



Pharmacy Continuing Education from WF Professional Associates

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"Vaccines Update: 2018-2019"

November/December 2018



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This lesson will focus on common vaccines administered by pharmacists. This lesson is intended for pharmacists & technicians in all practice settings.

The program ID # for this lesson is 0798-0000-19-026-H06-P for pharmacists, and 0798-0000-19-026-H06-T for technicians. This lesson furnishes 2.5 (0.25 CEUs) contact hours of credit.

Participants completing this lesson by October 31, 2021 may receive full credit. Release date for this lesson is November 1, 2018. This is knowledge-based continuing pharmacy education.

To obtain continuing pharmacy education credit for this lesson, you must answer the questions on the quiz (70% correct required) and return the answers. Should you score less than 70%, you will be asked to repeat the quiz. Computerized records are maintained for each participant.

If you have any comments, suggestions or questions, contact us at the above address, or call 1-843-488-5550. **Please write your name, NABP eProfile (cpe Monitor) ID Number & birthdate (MM/DD) in the indicated space on the quiz page.**

The objectives of this lesson are such that upon completion participants will be able to:

For Pharmacists:

1. Discuss Healthy People 2020 goals for adult vaccination rates in the United States.
2. Describe the status of pharmacists' authorization to administer vaccines in the United States and the potential for expansion.
3. Explain how to use the 2018-19 Advisory Committee on Immunization Practice (ACIP) current recommendations in screening patients for immunizations.
4. Identify the contraindications and precautions for the use of influenza, shingles and pneumonia vaccines.
5. Describe the common vaccines requested for international travel.

For Technicians:

1. Describe the status of pharmacy department authorization to administer vaccines in the United States and the potential for expansion.
2. Explain how to use the 2018-19 Advisory Committee on Immunization Practice (ACIP) current recommendations in screening patients for immunizations.
3. Identify the contraindications and precautions for the use of influenza, shingles and pneumonia vaccines.
4. Describe the common vaccines requested for international travel.

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UPDATE: VACCINES 2018-2019 BACKGROUND

This lesson will focus on common vaccines administered by pharmacists. Information is provided that includes current rates of vaccination, changes in the ACIP (Advisory Committee on Immunization Practice) recommendations for 2018-19, potential risks for vaccine errors and how to identify patients who would benefit from vaccines. In addition, information is provided on common vaccines for international travel.

Vaccination has been a successful tool to reduce the burden of infectious diseases throughout the world.¹ Vaccines have reduced child mortality, hospitalizations and death from vaccine-preventable diseases. In the United States, there are immunization recommendations for 17 vaccine-preventable conditions. Unfortunately, some vaccine-preventable diseases, including viral hepatitis, influenza and tuberculosis are still reported in the United States. These diseases account for a significant cost in healthcare resources, illness and death. In Healthy People 2020, it is reported that 42,000 adults and 300 children continue to die each year from vaccine-preventable deaths.

An example of the risks associated with not vaccinating children made headlines in California in December, 2014.² An outbreak of measles occurred when an unvaccinated individual visited Disneyland. Measles rapidly spread and resulted in 84 cases of the disease across 14 states. Experts have reported that one reason for the rapid spread of measles in this instance was that some areas of California had only 50% immunization rates for childhood vaccines. Although anti-vaccine groups concerns about risks of vaccines have been debunked by scientists, there is still a significant issue with sections of the population not receiving childhood and adult vaccinations. Even more recently in July 2016, the State of Arizona reported an outbreak of 22 cases of measles.³ Some cases were severe and at least one person was hospitalized for 4 days. Measles vaccine programs that were started in the 1960s resulted in the disease being completely eliminated in the United States in 2000.⁴ That means that it no longer occurred naturally within the country's borders. The return of measles in the United States reminds us that it is still a significant disease worldwide. Measles is reported to affect over 20 million people in other countries. These individuals with the disease can carry it to the United States. It has been reported that the number of measles cases in Europe quadrupled in 2017.⁵ There were 21,315 new cases in 2017 compared with 5,273 cases in 2016. The World Health Organization stated that a decrease in vaccination rates is one of the contributing factors to this increase. The highest numbers of cases of measles were in Romania, Italy, and Ukraine.

A study published in 2018 from Baylor University reported hotspots around the United States that are at risk for measles outbreaks due to the decline in individuals receiving MMR vaccines.⁶

Eighteen states allow nonmedical exemptions (NME) for vaccinations and there has been an upward trend in children with NMEs since 2009. The high rate of NMEs in densely populated areas increases the risk for a measles outbreaks.

