Pharmacist CE LESSON

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Target Audience
Pharmacists in community-based practice.

Program Goal
The purpose of this program is to refresh the knowledge and skills of pharmacists in the proper collection of a medication history, administration of immunization products, documentation and counseling to ensure patient safety.

Learning Objectives:
Upon completion of this program, the pharmacist should be able to:
1. Describe the history of vaccines and the role of pharmacist immunizers.
2. Review the element of a complete patient history following immunization guidelines to make appropriate immunization recommendations.
3. Identify tools and steps required for proper immunization administration including documents, forms, supplies and proper documentation.
4. List immunization safety measures for the immunizing pharmacist and common immunization counseling pearls for patients.
5. To obtain credit: To complete the program and receive CPE credit, view all lesson content and complete the learning assessment by submitting answers online. A minimum test score of 70% is needed to obtain credit. After successfully completing the learning assessment, participants must complete a program evaluation and claim the available CPE credit. Participants also must verify personal information required by CPE monitor and/or CE Broker (for Florida license holders) prior to submitting CPE credit claims.

Questions: Contact the DSN customer service team at DRSNCE@LF1925.com.

Immunization administration: A review for pharmacist immunizers

INTRODUCTION
More than 200 years ago, an English doctor, Edward Jenner, and a cow named Blossom paved the way for the prevention of disease via vaccination.1 Through keen observation, Jenner noted that local milkmaids did not regularly contract smallpox. He hypothesized that the blisters some of the milkmaids acquired from cowpox provided immunity against smallpox.1 To test this hypothesis, in 1796, Jenner took cowpox blister fluid from a milkmaid’s hand and injected it into a young boy, thereby administering the first vaccination. To demonstrate that his vaccination was effective, Jenner then horrifyingly took fresh fluid from a smallpox blister and injected it into the same boy to prove his supposition that cowpox prevented smallpox. Fortunately, the young boy remained healthy and did not contract smallpox. This led to Jenner further testing his intervention on more people, including his own son, and ultimately publishing his results.1 The word vaccine is derived from vacca, which means “cow,” and was used by Jenner to specifically describe vaccination with cowpox.1 However, the term was later used by Louis Pasteur to describe any product used for inoculation as a tribute to Edward Jenner and his novel discovery.1 Dramatic advances in the development of vaccines occurred in the 20th century with the most notable impact made in the fight against polio.1 In 1916, a polio outbreak in New York killed more than 2,000 people, and 4,000 more across the United States.1 The iron lung, created in 1929, was the quintessential symbol for the dangers of acquiring polio. It was not until 1955 that the first polio vaccine, created by Jonas Salk, was approved for use in the United States.1 From the 1960s through the 1990s, the focus of vaccines was turned to that of diseases that affect children, (e.g., measles, mumps, rubella and varicella. Prior to the creation of the measles vaccine in 1963, 763,094 reported cases of measles occurred within the United States. By 2000, measles was declared eliminated within the United States. Because the disease exists in other parts of the world, cases still occur as a result of importation of the disease — 63 cases were reported in 2010.1 By the year 2000, other important vaccines such as hepatitis A/B and invasive pneumococcal had been created, furthering the effort in the prevention of disease.1

The invention of immunization is considered one of the top 10 greatest public health achievements of the 20th century.2 In addition, vaccines have been shown to be the most cost effective preventative service for prevention of disease.3 For every birth cohort that is vaccinated with recommended routine vaccines, society saves 33,000 lives, prevents 14 million cases of diseases, reduces direct healthcare costs by $9.9 billion and saves $33.4 billion in indirect costs.3 However, even with all these advances in the United States, approximately 42,000 adults and 300 children die each year from vaccine-preventable diseases.3 Those who are unvaccinated or undervaccinated are particularly vulnerable to disease outbreaks. This was evident in the 2008 measles outbreak that resulted in 131 reported cases from imported measles — three-fold greater than the previous year.4 In addition, antivaccination movements also have contributed to lower vaccination rates, and herd immunity making individuals more susceptible to vaccine-preventable diseases within the United States. While the last 20 years

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of the antivaccine movement, including the controversy surrounding the measles, mumps and rubella, or MMR, vaccine are notable, criticisms of immunizations have occurred almost from the very beginning of the intervention.1 Individuals have objected on religious and moral grounds, and controversies have arisen regarding other vaccinations such as diphtheria and polio, and contributed to lower vaccination rates and risk to public health.1

Pharmacists and immunization
Pharmacists have participated in the immunization process of the public since the early 1800s, with the first documented record occurring in the mid-1800s, when pharmacists distributed smallpox vaccine to physicians.5 Similarly, pharmacists assisted in the distribution of diphtheria antitoxin in the late 19th and early 20th centuries, and, in the late 1950s and early 1960s with the distribution of the oral polio vaccine.5 The modern role of pharmacists as immunizers did not take place until 1993 when the U.S. Department of Health and Human Services, or DHHS, enlisted the help of the American Pharmaceutical Association, now Pharmacist Association, or APHA, to define the role of the pharmacist in a pediatric vaccination program.5 As a result of this partnership, DHHS recognized pharmacists as being able to assist in four-key immunization areas: vaccine education and mobilization; vaccine distribution; vaccine access and administration; and vaccine registries and tracking systems.5 By 2004, 43 states recognized, in some capacity, the role of the pharmacist in administering vaccines or in the role of vaccine advocacy.5 Today, pharmacists in all 50 states and the District of Columbia have the authority to administer vaccines.

