

## Technician Tutorial: The Basics of Immunization and Vaccines

Vaccines are considered one of the most important contributions to public health. Since the introduction of vaccines many years ago, very dangerous and deadly diseases such as polio and smallpox have been virtually eliminated in most countries.

The basic concept of a vaccine is fairly simple. Vaccines introduce a very small amount of a substance, such as a killed or weakened bacteria or virus, into the body. These aren't strong enough to actually cause infection in healthy recipients of vaccines, although it's a popular myth that they can. In response to the vaccine, the body builds up bacteria- or virus-fighting antibodies against that particular bacteria or virus. This is protective, so that an individual who receives a vaccine will be immune to the specific infection. Most vaccines are protective in at least 80% of individuals who receive them.

Despite the protective benefits of vaccines, many individuals are not properly immunized. This leaves them susceptible to vaccine-preventable infections, and also increases the risk for outbreaks in the community. In the U.S. and Canada, pharmacists are eligible to immunize patients by administering vaccines. Requirements for administering vaccines vary by state or province/territory. For example, some states allow pharmacy technicians with special training to support the pharmacist by administering vaccines. And during the COVID-19 pandemic, new federal guidance in the U.S. authorized qualified pharmacy technicians in ALL states to administer childhood vaccines to kids ages 3 to 18, and COVID-19 vaccines to patients ages 3 years and older.

It's important for pharmacy technicians to understand the ins and outs of immunization, and to have the knowledge and skills to help provide this important service to patients.

*Patricia Cake is a 37-year-old daycare provider. It's mid-September, and she's in the pharmacy today asking to get a flu shot. She mentions that she can't risk getting the flu and passing it on to "her babies." Patti is a regular patient, so you ask her if she has any updates such as new drug or food allergies or new medical problems. She says, "No changes at all, except I have been taking a fish oil supplement to help my eyes." You note this new supplement on her patient profile.*

### ***How can I help support vaccine administration?***

You're in a prime position to **help identify patients** who may need vaccines. This is an important function because, as mentioned, many patients aren't current with their immunizations. Consider strategies you can use to identify patients eligible for vaccines. For example, you can double-check with patients to find out whether they've had a flu vaccine once it becomes available in late summer/early fall. You can look at a patient's age to help determine if they're eligible for vaccines such as shingles (*Shingrix*) or pneumococcal (*Pneumovax 13, Pneumovax 23*). Plus, you can document immunizations when updating a patient's profile or taking a medication history, to help the pharmacist determine any needed vaccines. You can also access vaccine screening tools online, such as <https://www2.cdc.gov/nip/adultimmsched/> (U.S.) or <https://www.canimmunize.ca/en/pei-assessment-tool> (Canada), to help. These screening tools are based off of vaccine schedules, which are recommendations that specify which vaccines an individual should receive and when. Vaccine schedules are published and updated annually by the Advisory Committee on Immunization Practices (ACIP) in the U.S. (available at <https://www.cdc.gov/vaccines/schedules/>). In Canada, the National Advisory Committee on Immunization (NACI) makes recommendations for the use of vaccines, but provinces and territories create their own immunization schedules for their regions (more information can be found at <https://www.canada.ca/en/public-health/services/provincial-territorial-immunization-information.html>). You can help support your pharmacist by making sure you have the most current immunization schedule printed out or saved as a bookmark on your pharmacy computer.

Another tool that might help with screening patients for needed vaccines is an immunization registry or Immunization Information System (IIS). These consolidate vaccine records from multiple providers, to give a more complete picture of a patient's vaccine history, in addition to other features, such as patient-specific vaccine recommendations. These systems vary by state or province/territory, including rules on who can access them and what must be reported. For example, in the U.S., COVID-19 vaccines being administered under FDA's Emergency Use Authorization **must** be reported to your state/local jurisdiction's IIS as soon as possible and no later than 72 hours after vaccine administration.