GOALS OF HEALTHY PEOPLE 2020

Healthy People 2020 initiated immunization goals for both children and adults.¹ These immunization goals are aggressive and are designed to reduce, eliminate or maintain elimination of vaccine-preventable diseases. There are 32 Immunization and Infectious Disease (IID) Objectives in Healthy People 2020. A detailed explanation of each of these objectives can

be found at <https://www.healthypeople.gov/2020/topics-objectives/topic/immunization-and-infectious-diseases/objectives>. There are some specific objectives pertaining to immunization rates that are of interest shown in Table 1. There has been significant improvement in immunization rates in all categories as of 2016, the last published report.

Table 1- Immunization Objectives for 2020¹

IID Objective	Title	Baseline	2016	Target
7.8	Effective coverage level of 2 doses of hepatitis A vaccine among children by age 19-35 months.	53%	60.6%	85%
8	Increase the percentage of children aged 19 to 35 months who receive the recommended doses of DTaP, polio, MMR, Hib, hepatitis B, varicella and pneumococcal conjugate vaccine (PCV)	68.4%	74.1%	80%
11.4	Increase the vaccination coverage level of 3 doses of human papillomavirus (HPV) vaccine for females by age 13 to 15 years	28.1% (in 2012)	37.2%	80%
11.5	Increase the vaccination coverage level of 3 doses of human papillomavirus (HPV) vaccine for males by age 13 to 15 years	6.9% (in 2012)	29.5%	80%
12.11	Increase the percentage of children aged 6 months through 17 years who are vaccinated annually against seasonal influenza	46.9% (in 2010-11 influenza season)	51.9%	70%
12.12	Increase the percentage of adults aged 18 and older who are vaccinated annually against seasonal influenza	38.1% (in 2010-11 influenza season)	43.4%	70%
12.13	Increase the percentage of health care personnel who are vaccinated annually against seasonal influenza	55.8% (in 2010-11 influenza season)	64.8%	90%
13.1	Increase the percentage of noninstitutionalized adults aged 65 years and older who are vaccinated against pneumococcal disease	60% (in 2008)	66.9%	90%
13.2	Increase the percentage of noninstitutionalized high-risk adults aged 18 to 64 years who are vaccinated against pneumococcal disease	16.6% (in 2008)	23.9%	60%
14	Increase the percentage of adults who are vaccinated against zoster (shingles)	6.7% (in 2008)	33.4%	30%

Based on the most recent data from 2016, it is clear that there are opportunities for pharmacists to increase the vaccination rate for a number of conditions.¹ Certainly, the expanded access of the influenza vaccine at community pharmacies has increased the vaccination rate for this condition. The current rates for flu vaccine are still well below the target of 70-90%. It is particularly troubling to see the poor compliance with vaccination among healthcare workers (64.8%). There are some significant changes in the recommendations for influenza vaccine for 2018. These updated changes are discussed in this lesson.

Increasing vaccination rates in herpes zoster is a target that many pharmacies could focus on. More specific information about herpes zoster is described in this lesson. As the U.S. population ages, more patients will be candidates for this vaccination. The "baby boomers" began turning 65 in 2011.⁷ By 2029, when all of the baby boomers will be 65 years and over, more than 20 percent of the total U.S. population will be over the age of 65. By 2056, the population 65

years and over is projected to become larger than the population under 18 years of age. The growth of the older adult population in the United States makes it critical that pharmacists screen and identify older adults who need additional vaccines or specific formulations of vaccines. Pharmacies might consider offering “Older Adult Immunizations” as a possible specialty within their practice, including pneumococcal, influenza and herpes zoster vaccines.

PHARMACISTS’ AUTHORITY TO ADMINISTER VACCINES

All states, as well as the District of Columbia and Puerto Rico, permit pharmacists to administer vaccines.⁸ The extent of the pharmacists’ authority to immunize does vary between states. Some states do not allow pharmacists to immunize children or restrict the age range of children who can be immunized by a pharmacist. It is important to determine what your Pharmacy Practice Act allows regarding your authority related to immunization.

All pharmacists involved in immunizations must demonstrate competence to administer vaccines and understand immunization recommendations.⁸ The American Pharmacists Association and other groups provide training programs <http://pharmacist.com/pharmacy-based-immunization-delivery>. In addition to baseline training, pharmacists should complete annual education to learn about changes in immunization practice.

In support of Healthy People 2020, non-physician healthcare professional (NPHP’s), including pharmacists, are taking a larger role in administering vaccines.¹ The Center for Disease Control, Centers for Medicare and Medicaid Services and the Medicare Voluntary Prescription Drug Benefit Programs (Part D) have endorsed the use of NPHPs to administer vaccines. As of July 2015, eight states allow the pharmacist to both prescribe and administer all vaccines and nine other states allow this practice with influenza vaccine only.⁹

ADVISORY COMMITTEE ON IMMUNIZATION PRACTICE (ACIP) RECOMMENDATIONS

ACIP is responsible for making vaccine recommendations for the United States.¹⁰ The Committee has 15 voting members made up of experts on immunization practice and vaccine use. The Committee makes recommendations to the CDC regarding use of vaccines and related agents for effective control of vaccine-preventable diseases. These recommendations are reviewed and then become CDC policy.