Many factors have been shown to impact low vaccination rates of individuals such as apathy, misconceptions regarding safety and efficacy of vaccines, cost, distance from clinics, inconvenience and wait times.6 Pharmacists are the most widely accessible healthcare provider, and as such, are uniquely situated to help eliminate some of these barriers impacting vaccination rates among the public. Today, pharmacists have greater authority than ever before to immunize patients. Therefore, it is essential that immunizing pharmacists are up-to-date on the most current immunization requirements, guidelines and administration techniques.

ASSESSING PATIENT INFORMATION AND MEDICAL HISTORY IN IMMUNIZATION

Obtaining a thorough patient history is vital before any immunization is administered by the pharmacist. The information collected will assist the pharmacist in determining if the vaccine the patient is requesting is indicated, and what other vaccines the patient may be a candidate for. In addition to determining the indication, obtaining a thorough patient history also helps identify contraindications and precautions the pharmacist should be aware of prior to administering the immunization(s). It is important to assess both subjective and objective information. The patient history should include the following information:

Patient age
The pharmacist’s authority to deliver immunizations often is dependent upon a patient’s age, and may vary depending on the state in which the pharmacist practices. Special precautions should be taken to ensure the vaccine being considered is within the scope of practice to be legally administered. The Advisory Committee for Immunization Practices, or ACIP, provides recommendations for routine vaccines that contain the age or age range in which the vaccine should be administered.7 In addition, the Centers for Disease Control and Prevention, or CDC, distributes immunization schedules for healthcare providers based upon two age groups: 1) adults 19 years old and older, and 2) children/adolescents 18 years old or younger. These schedules are updated on an annual basis.8

Current and past health conditions:9
A patient’s current health condition may be an indication for vaccine administration, e.g., diabetes and pneumococcal, or may exclude the patient from vaccination, e.g., active cancer and herpes zoster. Collection of a thorough health history is essential for proper vaccine administration and the identification of contraindications, which will be discussed further. Common conditions utilized in the screening process to identify patients for other vaccinations include tobacco use, asplenia and certain chronic diseases, including diabetes, asthma, lung disease, kidney disease, anemia and heart disease.

Allergies:6
Assessment of allergies to medications, food, vaccine components and latex should be reviewed prior to immunization administration.

Vaccination history:
Reviewing the patient’s past vaccination history will aide in identifying routine vaccinations indicated, including appropriate spacing and timing of subsequent doses.8 For example, it is important to learn if the patient has had another vaccine in the past four weeks. If so, it is important to know the type of vaccine. Live-virus vaccines cannot be administered within 28 days of each other.

Pregnancy status:
In women of childbearing age, pregnancy status and/or plans to become pregnant should be assessed prior to vaccine administration.9 While pregnancy status is often an indication for vaccination, e.g., Tdap with each pregnancy, certain vaccines such as live-virus containing products are contraindicated and should not be administered one month before and during pregnancy.7

Lifestyle:
Lifestyle and social factors should be carefully considered in immunization administration.9 For example, factors such as birth outside of the United States, intravenous drug use or being a male who has sex with other males are indications for routine hepatitis B vaccination.10 College students living in dormitories are at an increased risk for meningococcal disease. For this reason, it is recommended that these students receive the meningococcal vaccine. This indication also has been expanded to routinely include high school students in many states.7

Occupation:
Most occupations do not require vaccination against vaccine preventable diseases. However, healthcare workers who have a high risk of blood exposure are routinely offered vaccination against hepatitis B.7 Similarly, microbiologists and lab workers who routinely work with Neisseria Meningitidis are also recommended to receive the meningococcal vaccine.7

Travel:
Traveling domestically or abroad can expose patients to vaccine-preventable diseases and should be assessed to appropriately protect patients.9 Certain vaccine-preventable diseases, such as Polio, have been eliminated from the United States, but still occur in other countries. The 2008 outbreak of measles is a great example of a vaccine-preventable disease that was imported from abroad and resulted in an outbreak in the United States — 131 reported cases from January to July 2008.4 International travel poses the highest risk to Americans, depending on the itinerary and length of stay. In fact, the CDC has an entire website dedicated to travel health recommendations based upon the specific destination.11 Common diseases international travelers may need vaccinations for include typhoid, rabies, hepatitis A and B, cholera, Japanese encephalitis and yellow fever.11 Travelers to certain parts of South America and Africa may not be permitted to enter the country
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Table 1 Vaccine contraindication screening questions