There are a lot of myths and misconceptions about vaccines, such as the belief that vaccines cause autism or that the flu vaccine causes the flu. Listen for these concerns and **get the pharmacist involved to address vaccine hesitancy and ease fears about unfounded myths.**

Pharmacy technicians can also assist pharmacists in a wide variety of other ways. These might include **scheduling appointments** for patients who request immunization, **providing patients with necessary paperwork** (e.g., vaccine information statements [VIS], informed consent forms, screening questions, etc), **billing** for vaccines and their administration, and **ensuring adequate inventory** of vaccines and other necessary supplies (e.g., gloves, cotton balls or gauze pads, alcohol swabs, etc).

In addition to states that allow technicians to **administer vaccines**, emergency federal guidance also authorizes qualified technicians to administer childhood vaccines to kids ages 3 to 18 or COVID-19 vaccines to patients ages 3 years and older. Technicians who will be administering vaccines per this federal guidance need to go through an ACPE-approved training program that includes hands-on injection technique and must have a current CPR certificate. Our *Pharmacy Technicians University (PTU) Elite: Immunizations* training program is designed help you meet requirements to give vaccinations, and be confident and prepared. Review our checklist, *Vaccine Administration Strategies*, for best practices and helpful tips on giving vaccines and minimizing patient anxiety and fears around needles and vaccines. These tips will be especially helpful for administering vaccines to children. Keep in mind that clinical aspects of immunization, such as answering medical questions, counseling the patient, ensuring the vaccine is appropriate, reviewing the immunization screening questions, and verifying the immunization "prescription," are still the responsibility of the pharmacist.

### ***Are there any reasons a person should NOT receive a vaccine?***

Vaccine screening questionnaires, which patients are usually required to fill out prior to getting a vaccine, help the pharmacist determine if there are any reasons the patient should not be vaccinated. You play an important role in ensuring patients fill these forms out correctly and completely. There aren't many reasons a person shouldn't receive a vaccine, but there are some to be aware of.

Allergic reactions to previous doses of a vaccine or vaccine components, although rare, may be a reason that a patient should not receive a vaccine. For instance, you'll want to be alert for patients with a latex allergy, since some vaccines may contain latex in parts of prefilled syringes or vial stoppers. One example of this is with the Tdap vaccines, *Adacel* and *Boostrix*. The prefilled syringes may have latex, but not the vials. If you work in the U.S., to find out if a vaccine contains latex, you can access the Centers for Disease Control and Prevention (CDC)'s table "Latex in Vaccine Packaging" at <https://www.cdc.gov/vaccines/pubs/pinkbook/downloads/appendices/b/latex-table.pdf>. You can also check the product label to see if there are any statements about the product not containing latex, or you can contact the manufacturer directly. Other examples of allergies to be aware of with specific vaccines include severe allergy to egg with most influenza vaccines (these patients can usually still get any flu vaccine, but may need to be vaccinated in a clinic setting) and a severe allergy to yeast with some vaccines such as the human papilloma virus (HPV) vaccine (*Gardasil 9*), hepatitis B vaccines (e.g., *Engerix-B*, *Recombivax HB*), and pneumococcal 13-valent conjugate vaccine (*Prennar 13*; PCV13).

Live vaccines should not be given to pregnant patients due to the risk of the live vaccine crossing the placenta and infecting the fetus. Live vaccines also shouldn't be given to patients who are immunocompromised due to weakened immune systems such as from chemotherapy or other immunosuppressing drugs (chronic high-dose steroids [prednisone, methylprednisolone, etc] or biologic meds for rheumatoid arthritis, Crohn's disease, etc [*Cimzia* (certolizumab pegol), *Humira* (adalimumab), *Remicade* (infliximab), etc]). Immunosuppressed patients are more vulnerable to infection than the general population, so there's a slight chance of developing an infection from a live vaccine. Examples of live vaccines include measles/mumps/rubella (*MMR II*, etc), varicella (*Varivax* [U.S.], *Varivax III* [Canada], etc), and the live attenuated influenza intranasal vaccine (*FluMist Quadrivalent*).