The ACIP meets three times a year to review recommendations, discuss outbreaks of vaccine-preventable diseases and review any vaccine shortage issues.¹¹ The ACIP reviews new clinical research that is used to make alterations in the recommended vaccine schedule, what type of vaccine to include, or other warnings. The ACIP immunization schedules are maintained on the CDC website at <http://www.cdc.gov/vaccines/schedules/hcp/index.html>. These immunization schedules include schedules for routine vaccines for children under 18 years of age and “catch up” immunization schedules for children who have missed doses of vaccines. It also contains the current recommendations for immunizations of adults. In October 2017, ACIP approved the 2018 immunization schedule for adults age 19 or older, effective February 2018.¹¹⁻¹³

SPECIFIC VACCINE INFORMATION

All pharmacists who are planning to immunize patients must be certified to administer vaccines and complete education and training on all aspects of vaccine administration. This lesson provides specific updates on targeted vaccines, but it does not replace competency training.

INFLUENZA

Influenza is a common viral infection.¹¹ It is a contagious respiratory tract infection caused by the influenza virus. It can precipitate serious complications including hospitalization or death. Symptoms of influenza may include fever, runny nose, sore throat, cough, muscle aches and pain. Patients are contagious from one day before their symptoms start and for about 1 week afterwards. Some individuals are at higher risk for developing complications.¹¹

Those at high risk include:

- Children under 5 years are at risk, but those under 2 years are at highest risk.
- Adults > than 65.
- Individuals in nursing homes.
- Pregnant patients.
- Patients with compromised immune systems.
- Those with chronic illnesses, including asthma, heart disease, kidney disease and diabetes.
- Individuals who are very obese, with a body mass index (BMI) of 40 or higher.

Flu season occurs in the United States usually from December to March; however, the season can last longer.¹¹ The Center for Disease Control provides weekly surveillance reports to determine when the flu season actually begins.

This year there is a new formulation for the "flu shot".¹¹⁻¹³ Each year the CDC analyzes the current influenza strains. The vaccine is then designed based on the most prevalent influenza strains that are seen in the United States. For 2018-2019, three-component vaccines are recommended to contain:

- A/Michigan/45/2015 A(H1N1)pdm09-like virus
- A/Singapore/INFIMH-16-0019/2016 A(H3N2)-like virus
- B/Colorado/06/2017-like (B/Victoria lineage) virus

The four component vaccines are recommended to include the above strains, plus an additional B virus called B/Phuket/3073/2013-like (B/Yamagata lineage) virus.

The B component recommendations are a change in the influenza B/Victoria lineage component recommended for the 2017–2018 Northern Hemisphere and 2018 Southern Hemisphere influenza vaccines. The B component change was made because of the increasing global circulation of an antigenically drifted B/Victoria lineage virus (V1A.1). See https://www.cdc.gov/mmwr/volumes/67/wr/mm6722a4.htm?s_cid=mm6722a4_w.

Important Change For 2018-19 Flu Season¹⁰

On February 21, 2018, ACIP recommended that Quadrivalent live attenuated influenza vaccine (LAIV4) (FluMist Quadrivalent, MedImmune) be an option for influenza vaccination of persons for whom it is appropriate for the 2018–19 season.

Elderly Patients

Fluzone High-Dose vaccine is intended for use in people ≥ 65 years or older.¹⁴ It contains four times the antigen contained in standard influenza injections. This higher dose is needed for elderly patients to seroconvert. It is given at the same dose as standard influenza injection (single intramuscular dose).

Patients with Egg Allergy

Guidelines have changed this year for individuals with egg allergy.¹⁵ For patients who only experience hives following exposure to eggs, any influenza vaccine can be administered that is appropriate for the patient's age. If the patient reports angioedema, breathing problems, lightheadedness, or they have needed epinephrine, they should only receive the influenza vaccine in a medical facility equipped to recognize and manage vaccine allergies. As an alternative, for individual's ≥ 18 years of age, there is an influenza vaccine (Flu Blok) that is produced without using eggs.

Influenza Vaccine

The influenza vaccine is injected intramuscularly.¹⁵ The dose must be given each year to ensure appropriate protection against the current flu viruses. This vaccine is contraindicated in patients who have had a severe allergic reaction (e.g., anaphylaxis) to any component of the vaccine. The influenza vaccine is generally well tolerated in adult patients. The most frequent adverse effects are injection site reactions, pain (13%), redness (10%) and swelling (8%).