<table>
<thead>
<tr>
<th>GENERAL QUESTIONS</th>
<th>RELEVANT VACCINE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Are you sick today?</td>
<td>All vaccines</td>
</tr>
<tr>
<td>2. Do you have allergies to medications, food, a vaccine component or latex?</td>
<td>All vaccines</td>
</tr>
<tr>
<td>3. Have you ever had a serious reaction after receiving a vaccination?</td>
<td>All vaccines</td>
</tr>
<tr>
<td>4. Have you had a seizure, or a brain or other nervous system problem?</td>
<td>Influenza, Td/Tdap</td>
</tr>
<tr>
<td>5. Do you have a long-term health problem with heart disease, lung disease, asthma, kidney problems, diabetes, anemia or other blood disorder?</td>
<td>LAIV</td>
</tr>
<tr>
<td>6. For women: Are you pregnant or planning on becoming pregnant in the next month?</td>
<td>HPV, IPV, MMR, LAIV, VAR, ZOS</td>
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<table>
<thead>
<tr>
<th>LIVE-VACCINE QUESTIONS</th>
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<tbody>
<tr>
<td>1. Have you received any vaccination in the past four weeks?</td>
<td>LAIV, MMR, VAR, YF, ZOS</td>
</tr>
<tr>
<td>2. Do you have cancer, leukemia, HIV/AIDS, active shingles or any other immune problem?</td>
<td>LAIV, MMR, VAR, ZOS</td>
</tr>
<tr>
<td>3. During the past year, have you received a transfusion of blood or blood products, or been given immune, or gamma, globulin or antiviral drugs?</td>
<td>LAIV, MMR, VAR, ZOS</td>
</tr>
<tr>
<td>4. In the past three months, have you taken medications that affect your immune system, such as cortisone, prednisone, other steroids or anticancer drugs, as well as drugs for the treatment of rheumatoid arthritis, Crohn’s disease or psoriasis? Have you had radiation treatments?</td>
<td>LAIV, MMR, VAR, ZOS</td>
</tr>
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Adapted from immunize.org/catg.d/p4065.pdf; Accessed 13 Aug 2017. Thank you to the Immunization Action Coalition

without proof of yellow fever vaccination. A pharmacist’s authority to administer travel health vaccines usually requires additional training and, in some cases, registration with the public health department, e.g., yellow fever. In addition, every two years, the CDC publishes the CDC Health Information for International Travel reference, commonly referred to as the Yellow Book, to guide healthcare providers in pre-travel vaccine recommendations, destination-specific health advice and easy-to-reference maps, tables and charts.12

A current medication list and medication use history for prescription and non-prescription medications, herbas and dietary supplements should be reviewed with the patient prior to administering immunizations.9 Additional information on the patient’s lifestyle habits, preferences, beliefs and health-related goals should be considered in the process. The Immunization Action Coalition, or IAC, has a convenient online screening form that can be utilized to aid in the checklist found at immunize.org/catg.d/p3070.pdf.9

The following screenings for contraindications to vaccines should be conducted by the pharmacist:

**Screening for contraindications to vaccines**

Like any health intervention conducted, risks to receiving vaccines exist, and not every patient is a candidate for every vaccine. Screening for contraindications helps the pharmacist identify patients who are not candidates for immunization administration based upon their specific health history and clinical circumstances.

The following screenings for contraindications should be conducted by the pharmacist:

**Current health:**

The first question to assess a patient’s current health picture is to check if the patient is feeling ill that day. Mild acute illness, such as upper respiratory infections and diarrhea, are not contraindications to vaccine administration.13,14 Similarly, if a patient is taking antibiotics, vaccination should not be withheld.9,14 As a precaution, all vaccines should be held in those patients with acute moderate-to-severe illness, until after the illness has improved or resolved.13,14

**Allergies:**

Screening for all allergies is extremely important. Some vaccine products may contain ingredients that can cause allergic reactions. An example of this is latex. Many vaccine components, besides the actual vaccine, including vial stoppers, prefilled syringe plungers and prefilled-syringe caps may contain latex that could trigger an allergic response. The patient’s latex-allergy status must be evaluated prior to administering these vaccines.14 Patients who have an anaphylactic reaction to latex cannot receive any vaccine that contains latex.7,14

Full information relating to vaccines supplied in vials or syringes that contain latex can be reviewed in the CDC pink book.15 In patients with egg allergies, the CDC recommends any influenza vaccine that is indicated based upon age. However, patients with severe egg allergy that results in any symptom other than hives, e.g., angioedema, should be referred to a healthcare provider who can recognize and manage severe allergic-reaction conditions.16 Furthermore, patients who have had a serious reaction to a previous vaccine may be contraindicated from receiving subsequent doses or may need to be monitored by a healthcare provider equipped to manage severe allergic reactions.16 Usually vaccines are deferred when a precaution is present but may not always be possible in the case of an outbreak where the benefit outweighs the risks.13,14