Don't be surprised if your pharmacist delays vaccinating patients who have a moderate or severe illness with or without fever. This precaution helps prevent confusion between symptoms of the illness and potential adverse reactions to the vaccine. Also keep in mind, during the COVID-19 pandemic vaccination should be deferred for patients with fever, cough, chills, muscle or body aches, or other COVID-19 symptoms, to minimize exposure to others.

As a good double check, information on contraindications or precautions to vaccines, as well as vaccine benefits, are included in the U.S. vaccine information statements (VIS).

*You hand Patti a screening questionnaire to fill out and a VIS for the flu vaccine to look over as she waits. Since she's 37, you know that she'll most likely need the standard-dose quadrivalent flu vaccine. Before you begin to enter the Rx for the vaccine into the computer system, you pause to gather your thoughts.*

### ***What should I consider when I enter an Rx for a vaccine into the computer?***

It's always important to **make sure that you have the patient's allergies documented**, both food and drug allergies, along with the patient's reactions, if possible.

**Watch for mix-ups** since vaccines are relatively easy to get confused. One example is Tdap (*Adacel*, etc) and DTaP (*Daptacel* [U.S.], etc). Both of these vaccines are used to protect people against tetanus, diphtheria, and pertussis. However, Tdap is a booster for adolescents and adults, and DTaP is for primary immunization of kids up until their seventh birthday. A good way to avoid mix-ups with these vaccines is to think "caps for kids," since DTaP contains more capital letters. Errors have occurred with other vaccines that are available in both adult and pediatric doses, such as some hepatitis B vaccines (e.g., *Engerix-B*, *Recombivax HB*). Dosing errors where a child receives an adult's dose can result in an increased risk of localized reactions for the child (e.g., more pain or swelling at the injection site). Errors where an adult receives a child's dose may lead to inadequate efficacy and the need for additional vaccine doses to be given. Yet another example of a potential mix-up is with the wide array of seasonal flu vaccines. There are a number of different types of flu vaccines, some of which are approved only for adults (e.g., *Flublok Quadrivalent* [U.S.]) or only for elderly patients age 65 and older (e.g., *Fluzone High-Dose*, *Fluad*).

To help avoid these mix-ups, pull the vaccine you need from the shelf first, before entering it into the computer system. Verify the product with the pharmacist if needed, to ensure you have the correct vaccine for the patient. Triple-check the product to make sure you've selected the right one. You can also double-check the patient's age against the vaccine age indications in the product's package insert. When you enter the prescription into the system, make sure to select the correct product by comparing it to the vaccine you have in hand, such as by confirming that the NDC (or DIN) numbers match.

If you have any questions about an order for a vaccine, ask the pharmacist. Guessing is never a good idea. And in general, clarify orders that have vaccine abbreviations, and **avoid the use of abbreviations** for vaccines in your own documentation, such as when you're updating vaccine histories, to prevent mix-ups. For instance, mix-ups have occurred when using the abbreviations Tdap and DTaP, HepA and HepB, and PCV13 and

PPSV23. Instead, write out the generic name or brand name, or both, such as pneumococcal 13-valent conjugate vaccine (*Prevnar 13*) or pneumococcal 23-valent polysaccharide vaccine (*Pneumovax 23*).

**Be aware of immunizations that will require additional doses** than just the first vaccine dose (e.g., HPV, shingles [*Shingrix*], hepatitis B, etc). These immunizations require multiple vaccine doses to be given within a specified period of time in order to provide optimal protection. When entering these vaccines into the computer system, ask your pharmacist about including refills amounting to the number of additional doses the patient will need. This may help save time from having to re-enter the vaccine Rx in the future and can help reduce the risk that the wrong vaccine is selected for additional doses. For example, the COVID-19 vaccines which require two doses (e.g., the Pfizer-BioNTech or Moderna vaccine) are currently NOT interchangeable. This means that whichever vaccine the patient got for their first dose should be the same vaccine they get for their second dose. Utilize reminder features within your computer system and other technology (e.g., apps, texts, emails, phone calls) to help remind patients to return for their next dose. Additionally, consider providing a vaccination card with the date when the patient needs to return for their next dose, and scheduling an appointment with the patient at the time they receive their first dose, especially for COVID-19 vaccines. Patients need to get their second COVID-19 vaccine dose within the recommended timeframe (at least 21 days after the first dose for the Pfizer-BioNTech vaccine and 28 days for the Moderna vaccine) to be fully protected.