HERPES ZOSTER

Shingles is caused by the varicella zoster virus.¹⁶ The varicella zoster virus is the same virus that causes chickenpox. After a patient has chickenpox, the virus stays in the body in a dormant (inactive) state. The virus can reactivate decades later, causing shingles. The symptoms of shingles start as a painful rash with blisters on one side of the face or body. The blistering rash clears up within two to four weeks. Some patients experience pain, itching, or tingling in the area where the rash eventually develops. This may happen anywhere from one to five days before the rash appears.

Shingles follow the dermatomes of the body.¹⁶ A dermatome is the area of skin that is mainly supplied by a single spinal nerve. The rash occurs on either the left or the right side of the body or face. In patients who are immunocompromised, the rash may be more widespread and may resemble a chicken pox rash. In addition to the painful rash, patients also report fever, headache, and chills.

A serious adverse effect of shingles is post-herpetic neuralgia (PHN).¹⁶ PHN presents as severe pain where the shingles rash occurred. PHN can be severe and debilitating but usually resolves in a few weeks or months in most patients. Shingles may lead to other serious complications including vision loss, pneumonia, hearing problems, or death.

It is estimated that nearly one out of three people in the United States will develop shingles in their lifetime.¹⁶ There are approximately one million cases reported each year. About 50% of all shingles cases occur in individuals who are 60 years of age or older. Certain populations are at increased risk for developing shingles. These groups include patients with:

- leukemia and lymphoma
- human immunodeficiency virus (HIV)
- bone marrow or organ transplantation
- patients who take immunosuppressive drugs

Herpes Zoster Vaccines

Shingrix and Zostavax

The Food and Drug Administration approved Shingrix in 2017. This is the first new herpes zoster vaccine approved in over ten years.¹⁷ In October 2017, the CDC changed recommendations for herpes zoster vaccination to Shingrix. Not only is Shingrix the preferred vaccination, it is recommended for all patients 50 years of age and older, including those who already received Zostavax.

Shingrix is a recombinant, non-live vaccine, while Zostavax is a live vaccine.¹⁶ Most live vaccines like Zostavax need to be used with caution in patients who are immunocompromised due to an increased risk of adverse reactions. There is no caution for use of Shingrix in immunocompromised individuals.¹⁷ In addition, non-live vaccines typically have less stringent storage requirements. Shingrix is refrigerated while Zostavax must be frozen.

Shingrix requires two doses, 2 to 6 months apart, compared to a single dose of Zostavax.¹⁷ This improved vaccine (Shingrix) has a reported efficacy of 98% for one year and 85% over three years. The older herpes zoster vaccine (Zostavax) has an overall effectiveness of 61%. Shingrix contains an immune response boosting adjuvant (AS01B). Adjuvants are a common component of many vaccines and can boost the potency, quality or longevity of an immune response. Zostavax does not contain an immune boosting adjuvant and its effects begin to wane in patients over 70 years of age.

Shingrix is indicated for the prevention of herpes zoster (shingles) in adults 50 years of age and older.¹⁷ It is not effective for the primary prevention of chickenpox. Shingrix is contraindicated in individuals with a history of anaphylaxis to any component of the vaccine.

Shingrix is given as two intramuscular injections 2 to 6 months apart.¹⁷ It is important for pharmacists to note that the Shingrix vaccine is stored in the refrigerator and should be reconstituted immediately prior to use. Once it is reconstituted, administer the dose immediately. If more than 6 hours have passed since reconstitution, the vaccine should be discarded.

The most common adverse reactions reported with Shingrix include injection site reactions.¹⁷ These include pain (78%), erythema (38%) and swelling (26%). Systemic adverse effects include myalgia (45%), fatigue (44%), headache (38%), shivering (27%) and fever (20%).

The Center for Disease Control has issued their guidelines for Herpes Zoster vaccination for 2018.¹⁸ The recommendations are shown below:

- Administer 2 doses of recombinant zoster vaccine (RZV) (Shingrix) 2–6 months apart to adults aged 50 years or older regardless of past episode of herpes zoster or receipt of zoster vaccine live (ZVL) (Zostavax).
- Administer 2 doses of RZV 2–6 months apart to adults who previously received ZVL at least 2 months after ZVL.
- For adults aged 60 years or older, administer either RZV or ZVL (RZV is preferred).
- "ZVL" has replaced the term "HZV" (herpes zoster vaccine) that was used in past adult immunization schedules to refer to the live zoster vaccine.