**Vaccine history:**

It is essential for the pharmacist to be aware of any vaccines a patient may have received within the last 28 days. Certain vaccines, such as the LAIV or other live-virus vaccines, e.g., MMR, VAR, ZOS, YF, are not recommended to be administered within 28 days of each other. In contrast, inactivated vaccines may be administered without regard to spacing, provided they are not administered together in the same syringe in the same site.7
In most cases, long-term health problems actually can help the pharmacist identify other vaccine-preventable diseases for which the patient needs vaccine protection. For example, patients with diabetes who present for their yearly influenza vaccination, but have not received a pneumococcal vaccine, would be indicated for both immunizations. However, patients with long-term health problems should not receive the LAIV as its safety has not been established.

**Immunocompetence:**

Patients who have cancer, leukemia, HIV/AIDS or other immune system problems generally are contraindicated from receiving live-virus vaccines. Some exceptions exist, such as MMR and varicella vaccines for patients with CD4+ T-lymphocyte counts greater than or equal to 200 cells/µL. In patients who are taking medications that can affect their immune system, e.g., high-dose steroids, disease modifying antirheumatic drugs, vaccination with live-virus vaccines should be avoided until after therapy has ended. Pharmacists should consult ACIP guidelines to determine the specific length of time to delay vaccination.

**Seizure, brain or other nervous system problem:**

Tdap is contraindicated in patients who have a history of encephalopathy within seven days following tetanus administration, before the age of 7. Unstable neurologic conditions are a precaution to vaccination with Tdap. Those with stable neurological conditions, including seizures, unrelated to vaccination can be vaccinated as usual.

**Blood transfusion, blood products, immune, or gamma, globulin or antiviral drugs:**

Certain live-virus vaccines may need to be deferred depending on individual patient factors. Pharmacists should consult ACIP guidelines for current information on spacing between antiviral drugs, immune globulin or blood product administration, and live vaccines.

**Pregnancy status:**

Live-virus vaccines are contraindicated one month before and during pregnancy due to a theoretical risk of transmission to the fetus. Women of childbearing age who are sexually active and receive a live-virus vaccine should be counseled on appropriate contraception measures for up to one month post vaccination. Inactivated influenza vaccine and Tdap are recommended in pregnancy and can be administered at any time — Tdap preferred during 27-to-36 weeks of gestation.

**REQUIRED IMMUNIZATION ADMINISTRATION DOCUMENTS**

The documents required to immunize may vary depending on the setting in which the immunization takes place. Pharmacists are responsible for staying up to date on local and national laws. In addition, the pharmacist should follow all policies and procedures set by the employer of the site delivering immunizations. Important items to review thoroughly include immunization protocols and scope of practice guidelines allowing administration under a standing order, collaborative practice agreement or by other means. Every practice setting that administers vaccines also should have a detailed emergency immunization protocol in place to manage vaccine reactions, including severe allergic reactions. Furthermore, immunizing pharmacists should be familiar with their emergency kit contents, and execute with competence the procedures within the emergency protocol if needed. In addition, pharmacists who immunize should be certified in cardiopulmonary resuscitation or CPR, and have such emergency supplies on hand as epinephrine, diphendhydramine, a blood pressure cuff, and stethoscope.

In general, most settings where pharmacists use vaccines require some form of consent form with screening questions. The consent form provides three purposes: 1) To capture consent to administer by the patient or caregiver; 2) To conduct a screening for contraindications; and 3) To document pertinent information regarding the vaccine(s) administered by the pharmacist.

It is essential that the pharmacist reviews this form prior to preparing or administering any immunization to a patient. Forms should be reviewed for accuracy and completeness of all required areas. Patients may not understand screening questions and leave them blank. If the pharmacist does not review and capture missing information, this can lead to administering vaccines out of protocol; providing a contraindicated vaccine to the patient allowing an avoidable adverse event to occur; or enabling more severe patient harm. Beyond the risks for the patient, any vaccine that is prepared and not used within the recommended manufacturer guidelines must be wasted leading to a financial loss for the employer. In addition to a consent form, a relevant vaccine information statement, or VIS, must be provided to the patient for each vaccine administered per federal law. The CDC produces all VIS documents and updates them as appropriate. The VIS explains the risks and benefits of the vaccine administration to the patient in a standard, patient-friendly manner.

**REQUIRED IMMUNIZATION ADMINISTRATION SUPPLIES**

To deliver immunizations, medical supplies are needed that are available from a wholesaler or medical supply company. The majority of supplies required to administer immunizations are the same regardless of the vaccine being administered. Many pharmacies organize common supplies in baskets and carts to allow mobility and easy accessibility when delivering immunizations. Table 2 provides a list of

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**PATIENT SCENARIO 1**

TK is a 30-year-old female who presents to the pharmacy, stating she needs a tetanus vaccine that was recommended by her doctor. She would like to receive the vaccine today since she is picking up her regular medication for hypothyroidism. She denies any allergies to any medications. The technician provides TK a consent form with contraindication screening questions. Upon review, the pharmacist notes that TK marks “no” to all screening questions, except for latex allergy and pregnancy status that she marked as “yes.” What other information should the pharmacist gather during the consultation with the patient prior to administering the requested vaccine?