**Bill vaccines to the correct payer.** In the U.S., patients may pay cash for a vaccine, or it may be covered by an insurance plan, such as Medicare Part B or Part D. Some vaccines (e.g., influenza, hepatitis B, pneumococcal, etc) are covered under Part B, but the shingles vaccine and others that are not covered under Part B may be covered under Part D. For patients insured by a commercial plan, it could be challenging to figure out whether a vaccine is covered by their medical plan or prescription drug plan. Vaccines may be covered under the pharmacy benefit, medical benefit, or in some cases both. Always obtain both a patient's medical health plan and prescription drug coverage information. Sometimes this is on the same insurance card, but in other cases the patient may have two separate cards. If you aren't sure who to bill the vaccine to, it's best to check directly with the patient's insurance company. Also, keep in mind that in the U.S., since COVID-19 vaccines are funded by the government, there will be no charge to patients for the vaccine itself. However, there may be a vaccine administration fee that payers or the patient may be responsible for. For more details on COVID-19 vaccine billing, check out our chart, *Communicating About COVID-19 Vaccination*.

*You pull the vaccine you need out of the refrigerator, Fluzone Quadrivalent, and double-check with the pharmacist to make sure this one is okay to use. She says, "yes," so you continue with entering the Rx. You double-check Patti's profile, and she only has allergies to sulfa drugs (rash) and strawberries (trouble breathing). When you enter the Rx for the flu vaccine into the computer system, you do not get an allergy alert. You have Patti's United Healthcare medical plan information and her OptumRx prescription drug coverage information already in the computer system. You bill the flu vaccine to United Healthcare since you notice that last year's flu vaccine was billed to that plan.*

### ***Are there any special dispensing or labeling requirements for vaccines?***

Often, the pharmacist will be administering vaccines directly, instead of dispensing them. Exceptions to this would be (rarely) if a patient comes in to buy a vaccine to take back to their prescriber to administer, or in the hospital setting, where vaccines are dispensed for administration by a nurse or prescriber.

Make sure that you **choose the correct product** when a vaccine is dispensed. As mentioned above, mix-ups such as with Tdap/DTaP, can easily occur. Many of these errors are caused when the wrong product is pulled from stock upon dispensing. Stock these products separately and correctly, to avoid problems.

Also, make sure you **dispense the correct diluent** with a vaccine. A number of vaccines require dilution or reconstitution prior to administration, such as the shingles vaccine, *Shingrix*, and the meningococcal vaccine,



*Menveo*. It's important to avoid injecting the plain diluent instead of the reconstituted vaccine, since this could leave the patient unprotected. The specific diluent needed is often sent in the same shipment as the vaccine, but in some cases it may not be. For example, the Pfizer-BioNTech COVID-19 vaccine must be diluted with 1.8 mL of 0.9% sterile Sodium Chloride Injection, USP. This diluent is not shipped with the vaccine and is sent separately, due to the ultracold storage of the vaccine. For any vaccine requiring dilution or reconstitution, be sure to record the date and time on the vaccine vial, since the vaccine is only good for a certain period of time after dilution or reconstitution. For instance, any unused Pfizer-BioNTech COVID-19 vaccine must be discarded six hours after dilution.

Regardless of the scenario, a **VIS** must be dispensed with most vaccines in the U.S. This is mandated by federal law. It is also required to document the VIS edition date and the date the VIS is given to the patient. The most current VISs are available at <https://www.cdc.gov/vaccines/hcp/vis/current-vis.html>. It's a good idea to keep a supply of these handy. If there is no VIS for a combination vaccine, you should distribute the VIS for the components of the combination vaccine.