MUMPS BOOSTER

There has been an increase in the incidence of mumps in the United States.¹⁹ The CDC recommends vaccinating people during a mumps outbreak to control the spread of the disease. The immunity from a Measles Mumps Rubella vaccine can decrease over time, so giving a mumps booster can be effective in providing good levels of immunity. The ACIP recommends booster doses of mumps vaccine for individuals at high risk of catching the disease during an outbreak, even if they have already received 2 doses in their lifetime. Two MMR doses are about 88% effective in preventing mumps.

Groups at high risk during a mumps outbreak include:

- college students
- healthcare professionals caring for individuals with mumps
- those living in a community experiencing an outbreak or recently exposed to the disease
- individuals planning to travel internationally in countries where mumps is a problem

The most common side effect of MMR is fever which is reported in 5 to 15% of individuals. Rash is reported in 5% of cases. These side effects usually appear one to two weeks after the vaccine is given. Approximately one quarter of women who receive the MMR vaccine will develop temporary joint pain from the rubella component of the vaccine.

PNEUMOCOCCAL DISEASE AND VACCINES

Pneumococcal disease kills more people in the United States each year than all other vaccine-preventable diseases combined. Fatalities from pneumococcal disease usually occur with bacteremia and meningitis and the death rate from pneumococcal disease may be as high as 60% in elderly patients.

There are two vaccines for pneumonia:

- PCV13 protects against 13 of the most severe types of bacteria that cause pneumonia.
- PPSV23 protects against an additional 23 types of pneumonia bacteria.

Both of these agents should be administered to all adults over 65 years. The PCV13 should be given first, then the PPSV23 should be given 12 months later. These vaccines should not be given together.

Adults age 19 through 64 who have certain chronic diseases should receive a PCV13 dose at the next vaccination opportunity. These include:

- Immunocompromised patients
- Sickle Cell Disease, Asplenia
- Cerebrospinal fluid leak
- Cochlear implant

MEDICATION ERRORS WITH VACCINE ADMINISTRATION

The Institute for Safe Medication Practice maintains a vaccine error reporting program (VERP).²⁰ There are a number of contributing factors that can increase the chance for a vaccine error. Some of these errors can be remedied with additional education and training, while others may be reduced by changing the processes within the workplace to reduce interruptions and confusion. The most common contributing factors reported to the ISMP VERP include:

- Choosing the incorrect age-specific formulations of vaccine
- Unfamiliarity with the vaccine, particularly its dose, dosing schedule, age specifications, route of administration, and a vaccine's components (e.g., combination vaccines; diluent and powder)
- Failure to check or verify the vaccination schedule and the patient's age, health record, or state immunization information system to avoid invalid doses administered too soon, or missed opportunities to vaccinate
- Confusion due to similar vaccine names and abbreviations
- Confusion due to similar and ambiguous vaccine labeling and packaging
- Administering a diluent without a vaccine
- Administering one component of two-component vaccines
- Using the wrong vaccine diluent
- Unsafe storage (e.g., too close to similar-looking vaccines, temperature excursions, expired vaccines)

The report listed the top six vaccines associated with errors:

1. Influenza
2. Diphtheria and tetanus toxoids, acellular pertussis, inactivated poliovirus (DTaP-IPV)
3. Hepatitis A
4. Tetanus toxoid, reduced diphtheria toxoid, and acellular pertussis adsorbed (Tdap)
5. Human papillomavirus, recombinant (4vHPV, 2vHPV)
6. Diphtheria and tetanus toxoids, and acellular pertussis adsorbed (DTaP)

Pharmacists should review this report and ensure that they have appropriate procedures to reduce the risk of vaccine administration errors in the pharmacy.

TRAVEL VACCINES

Pharmacists are in a unique position to provide travel vaccines as part of their overall vaccination program. Pharmacists can work with patients to develop a travel vaccine plan. Travel vaccine information can be found in the CDC Yellow Book. This reference is available online at the following link: <https://wwwnc.cdc.gov/travel/page/yellowbook-home>. It is also available as a mobile application.

The CDC travel website can be an extremely useful tool in determining what vaccines an individual needs prior to traveling. It can be found at <https://wwwnc.cdc.gov/travel>. This website allows you to choose the countries of travel, whether children or pregnant women will be traveling and recommendations for people with chronic diseases. It is useful for individuals who are going on cruises as well as visiting individual countries.

The most common travel vaccines that are requested include:

Common Travel Vaccines	
Hepatitis A and B	Rabies
Meningococcal disease	Japanese Encephalitis
Typhoid and paratyphoid fever	Yellow fever
Polio Vaccine	

Pharmacists may be required to complete a certification program on travel vaccinations prior to offering this service in their pharmacy. This program can be found at <https://www.pharmacist.com/pharmacy-based-travel-health-services>.²¹

Yellow Fever Vaccine

Yellow fever vaccine is only available at a limited number of clinics in the United States.²¹ The only US-licensed yellow fever vaccine (YF-Vax) is currently out of stock. Until supply returns at the end of 2018, an alternative yellow fever vaccine, Stamaril, is available. The Food and Drug Administration (FDA) has approved the use of Stamaril until YF-Vax is available. It is comparable in safety and efficacy as YF-Vax.