**Discussion**

Since the patient is requesting the Tdap vaccine, the pharmacist should consult the Advisory Committee on Immunization Practices, or ACIP guidelines for the most current information related to indication and contraindications. Tdap can be administered at any time during pregnancy. However, the pharmacist should consult with the patient as to how far along she is in her pregnancy since the Tdap vaccine is ideally administered within 27-to-36 weeks of gestation. A vaccine history also should be conducted. The pharmacist should consider the time of year to also ascertain whether or not the patient is in need of the yearly influenza vaccine. Tdap and influenza vaccines are inactivated and can be administered without spacing of doses. The pharmacist also should inquire about the vaccination status of her spouse/significant other, parents or other close relatives who will have significant contact with her newborn child to recommend Tdap vaccines to protect the infant.
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needed supplies. When ordering supplies, it is prudent to stock non-latex adhesive bandages and latex-free disposable gloves to account for potential latex allergies. Multiple sizes of disposable gloves should be readily available to comfortably fit all who will be immunizing. With syringes, multiple needle lengths and gauges are needed to accommodate different routes of administration and age/bodyweight of the patient. Table 3 reviews key considerations for immunization supplies.20

Avoiding needle-sticks is of vital importance when considering immunization administration, and will be discussed further under vaccine safety. Fortunately, several different options are available for pharmacists, such as retractable, vanishing needles and needle shields to prevent needle-sticks and blood exposure. Proper product preparation and use of all safety features are essential. It also is important to never recap a used needle before placing it in a sharps container to avoid needle-sticks. Pharmacists should consult their needle-stick exposure protocol prior to administration of vaccines, and be familiar with the contents in the event of an exposure.

PREPARATION OF VACCINE PRODUCT

Product packing varies based upon the vaccine being administered and the manufacturer. Vaccines may be supplied in multiple-use vials, single-prefilled syringes or as products that require reconstitution with supplied diluent. Pharmacists should consult the prescribing information for each product and familiarize themselves with the proper preparation and use of each vaccine product they will be administering. It is important to note the stability of the vaccine once a vial is reconstituted; a dose is drawn from a multiuse vial; or a needle is attached to a prefilled syringe. Each of these actions affect the time remaining that the product can be administered to the patient.21 For immunization clinics, the CDC no longer recommends pre-drawing vaccine, but instead recommends the use of prefilled syringes for large immunization clinics as they are already designed for storage and administration.21

IMMUNIZATION-ADMINISTRATION TECHNIQUE

Proper immunization technique is essential to the safety and satisfaction of the patient. The American Pharmacists Association has a helpful video on proper immunization injection technique found at pharmacist.com/vaccine-administration-techniques?dfptag-imz that may be utilized as a visual reference.22 Patients who require multiple injections and prefer the same extremity should have injection sites separated by a minimum of 1 inch when possible. Five routes of immunization administration currently are available for vaccines in the United States:

Intramuscular injection, or IM:

An intramuscular injection is the most common injection site for the majority of vaccines available within the United States. To provide an IM injection, these steps should be followed:23

1. Wash hands
2. Ensure the extremity is free of clothing
3. Put on disposable gloves — not required, but strongly encouraged
4. Locate injection site
   a. Infants and toddlers
      i. Anterolateral thigh muscle
         1. 0-to-35 months: vastuslateralis
         2. 3-years old and older: deltoitd
   b. Children and adults
      i. Central and thickest portion of the deltoid muscle
      ii. Above the level of the armpit and approximately two-to-three fingers below the acromion process
      iii. Do not inject too high or too low
5. Clean the area of injection with an alcohol swab and allow to dry
6. Ensure needle length is long enough to reach deep into the muscle. Table 3 reviews the lengths of needles to use.
7. Insert needle at a 90-degree angle with a swift and smooth motion, holding the syringe at the hub
8. Inject the vaccine with consistent and firm pressure on the plunger
9. Remove the needle from the extremity at the same angle it was inserted
10. Activate syringe safety device
11. Dispose of syringe in sharps container immediately
   a. Do not recap syringe or place anywhere other than sharps container
12. Apply adhesive bandage

Subcutaneous injection, or Sub-Q:

To provide a Sub-Q injection, follow these steps:23

1. Wash hands
2. Ensure extremity is free of clothing
3. Put on disposable gloves — not required, but strongly encouraged
4. Locate injection site
   a. Fatty tissue overlying the anterolateral thigh muscle
      i. 0-to-12 months old
      ii. 12 months old and older
   b. Fatty tissue over the triceps
      i. 12 months old and older
5. Clean the area of injection with an alcohol swab and allow to dry
6. Ensure needle length is appropriate for subcutaneous injection. Table 3 reviews the lengths of needles to use.
7. Pinch up on Sub-Q tissue to prevent injection into muscle
8. Insert needle at a 45-degree angle with a swift and smooth motion, holding the syringe at the hub
9. Inject the vaccine with consistent and firm pressure on the plunger, while maintaining pinch on skin
10. Release pinch and pause, then remove the needle from the extremity at the same angle it was inserted
11. Activate syringe safety device