Since COVID-19 vaccines are authorized for use under an Emergency Use Authorization (EUA), you will need to provide patients with an EUA fact sheet for recipients and caregivers, instead of a VIS. These fact sheets are specific to each authorized COVID-19 vaccine, and can be accessed from the FDA's website: <https://www.fda.gov/emergency-preparedness-and-response/coronavirus-disease-2019-covid-19/covid-19-vaccines>. It is also recommended to provide patients with a *v-safe* information sheet: <https://www.cdc.gov/coronavirus/2019-ncov/downloads/vaccines/v-safe-information-sheet-508c.pdf>. *V-safe* is a voluntary smartphone-based tool that uses text messages and web surveys to check on people who have been vaccinated and provide second-dose reminders. The goal of *v-safe* is to help identify potential side effects after vaccination.

**Manufacturer name and lot number** must be recorded for vaccines that are administered. One of the reasons for this is for tracking of adverse events. This information must be kept on file and it must be provided in the hospital setting when a vaccine is dispensed for administration by another healthcare professional. You will usually accomplish this by neatly writing the information on the label of the vaccine, if it is drawn up in a syringe and dispensed. If the vaccine is dispensed in its original container, there's no need to write it down because the person who administers the vaccine can copy it from the box or vial onto the vaccine administration record. A vaccine administration record refers to the documentation of key pieces of information regarding administration of the vaccine, including vaccine manufacturer and lot number, the location of vaccine administration (e.g., left or right arm deltoid muscle), date and time of administration, who administered the vaccine, etc. The vaccine administration record may be its own form, or it may be included on the same form as the vaccine screening questionnaire or the vaccine consent form.

Since most vaccines **require refrigeration**, you will want to place a "refrigerate" auxiliary label on those that are dispensed and not administered immediately. Also, make sure that any multidose vial of a vaccine has an **appropriate beyond-use date** noted on the product label once the vial has been entered. This date is usually the expiration date on the vial, unless the manufacturer has different information in the product labeling, such as 28 days after the vial is first entered. It's also important to note on the product label the number of doses that have been removed from the vial. Typically, no more than the maximum number of doses indicated in the package insert should be withdrawn from the vial. After the maximum number of doses have been withdrawn, the vial should be discarded, even if the beyond-use date hasn't been reached or if there still seems to be vaccine leftover. If contamination is suspected, the vial should also be discarded.

*You place the flu vaccine you had pulled from the refrigerator in a basket with the prescription label and a plastic bag with all the supplies needed to administer the vaccine (needle and syringe, gloves, bandage, gauze pad, alcohol swab). You notice you're running low on these pre-packaged bags and make a note to put together some more of these when things slow down.*

### ***What about storage requirements for vaccines?***

Most vaccines require refrigeration, and some must be kept frozen, such as the varicella-containing vaccines in the U.S. Watch out for vaccines that come with a diluent that has different storage requirements, such as with *Varivax* (U.S.), where the vaccine is stored in the freezer and the diluent in either the refrigerator or at room temp. Make sure there's a note in the freezer where *Varivax* is stored indicating that the diluent must be retrieved from another location. For all other vaccines, the diluent and vaccine should be stored next to each other. The following are some tips for the proper storage of vaccines that require cold temperatures:

- Frozen vaccines should be stored at -15°C (5°F) or colder.
- Refrigerated vaccines should be stored at temperatures between 2°C and 8°C (36°F to 46°F). Refrigerator settings should be mid-range at 5°C (41°F) to allow the highest safety margin.
- Store vaccines in their original packaging. This helps protect them from light and keeps them visually distinct to avoid mix-ups. For vaccines with similar names or packaging (e.g., adult and pediatric vaccines), use shelf tags or store in different locations within the refrigerator.
- Don't crowd vaccines. For consistent temperatures, allow air circulation between items.
- Store products in the middle of the refrigerator, not in bins or door compartments, away from the floor, coils, walls, and vents. This helps ensure stable temperatures.
- Do not store food and beverages in the same refrigerator or freezer as vaccines. There may even be regulations against this practice in your area.
- Examine arriving orders for refrigerated or frozen packaging and unpack them immediately.
- Finally, be sure to follow your pharmacy's policy for checking and logging temperatures.