For most individuals who are traveling to areas where yellow fever is present, a single dose of yellow fever vaccine provides lifelong protection. Reactions to yellow fever vaccine are generally mild. They may include headaches, muscle aches, and low-grade fevers.²¹

Polio Vaccine

In May 2018, the World Health Organization released updated recommendations on polio vaccine requirements.²³ Temporary polio vaccine is recommended if traveling to Afghanistan, Democratic Republic of the Congo, Kenya, Nigeria, Pakistan, Somalia and Syria. Individuals should receive the polio vaccine 4 weeks to 12 months before travel to affected areas. Some countries may require that you show proof of vaccine before you are permitted to leave the polio-infected country.

IMPLEMENTING A VACCINE PROGRAM IN YOUR PHARMACY

There are many pharmacists who have started vaccine programs at their pharmacies.²⁴ Before implementing a program at your pharmacy, you need to ensure that you are well prepared. Consider the following steps before beginning your own program.

1. Understand the policies in your state. Review the Pharmacy Practice Act in your state. It will describe which vaccines the pharmacist is permitted to administer.
2. Identify patients who would be appropriate for vaccination. These groups would include the elderly, school age children, patients with chronic diseases such as heart disease, lung disease or diabetes.
3. Work with third-party payors to provide vaccine services for their covered patients. Many third parties pay for pharmacists to vaccinate patients.
4. Implement a marketing program to ensure all your patients are aware of your vaccine program including travel vaccine services. Consider utilizing emails, direct mailing, store signage and social media.
5. Before ordering vaccines, you will need to consider which ones you will be administering, and the necessary storage requirements.
6. Determine where you will administer the vaccine in your pharmacy. Be sure to have an appropriate place to safely administer the vaccines. You may also provide vaccines at off-site clinics such as at local churches, workplaces, or community events/health fairs. Talk to your local Chamber of Commerce for potential ideas.
7. Develop a policy for handling adverse reactions to a vaccine injection. All pharmacists should be trained in emergency protocols. You should have an emergency response kit available on site when administering vaccines.

RESOURCES FOR THE PHARMACIST

There are a number of immunization mobile applications available to the pharmacist for reference.²⁵ A useful site that provides an overview of these applications is

<http://www.immunize.org/resources/apps.asp>:

AAP Red Book: This reference from the American Academy of Pediatrics provides a well-organized and thorough resource for childhood infections and immunizations. The textbook version has been used for several years and there is a mobile app available now.

The CDC Vaccine Schedule: This mobile application provides access to all CDC recommended immunization schedules and footnotes. This application has been optimized for tablet and smartphones.

CDC Influenza: This application provides an easy to access format. Some unique features in this application include updated data on national flu activity, influenza vaccination recommendations, information on diagnosis and treatment of influenza, and information on laboratory testing for influenza.

The CDC Yellow Book (International Travel Vaccines): The yellow book provides information on what vaccinations are required for international travel. Information on other medications required when traveling internationally is also provided.

The Vaccine Handbook (The Purple Book): The purple book is a popular resource with practitioners. It contains not only the most current CDC recommendations for immunization but also practical advice on how to handle specific situations that may occur in practice.

CONCLUSION

There continues to be significant opportunities for pharmacists to administer vaccines. All states allow for pharmacists to administer vaccines. The Healthy 2020 objectives have not been achieved and provide a great starting point for pharmacists to focus on. Flu shots continue to be the centerpiece for many pharmacy immunization programs. There is a new influenza formulation available for the 2018-19 season. Community pharmacists should investigate the value of adding travel vaccine services to their vaccine program. In addition, HPV vaccine and herpes zoster vaccines are two vaccines that can easily be added to your pharmacist vaccine program.

