

Maximizing COVID-19 Vaccine Doses

Practice recommendations for vaccine withdrawal and administration technique

This resource provides recommendations from the field for preparing COVID-19 vaccines for withdrawal and administration to minimize variability in the number of doses obtained from COVID-19 vaccine vials. While it is important to follow these best practices to maximize COVID-19 vaccine doses, [CDC guidance](#) states that **vaccinators should not miss an opportunity to vaccinate eligible persons when they are ready to get vaccinated—even if it is not possible to use all doses in a vial.**

Quick Links

- USP's [COVID-19 Vaccine Storage and Handling Toolkit](#)

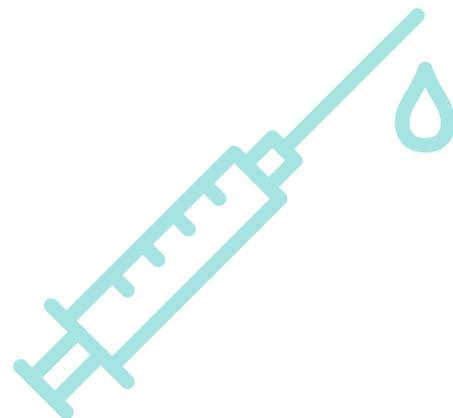
Proper preparation and handling for each respective COVID-19 vaccine

- [Pfizer-BioNTech](#): Each vial of vaccine must be diluted with 1.8 mL of 0.9% Sodium Chloride Injection, USP, using a 21-gauge or narrower transfer syringe. After dilution, each dose should be a final volume of 0.3 mL.
- [Moderna](#): Vials should not be diluted. Each dose should be a final volume of 0.5 mL. Swirl vial gently between withdrawing each dose.
- [Janssen](#): Vials should not be diluted. Each dose should be a final volume of 0.5 mL. Swirl vial gently between withdrawing each dose.
- It is not necessary to change needles between withdrawing vaccine from a vial and administering it to a patient.
- Refer to the “COVID-19 Vaccine Summary Chart” in APhA's [COVID-19 Resources: Know the Facts](#) library.



Syringe and needle factors that impact the number of doses obtained from each vial

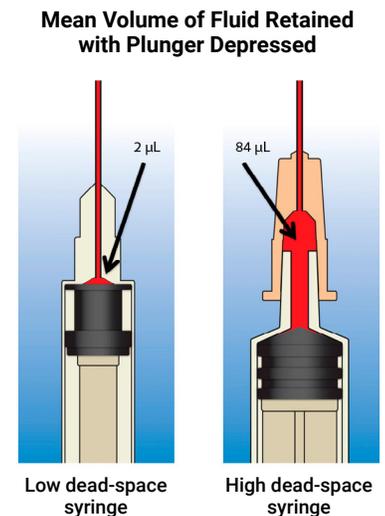
- The maximum number of doses, per the emergency use authorization (EUA), in each vial is as follows:
 - Pfizer-BioNTech COVID-19 Vaccine: 6 doses
 - Moderna COVID-19 Vaccine:
 - 11-dose vial (range: 10–11 doses)
 - 15-dose vial (range: 13–15 doses)
 - Janssen (J&J) COVID-19 Vaccine: 5 doses



Maximizing COVID-19 Vaccine Doses (continued)

Practice recommendations for vaccine withdrawal and administration technique

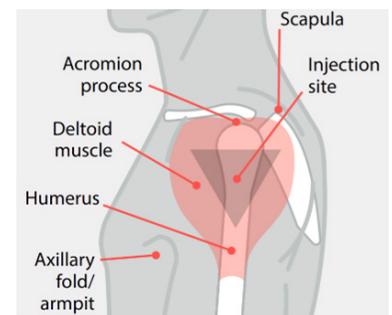
- Consider the following to maximize the number of doses obtained from each vial:
 - If appropriate, use 1-inch needles, 23 gauge or narrower.** [Needle selection](#) depends on patient age and weight. Be sure to administer the vaccine using the appropriate needle size for an intramuscular injection to the patient.
 - Use the smallest syringe size possible for accuracy in measuring dose.** Syringe selections will range from 1 mL–3 mL.
 - Use low dead-volume syringe/needles, when available, for the Pfizer-BioNTech vaccine and the Moderna 15-dose vial.** Dead volume refers to the space that exists between the syringe hub and needle, and the suspension that remains in this space does not get injected. If standard syringes and needles are used, there may not be sufficient volume to extract the maximum number of doses from a single vial, regardless of the type of syringe or needle. For more information about dead space, watch APhA’s 15 on COVID-19 CPE video, [“Understanding Dead Space.”](#)
 - Be sure to draw full doses of vaccine, and do not mix remaining vaccine from multiple vials.**
 - Do not use Tb or insulin syringes.** These needles are too short for intramuscular injection, and the syringe calibration may be in units versus mL.



[Pictured here](#) is the dead space with the volume of fluid retained.

Review intramuscular (I.M.) injection technique

- Pfizer-BioNTech, Moderna, and Janssen vaccines are administered I.M. to the deltoid muscle. Review proper technique for [adults](#) and [children](#).
- When used as directed by the manufacturer instructions, retractable needle syringes minimize the risk of accidental needle sticks. The recommended method for retractable needle activation is while the needle is in the patient’s arm. No dose is lost if the needle is retracted inside or outside of the patient’s arm.



[Pictured here](#) is the injection site for an adult patient.

Skills and technique assessment

- Conduct staff skills and technique [assessment](#) to ensure accurate technique is applied. This includes preparation of vaccine, identification of injection site, administration at the same level as the patient at a 90-degree angle, and disposal of sharps.



Maximizing COVID-19 Vaccine Doses (continued)

Practice recommendations for vaccine withdrawal and administration technique

Lessons learned and tips from frontline pharmacists administering COVID-19 vaccines

- Upon arrival of kits, inspect for complete contents and integrity of supplies. Have pharmacy replacement stock ready if needed.
- Ensure needles are securely attached to the syringe barrel prior to drawing up any solutions.
- When reconstituting the Pfizer-BioNTech vaccine, ensure removal of 1.8 mL of air from the vaccine vial with diluent syringe to equalize pressure in the vaccine vial and decrease risk of loss due to pressure change.
- Encourage second-check practices for volume and product accuracy prior to administration.
- When preparing vaccine indoors then taking outdoors for administration, recognize that temperature change from warm to cold poses a chance for vaccine to leak from needle/syringe into cap. Follow vaccine manufacturer guidance for temperature excursions and storage.
- Prefilling of syringes should be limited, as vaccine stability in syringes has not been thoroughly evaluated. Vaccine should be administered in a timely manner.
- Ensure the full standard vaccine volume is administered for a single dose. Avoid dividing doses into smaller volumes. If less than a full recommended dose of a vaccine is administered because of syringe, applicator, or needle leakage, the dose should be [repeated](#).



Disclaimer: The information in this document is provided only for general informational purposes and does not constitute business or legal advice. Information related to the COVID-19 pandemic is changing rapidly and continuously. The material and information contained in this publication is believed to be current as of the date included on this document. The American Pharmacists Association assumes no responsibility for the accuracy, timeliness, errors, or omission contained herein. Links to any sources do not constitute any endorsement of, validity, or warranty of the information contained on any site. The user of these materials should not under any circumstances solely rely on, or act based on this publication. Pharmacy professionals retain the responsibility for using their own professional judgment and practicing in accordance with all rules, regulations, and laws governing the pharmacy practice within their jurisdiction.