Be aware of unique storage requirements and beyond-use dates for COVID-19 vaccines. For example, the Pfizer-BioNTech COVID-19 vaccine can be stored in an ultracold freezer between -80°C to -60°C (-112°F to -76°F). Before mixing, it can also be stored in the refrigerator between 2°C and 8°C (36°F to 46°F) for up to five days. Once it's diluted it has a beyond-use date of six hours. The Moderna COVID-19 vaccine can be stored at freezer temperatures of -25°C to -15°C (-13°F to 5°F) or in the refrigerator for up to 30 days after thawing. It can be kept at room temp for 12 hours, but must be used within six hours after the first dose is withdrawn. For more details on COVID-19 vaccine storage, dosing, adverse effects, and more, review our chart, *COVID-19 Vaccines*. And review the CDC's COVID-19 Vaccine Training Modules: <https://www2.cdc.gov/vaccines/ed/covid19/>.

More information on proper storage of vaccines and other refrigerated medications can be found in our technician tutorial, *Keep it Cool: Storing Meds in the Fridge or Freezer*.

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## “Cheat Sheet” for Immunizations and Vaccines

### ***Why are vaccines so important?***

- They help prevent many bacterial and viral infections that can be very dangerous or deadly.

### ***What determines which vaccines should be given to patients and when they should be given?***

- Vaccine schedules for kids and adults are published regularly, such as annually in the U.S. These show which vaccines should be given and when. Help support your pharmacist by making sure you have the most current vaccine schedule printed out or saved as a bookmark on your pharmacy computer.

### ***Are there any reasons a person should NOT get a vaccine?***

- Whether or not a patient should get a vaccine will depend on the specific vaccine. One reason that a vaccine may not be given could be because the patient had an allergic reaction to a past dose of a vaccine or a vaccine component. Live vaccines (e.g., *MMR II*, *Varivax*, *FluMist Quadrivalent*) are contraindicated in people who are pregnant or immunocompromised (such as from chemotherapy).

### ***How can my pharmacy team help ensure patients receive vaccines?***

- Pharmacists are allowed to administer vaccines in the U.S. and Canada.
- Some U.S. states are allowing, or looking into allowing, trained pharmacy technicians to administer vaccines. Emergency federal guidance authorizes qualified pharmacy techs to administer childhood vaccines to kids ages 3 to 18 or COVID-19 vaccines to patients ages 3 years and older during the pandemic.
- All techs can assist by:
  - Identifying patients who may need vaccines by looking at patient factors such as age, smoking status, and medical conditions
  - Listening for concerns about getting vaccines and getting the pharmacist involved
  - Scheduling appointments for patients to get vaccines
  - Providing patients with necessary paperwork
  - Billing for vaccines and their administration
  - Ensuring documentation is complete
  - Making sure there are adequate supplies of vaccines and other necessary items such as syringes, gloves, and cotton balls or gauze pads

### ***How can I help prevent errors with vaccines?***

- Avoid use of and clarify Rx's with abbreviations for vaccine names.
- Store vaccines with similar names separately (e.g., Tdap [*Adacel*, etc] and DTaP [*Daptacel*, etc]).
- Stay alert for vaccines with similar packaging or vaccines that come in adult and pediatric doses, and use strategies to prevent mishaps such as separate storage and shelf tags.
- Know if a vaccine requires additional doses and take steps to remind the patient to come back in to get the remaining doses to ensure adequate protection.
- Double-check if a vaccine comes with a diluent and be sure to dispense the vaccine AND the diluent.
- Be familiar with which vaccines must be frozen or refrigerated and follow storage instructions.

### ***What is legally required when vaccines are given?***

- In the U.S., a vaccine information statement (VIS) must be dispensed with most vaccines. A fact sheet should be dispensed for COVID-19 vaccines with an Emergency Use Authorization (EUA).
- Manufacturer name and lot number must be recorded when vaccines are administered.

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