REFERENCES

1. Healthy People.gov. Immunization and Infectious Diseases. <https://www.healthypeople.gov/2020/topics-objectives/topic/immunization-and-infectious-diseases/objectives>. Accessed June 19, 2018.
2. Center for Disease Control. U.S. Multi-state Measles Outbreak, December 2014-January 2015. <https://emergency.cdc.gov/han/han00376.asp>. Accessed June 19 2018.
3. American bar Association. Arizona measles outbreak attributed to vaccine-refusing guards at immigration detention center. http://www.abajournal.com/news/article/arizona_measles_outbreak_vaccine_refusing_guards_at_immigration_detention. Accessed June 19, 2018.
4. Papania M, Wharton ME. Measles elimination in the United States. *J Infect Dis*. 2004; 189 (Supplement 1):S1-S3.
5. World Health Organization. Europe observes a 4-fold increase in measles cases in 2017 compared to the previous year. http://www.euro.who.int/en/media-centre/sections/press-releases/2018/europe-observes-a-4-fold-increase-in-measles-cases-in-2017-compared-to-previous-year?utm_source=WHO+List&utm_campaign=25f704929e-EMAIL_CAMPAIGN_2018_01_18&utm_medium=email&utm_term=0_823e9e35c1-25f704929e-266923441. Accessed June 19, 2018.
6. Olive JK, Hotez PJ, Damania A, Nolan MS. The state of the antivaccine movement in the United States: A focus examination of nonmedical exemptions in states and counties. *PLOS Medicine* 2018;15(6):e1002578. <http://journals.plos.org/plosmedicine/article?id=10.1371/journal.pmed.1002578>. Accessed June 19, 2018.

7. Colby, Sandra L. and Jennifer M. Ortman. *The Baby Boom Cohort in the United States: 2012 to 2060*. Current Population Reports, P25-1141. U.S. Census Bureau, Washington, DC. 2014. Retrieved from: <https://www.census.gov/prod/2014pubs/p25-1141.pdf>. Accessed June 22, 2018.
8. American Pharmacists Association. Pharmacist administered immunizations. What does your state allow? <https://www.pharmacist.com/pharmacist-administered-immunizations-what-does-your-state-allow>. Accessed June 22, 2018.
9. Stewart AM, Lindley MC, Cox MA. State law and standing orders for immunization services. *Am J Prev Med*. 2016;50(5):e133-e142. [http://www.ajpmonline.org/article/S0749-3797\(15\)00641-8/pdf](http://www.ajpmonline.org/article/S0749-3797(15)00641-8/pdf). Accessed June 22, 2018.
10. Grohskopf LA, Sokolow LZ, Fry AM, Walter EB, Jernigan DB. Update: ACIP Recommendations for the Use of Quadrivalent Live Attenuated Influenza Vaccine (LAIV4) — United States, 2018–19 Influenza Season. *MMWR Morb Mortal Wkly Rep* 2018;67:643–645.
11. Center Center for Disease Control. Vaccine recommendations of the ACIP. <http://www.cdc.gov/vaccines/hcp/acip-recs/index.html>. Accessed June 24, 2018.
12. CDC. Review of effectiveness of live attenuated influenza vaccine. Presented to the Advisory Committee on Immunization Practices, February 21, 2018. Atlanta, GA: US Department of Health and Human Services, CDC; 2018. <https://www.cdc.gov/vaccines/acip/index.html>. Accessed June 24, 2018.
13. Center for Disease Control. Update: Influenza Activity in the United States During the 2017–18 Season and Composition of the 2018–19 Influenza Vaccine https://www.cdc.gov/mmwr/volumes/67/wr/mm6722a4.htm?s_cid=mm6722a4_w. Accessed June 24, 2018.
14. Center for Disease Control. What you should know and do this flu season if you are over 65 years of age. <http://www.cdc.gov/flu/about/disease/65over.htm>. Accessed June 24, 2018.
15. Fluzone [package insert]. Swiftwater PA: Sanofi Pasteur Inc.; June 2015. https://www.vaccineshoppe.com/image.cfm?doc_id=12937&image_type=product_pdf. Accessed June 25, 2018.
16. Center for Disease Control. Shingles (Herpes Zoster) World Health <http://www.cdc.gov/shingles/about/overview.html>. Accessed June 25, 2018.
17. Shingrix [package insert]. Research Triangle Park NC: Glaxo Smith Kline; October, 2017. https://gsksource.com/pharma/content/dam/GlaxoSmithKline/US/en/Prescribing_Information/Shingrix/pdf/SHINGRIX.PDF. Accessed June 22, 2018.
18. Center for Disease Control. Shingles (Herpes Zoster) Vaccination <https://www.cdc.gov/shingles/vaccination.html>. Accessed June 24, 2018.
19. Immunization action coalition. Mumps: Questions and Answers. Information about the disease and vaccines. <http://www.immunize.org/catg.d/p4211.pdf>. Accessed June 25, 2018.
20. Institute for Safe Medication Practice. Recommendations for practitioners and manufacturers to address system-based causes of vaccine errors. <https://www.ismp.org/newsletters/acutecare/showarticle.aspx?id=74>. Accessed June 26, 2018.
21. American Pharmacists Association. Pharmacy-Based Travel Health Services. <https://www.pharmacist.com/pharmacy-based-travel-health-services>. Accessed June 27, 2018.
22. Center for Disease Control. Yellow Fever Vaccine. <https://www.cdc.gov/yellowfever/vaccine/index.html>. Accessed June 27 2018.
23. Center for Disease Control. Polio Vaccine. <https://wwwnc.cdc.gov/travel/news-announcements/polio-guidance-new-requirements>. Accessed June 29, 2018.
24. Immunization Action Coalition. Setting up for vaccine services. http://www.immunize.org/guide/aov03_setup.pdf. Accessed June 30, 2018.
25. Immunization Action Coalition. Immunization apps to healthcare professionals. <http://www.immunize.org/resources/apps.asp>. Accessed June 30, 2018.