Table 2 Necessary vaccine administration supplies

- Vaccine
- Clean workspace
- Private or semiprivate administration area
- Hand sanitizer or access to sink with soap and water
- Waste receptacle
- Sharps container for disposal
- Syringes and needles with safety device
- Latex-free disposable gloves, or as required by the state
- Latex-free adhesive bandages
- Alcohol swabs
- Gauze pads or cotton balls
- Facial tissues (LAV only)

Table 3 Proper needle and gauge size based upon injection site

<table>
<thead>
<tr>
<th>INTRAMUSCULAR INJECTION</th>
<th>SUBCUTANEOUS INJECTION</th>
</tr>
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<tbody>
<tr>
<td>• 1-inch needle for most patients, including children</td>
<td>• 5/8-inch needle</td>
</tr>
<tr>
<td>• 1.5-inch needle :</td>
<td>• 23-to-25 gauges</td>
</tr>
<tr>
<td>• Women weighing more than 200 pounds</td>
<td></td>
</tr>
<tr>
<td>• Men weighing more than 280 pounds</td>
<td></td>
</tr>
<tr>
<td>• 5/8-inch needle may be used on:</td>
<td></td>
</tr>
<tr>
<td>• Adults weighing less than 130 pounds</td>
<td></td>
</tr>
<tr>
<td>• Child weighing less than 130 pounds or are under 28-days old</td>
<td></td>
</tr>
<tr>
<td>• 22-to-25 gauges for all needle lengths</td>
<td></td>
</tr>
</tbody>
</table>

Adapted from immunize.org/catg.d/p3085.pdf; Accessed 12 August 2017. Thank you to the Immunization Action Coalition

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PATIENT SCENARIO 2

TE is 65-year-old male who presents to the pharmacy to pick up his blood pressure medicine. The patient asks to speak with the pharmacist about the television commercial he saw about shingles. The patient states he does not recall having chickenpox as a child, but wants to know if he can still receive the vaccine. The patient denies any allergies to medications, states that he is not feeling ill today and answers “no” to all vaccine screening questions, except that he has diabetes. Upon consultation with the pharmacist, the patient states he also is due for the pneumococcal vaccine and would like to receive that today as well.

Current medication list:
- Atorvastatin at 20 mg daily
- Lisinopril at 5 mg daily
- Men’s 50-plus multivitamin daily
- Glipizide at 5 mg daily

Discussion

Per ACIP guidelines, TE is a candidate for the shingles vaccine based upon his age that is greater than or equal to 60-years old. The pharmacist’s standing order allows for patients to be vaccinated for shingles who are 60 years old and older, and this patient falls within the immunization protocol. TE’s current medications and consent form questionnaire have not indicated any contraindications to vaccination with the shingles shot at this time. Current CDC/ACIP guidelines recommend administration of herpes zoster, regardless if patients recall having had chickenpox or not — 99% of Americans age 40-years old or older have had chickenpox. The package insert of herpes zoster recommends a four-week interval in between administration of zoster and pneumococcal. However, the CDC and FDA continue to recommend simultaneous administration at the same visit, if the patient is eligible for both to avoid missing a vaccine opportunity. Several studies have been conducted recently that have provided no direct evidence that supports separating administration times. PCV13 always should be recommended first, and then PPSV23 recommended a year later. The patient should be counseled on both vaccinations and receive vaccine information sheets. Since the patient also has indicated having diabetes, his yearly influenza and hepatitis B series vaccination history should be assessed, and vaccination should be encouraged if appropriate.
In addition to the required documentation per federal law, individual states also may have required documentation and reporting that must be executed on by immunizing pharmacists. For example, some states require mandatory reporting to immunization registries by all providers who immunize within the state. In addition, individual practice sites may have other required documentation per their standing order or collaborative practice agreement to immunize. Immunizing pharmacists should be familiar with their state and individual practice site documentation requirements and execute as required.

**IMMUNIZATION SAFETY MEASURES**

**Needle-stick exposure**

The most common safety issue that impacts immunizing pharmacists is the risk of needle-sticks. As discussed earlier, it is imperative that pharmacists follow company policies and procedures when immunizing patients and be familiar with the direction in a needle-stick protocol. To avoid a needle-stick accident, pharmacists should maintain awareness at all times and avoid distractions when administering an injection. The needle safety device should always be activated after contact with the patient. A sharps container should be in the immediate vicinity of the immunization area, and the syringe should be placed directly in the sharps container immediately after the immunization is administered. Used syringes that are not placed in a sharps container immediately, regardless of the use of safety devices, increase the risk of needle-stick accidents. Furthermore, needles should never be recapped after having been injected into a patient. In the event of a needle-stick accident, the event should be reported to the proper site coordinator and responded to swiftly, following the practice site’s protocol.

