deltoid muscle in the upper arm
- Use anatomical landmarks to determine the injection site. The deltoid muscle is a large, rounded, triangular shape. Find the acromion process, which is the bony point at the end of the shoulder. The injection site will be approximately 2 inches below the bone and above the axillary fold/armpit.

3. Administer the vaccine correctly.
- Inject the vaccine into the middle and thickest part of the muscle. Insert the needle at a 90-degree angle and inject all of the vaccine in the muscle tissue.
- If administering more than one vaccine in the same arm, separate the injection sites by 1 inch if possible.

For additional information, go to CDC's vaccine administration resource library at www.cdc.gov/vaccines/hcp/admin/resource-library.html.

CDC