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Nov-Dec 2018 (Combined Lesson) "Vaccines: A Pharmacy Update for 2018 & 2019"

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LESSON EVALUATION

Please fill out this section as a means of evaluating this lesson. The information will aid us in improving future efforts. Either circle the appropriate evaluation answer, or rate the item from 1 to 7 (1 is the lowest rating; 7 is the highest).

1. Does this lesson meet the learning objectives? (Circle your choice).

Discuss Healthy People 2020 goals	YES	NO
Describe status of pharmacists' authorization to administer vaccines	YES	NO
Explain how to use the 2018-2019 ACIP recommendations	YES	NO
Identify precautions associated with vaccines	YES	NO
Describe common vaccines requested for international travel	YES	NO

2. Was the program independent & non-commercial? YES NO

	Low Relevance					Very Relevant		
3. Relevance of topic	1	2	3	4	5	6	7	

4. What did you like **MOST** about this lesson? _____

5. What did you like **LEAST** about this lesson? _____

6. How would you improve this lesson? _____

Please Mark the Correct Answer(s)

1. The Healthy People 2020 Target Goal for the percentage of adults who are vaccinated against zoster (shingles) is:

- a. 25%
- b. 30%
- c. 45%
- d. 80%

2. Which of the following are not common travel vaccines?

- a. Gardasil
- b. Hepatitis A and B
- c. Yellow fever
- d. Rabies

3. Which of the following statements is FALSE regarding the pharmacist's authority to immunize?

- a. The extent of the pharmacists' authority to immunize does not vary between states.
- b. All states, as well as the District of Columbia and Puerto Rico, permit pharmacists to administer vaccines.
- c. All pharmacists must demonstrate competence to administer vaccines.
- d. As of 2015, eight states allow the pharmacist to both prescribe and administer all vaccines and nine states allow this practice with influenza vaccine.

4. **The ACIP recommends that both pneumococcal conjugate vaccine (PCV13, Prevnar 13), and pneumococcal polysaccharide vaccine (PPSV23, Pneumovax) should be administered routinely in a series to all adults age 65 years and older; the PCV13 vaccine first, then the PPSV23 vaccine a year or more later.**
 - a. True
 - b. False
5. **Examples of individuals at higher risk for developing complications from influenza include:**
 - a. Jack Mobley, a 73 year old man residing in a nursing home
 - b. Dawson Myles, an 8 month old child who lives in Ohio
 - c. Alice Kallock, an 84 year old female with heart failure
 - d. All of these patients fall into high risk categories for developing complications from influenza
6. **Two MMR vaccines given over a lifetime are what percent effective in preventing mumps?**
 - a. 88%
 - b. 50%
 - c. 75%
 - d. 98%
7. **A serious adverse effect of shingles is:**
 - a. Post herpetic stroke
 - b. Post herpetic neuralgia
 - c. Fatigue
 - d. Leukemia
8. **Edna Worth is a 61-year-old patient who comes to the pharmacy for all of her prescriptions. She usually gets her flu shots from you as well as her prescriptions. She has come in and states that she would like to have the new Shingles vaccine. When you are reviewing her drug and medical history she states that she received a Zostavax vaccine last year. She wants to know if she still needs to get the new vaccine since she already had the Zostavax injection.**
 - a. You explain that she cannot receive the new shingles vaccine at this time. She will need to wait 1 year before she can receive Shingrix.
 - b. Since it was last year, she should receive a booster dose of Zostavax, not the new vaccine (Shingrix).
 - c. You explain that she needs to wait another 6 months before she can receive the Shingrix vaccine since she received Zostavax 12 months ago.
 - d. The CDC recommends all patients receive the Shingrix vaccine, including individuals who have already received Zostavax. So, you move forward with administering the vaccine.
9. **Yellow fever vaccine is administered:**
 - a. As a single vaccine once in a lifetime.
 - b. At age 30 years.
 - c. As 3 doses, at 0 Months, 2 months and 6 months.
 - d. As 2 doses given 6 months apart.
10. **What are the vaccines most often associated with medication errors?**
 - a. Influenza.
 - b. Diphtheria and tetanus toxoids.
 - c. Hepatitis A.
 - d. All of the above.