**Bleeding**

Bleeding may occur after an immunization. If so, the pharmacist should still acti-
cope post vaccination. Syncope may not be used to determine frequency of syncope events may be reported, VAERS data cannot be used to determine frequency of syncope post vaccination. Syncope may not be prevented with vaccination, but injuries as a result of syncope can be prevented. Common symptoms exhibited by patients include paleness, sweating, nausea, dizziness and loss of consciousness, and jerking may be possible. To avoid injury patients should always sit or lie down for injection, chairs should be perpendicular and have no wheels and nothing should be in front of the patient. Patients should remain seated and observed for 15 minutes after vaccination. Patients who do experience a syncope event may need their feet raised above their head, may sit on the floor with their head between their knees, and should be given an appropriate follow-up referral. In cases where patients are injured or lose consciousness, 911 may need to be called at a practice site that is not equipped to deal with more serious events. Finally, the pharmacist should report the event to VAERS.

Anaphylaxis:
A sudden or gradual onset of anaphylaxis can occur any time a vaccine is administered to a patient. It is essential that immunizing pharmacists are equipped with the necessary supplies and are competent to manage this serious adverse event. Sudden or gradual symptoms of anaphylaxis may include generalized itching; erythema; urticaria; angioedema — lips, face or throat; severe bronchospasm; shortness of breath; abdominal cramping; cardiovascular collapse; or shock. In the event of localized itching and swelling to the injection site, the pharmacist should observe the patient for the development of generalized symptoms. If they occur, the emergency medical system, or EMS, should be activated by calling 911 immediately. A second individual, such as a technician, should activate EMS while the immunizing pharmacist stays with the patient to assesses his or her airway, breathing, circulation and level of consciousness. Vital signs, such as blood pressure, should be monitored continuously. The immunizing pharmacist should be prepared to perform CPR, and may need to administer epinephrine and other medications per the emergency protocol every 5-to-15 minutes until EMS arrives. A patient should be kept in supine position unless breathing is labored. If the patient experiences breathing problems, the head should be elevated slightly as long as blood pressure is adequate to prevent loss of consciousness. If the blood pressure is low, elevate the patient’s legs and monitor blood pressure and pulse every five minutes. It is important to record the patient’s reaction to the vaccine, all vital signs measured, medications administered, the pharmacist who administered the medication and any other relevant clinical information. The incident also should be reported to VAERS and the patient’s primary care physician.

Vaccine-error prevention:
There is little available research on the adverse events related to vaccine errors. However, the World Health Organization, or WHO, emphasizes that adverse events due to vaccine errors are more common than adverse events due to the vaccines themselves. Syncope, or WHO, emphasizes that adverse events related to vaccine errors. With the large number of vaccines — approximately 30 — that most children receive by the age of 6, there are many opportunities for vaccine-related errors. Due to the immense opportunity and seriousness of potential vaccine errors, the Institute for Safe Medication Practices, or ISMP, undertook the task of learning more about vaccine errors and their causes by partnering with the California Department of Public Health in 2012 to develop the ISMP National Vaccine Errors Reporting Program, or VERP. This is the only national vaccine error-reporting system within the United States, with all its data sent to VAERS and utilized by the CDC and the U.S. Food and Drug Administration, or FDA. ISMP identified nine contributing factors during a two-year study with 1,000 reports submitted, and made recommendations for avoiding these errors in the future. An example of a common error reported was related to age-specific formulations, e.g., high-dose influenza shot being administered to patients under 65-years old. Immunizing pharmacists need to treat vaccine administration with the same attention to detail as they would with the dispensing of medication to prevent vaccine errors.

IMMUNIZATION COUNSELING PEARLS
All vaccines have the potential to cause adverse reactions, underscoring the importance of a proper screening prior to immunizing. However, even after a proper screening conducted by the pharmacist, it is still possible for patients to experience side effects, ranging from localized injection site reactions to severe and life-threatening events. The majority of vaccine administrations are tolerated well by patients, and simple aftercare instructions are important to discuss with patients.

**Immunization aftercare:**
After an immunization is administered, patients or their parents/guardians should be reminded that injection site reactions — redness, swelling, itching or soreness — are normal occurrences and can be managed by applying a cold compress to the area. If the injection site reaction is overly bothersome, an analgesic, usually acetaminophen or antipruritic, also known as diphenhydramine, medication may be used. Patients

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### Table 4: Required provider documentation each time an immunization is administered

- Patient’s name
- Date of birth
- Vaccine name*
- Vaccine manufacturer*
- Date the vaccination was administered*
- Vaccine lot number*
- Name and address of the person administering the vaccine*
- Publication date of the Vaccine Information Statement, or VIS*
- Date the VIS was given to the parent/guardian
- Site of vaccination
- Immunization adverse reaction indicator

*Federal documentation requirements required by statute 42 US Code 300a-25

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should be instructed to stay seated for at least 15 minutes after vaccination in case a vaccine-related reaction occurs, so the pharmacist can assist and manage if required. In addition to the VIS, pharmacists should counsel patients and/or parents or guardians to report any overly bothersome symptoms post vaccination.

In addition to aftercare, pharmacists should consult the prescribing information for the individual vaccines they are administering and provide patients further counseling as necessary. The VIS also can be helpful in directing counseling points for patients during the immunization encounter, seeing that it is a required form to be distributed to the patient anyway.

CONCLUSION

Vaccines have changed the landscape of the prevention of disease, eliminating many deadly diseases that once plagued the United States and the world. Pharmacists’ accessibility to the public makes them ideal candidates to provide immunizations and educate the public on vaccine-preventable diseases. It is important that pharmacists conduct a medical history and vaccine contraindication screening prior to administering any vaccine to a patient. Following proper vaccine storage, preparation and administration, technique is essential for patient safety and satisfaction. Administering immunizations is not without risk to the patient. Therefore, precautionary measures should be taken to avoid needle-sticks and exposure to blood-borne pathogens. Pharmacists may need to manage severe vaccine reactions after administration, but these events are typically rare. In contrast, mild vaccine reactions are common. Proper management and individual counseling pearls relevant to the vaccine administered are essential to provide to the patient.

PRACTICE POINTS

- The invention of immunization is considered one of the top 10 greatest public health achievements of the 20th century.
- Pharmacists have participated in vaccinations of the public since the early 1800s, with the first documented record occurring in the mid-1800s when pharmacists distributed smallpox vaccine to physicians.
- Obtaining a thorough patient history is vital before any immunization is administered by the pharmacist. The information collected will assist the pharmacist in determining if the vaccine the patient is requesting is indicated, and if other vaccines may be appropriate for the patient.
- The documents required to immunize may vary depending on the setting in which the immunization takes place, and should take into account employer policies, procedures and state laws.
- In addition to the required documentation, a relevant VIS form must be provided to the patient — or parent/guardian — for the vaccine he or she is about to receive.
- The most common safety issue that impacts immunizing pharmacists is the risk of needle-sticks. It is imperative that pharmacists follow company policies and procedures when immunizing patients, and are familiar with their needle-stick protocol.
- Sudden or gradual symptoms of anaphylaxis may include generalized itching, erythema or urticarial, as well as angioedema — lips, face or throat; severe bronchospasm; shortness of breath; abdominal cramping; cardiovascular collapse; or shock.

Successful completion of “Immunization administration: A review for pharmacist immunizers” (0401-0000-17-006-H06-P) is worth three contact hours of credit. To submit answers, visit our website at www.DrugStoreNewsCE.com. Please note: Assessment questions submitted online will appear in random order.

1. For every birth cohort that is vaccinated with recommended routine vaccines, society prevents how many cases of disease?
   a. 8 million cases of disease
   b. 10 million cases of disease
   c. 12 million cases of disease
   d. 14 million cases of disease

2. Pharmacists' role in vaccination of the public did not take place until the 1950s when the oral polio vaccine became available.
   a. True
   b. False

3. In addition to indication, what other pertinent information does the patient history help the pharmacist identify?
   a. Age and contraindications
   b. Allergies and contraindications
   c. Precautions and health conditions
   d. Precautions and contraindications

4. Women of childbearing age should not receive a live vaccine one month before or during pregnancy due to risk of virus transmission to the fetus.
   a. True
   b. False

5. Patients who are immunocompromised and in need of the live virus MMR may receive the vaccine if their CD4+ T-lymphocyte counts are:
   a. Greater than or equal to 50 cells/µL
   b. Greater than or equal to 100 cells/µL
   c. Greater than or equal to 200 cells/µL
   d. Greater than or equal to 300 cells/µL
   e. Greater than or equal to 400 cells/µL

6. Which of the following vaccines should be evaluated carefully in patients with a history of Guillain-Barré syndrome?
   a. Influenza and MMR
   b. Influenza and Tdap
   c. Tdap and hepatitis
   d. Tdap and pneumococcal

7. What needle length is recommended for a 125-pound woman who wants to receive an influenza shot?
   a. 5/8 inch
   b. 1 inch
   c. 1.5 inch
   d. 1.25 inch

8. Needles may be recapped after being used to inject a patient to avoid needlestick exposure.
   a. True
   b. False

9. Sudden or gradual symptoms of anaphylaxis may include all of the following, except:
   a. Angioedema
   b. Bronchospasm
   c. Fever
   d. Generalized itching
   e. Shock

10. Appropriate aftercare measures include the following, except:
    a. Analgesic use for pain
    b. Antipruritic use for itching
    c. Applying cold compress to injection site reaction
    d. Applying heat to injection site reaction