

PHARMACIST CE:

Pediatric Immunization Update

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Standard pharmacist immunization training includes information and skills for administering vaccines to children. However, with relevant changes to Wisconsin law pending, an update is required.¹ This CE fulfills the pediatric vaccination education requirements described in SB110/AB137, which details the following changes to pharmacy-based immunization:

- Pharmacists and interns who have completed appropriate training can immunize children under the age of 6 years pursuant to a prescription order that is valid for a maximum of 30 days.
- Pharmacists and interns who have completed appropriate training can immunize anyone aged 6 years or older without a protocol, standing order, or prescription, so long as they use recommendations from the Advisory Committee on Immunization Practices (ACIP).
- Pharmacists must enter immunization records into the Wisconsin Immunization Registry (WIR) within 7 days of vaccination.

CE FOR PHARMACISTS

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Learning Objectives

- Understand the pharmacy practice changes associated with the forthcoming Wisconsin Senate Bill 110/Assembly Bill 137 (SB110/AB137) and their implications
- Effectively plan for any necessary changes to their practice site that will follow passage of SB110/AB137
- Use the unique skills required to administer vaccines to young children and understand the special precautions that should be taken
- Issue age-appropriate and guideline-supported vaccine recommendations for young children

Immunization Schedule

The child and adolescent immunization schedule is updated frequently by the ACIP and published annually by the Centers for Disease Control and Prevention (CDC).² In order to comply with SB110/AB137, pharmacists will be required to use the schedule endorsed by the ACIP for individuals aged 7 years and older when immunizing these individuals without a prescription order.¹ Although other expert groups, such as the American Academy of Pediatrics and the Infectious Diseases Society of America, also issue

immunization recommendations, these recommendations are not always the same as those made by the ACIP and are not discussed in or supported by the proposed legislation. If a clinician determines that a vaccine is required that falls outside the ACIP recommendations, a prescription order may be used to allow a pharmacist to administer the vaccine.

The bill also stipulates that a valid prescription order is required for pharmacists to administer vaccine to children 6 years of age and under.¹ Prescription orders for this purpose are

TABLE 1. Details for Routine Vaccines Contained in the ACIP Pediatric Immunization Schedule³

Vaccine Name	Abbreviation(s)	Minimum/Maximum Recommended Age*	Notable Contraindications**	ROA
Diphtheria, tetanus, and acellular pertussis vaccine	DTaP	Minimum: 6 weeks Maximum: 6 years	Encephalopathy within 7 days of previous dose of DTaP (or Tdap) without another identifiable cause	IM
Diphtheria, tetanus vaccine	DT	Minimum: 6 weeks Maximum: 6 years	None	IM
<i>Haemophilus influenzae</i> type b vaccine	Hib (PRP-T) Hib (PRP-OMP)	Minimum: 6 weeks Maximum: 6 years	Age <6 weeks	IM
Hepatitis A vaccine	HepA	Minimum: 12 months Maximum: N/A	None	IM
Hepatitis B vaccine	HepB	Minimum: Birth Maximum: N/A	Known hypersensitivity to yeast	IM
Human papillomavirus vaccine	HPV	Minimum: 9 years Maximum: N/A	None	IM
Influenza vaccine (inactivated)	IIV	Minimum: 6 months Maximum: N/A	None	IM
Influenza vaccine (live, attenuated)	LAIV	Minimum: 2 years Maximum: N/A	<ul style="list-style-type: none"> • Current use of aspirin (for children and adolescents) • Use of influenza antiviral in past 48 hours • Age 2-4 years with asthma or reported wheezing in past 12 months[†] • Pregnancy[†] • Immunosuppressed[†] 	IN
Measles, mumps, rubella vaccine	MMR	Minimum: 12 months Maximum: N/A	<ul style="list-style-type: none"> • Pregnancy • Severe immune deficiency or family history of altered immunocompetence 	SQ
Meningococcal serogroups A, C, W, Y vaccine	MenACWY-D MenACWY-CRM	Minimum: 9 months Maximum: N/A	None	IM
Meningococcal serogroup B vaccine	MenB-4C MenB-FHbp	Minimum: 2 months Maximum: N/A		
Pneumococcal 13-valent conjugate vaccine	PCV13	Minimum: 6 weeks Maximum: N/A	Severe allergic reaction due to diphtheria-toxoid containing vaccine	IM
Pneumococcal 23-valent polysaccharide vaccine	PPSV23	Minimum: 2 years ^{††} Maximum: N/A	None	IM/SQ
Poliovirus vaccine (inactivated)	IPV	Minimum: 6 weeks Maximum: 17 years	None	IM/SQ
Rotavirus vaccine	RV1 RV5	Minimum: 6 weeks Maximum: 8 months	<ul style="list-style-type: none"> • Severe combined immunodeficiency • History of intussusception 	PO
Tetanus, diphtheria, and acellular pertussis vaccine	Tdap	Minimum: 7 years Maximum: N/A	Encephalopathy within 7 days of previous dose of Tdap (or DTaP) without another identifiable cause	IM
Tetanus and diphtheria vaccine	Td	Minimum: 7 years Maximum: N/A	None	IM
Varicella vaccine	VAR	Minimum: 12 months Maximum: N/A	<ul style="list-style-type: none"> • Pregnancy • Severe immune deficiency or family history of altered immunocompetence 	SQ

Abbreviations: IM = intramuscular; IN = intranasal; PO = oral; ROA = route of administration; SQ = subcutaneous;

* ACIP recommendations for routine and catch-up immunization of patients up to 19 years of age; age ranges are inclusive

** Severe allergic reaction due to previous dose or vaccine component is considered a contraindication for each vaccine product

[†] ACIP recommendation, not a true contraindication

^{††} Recommended only for select high-risk pediatric patients

TABLE 2. Details for Available Combination Vaccine Products Used in Pediatric Patients³

Vaccine Name	Abbreviation	Trade Name(s)	Minimum/Maximum Recommended Age*	ROA
DTaP, inactivated poliovirus, <i>Haemophilus influenzae</i> type b, and hepatitis B vaccine	DTaP-IPV-Hib-HepB	Vaxelis™	Minimum: 6 weeks Maximum: 4 years	IM
DTaP, hepatitis B, and inactivated poliovirus vaccine	DTaP-HepB-IPV	Pediarix™	Minimum: 6 weeks Maximum: 6 years	IM
DTaP, inactivated poliovirus, and <i>Haemophilus influenzae</i> type b vaccine	DTaP-IPV-Hib	Pentacel®	Minimum: 6 weeks Maximum: 4 years	IM
DTaP and inactivated poliovirus vaccine	DTaP-IPV	Kinrix™ Quadracel™	Minimum: 4 years Maximum: 6 years	IM
<i>Haemophilus influenzae</i> type b and meningococcal serogroups C, Y vaccine	Hib-MenCY	MenHibrix®	Minimum: 6 weeks Maximum: 18 months	IM
Measles, mumps, rubella, and varicella vaccines	MMRV	ProQuad®	Minimum: 12 months Maximum: 12 years	SQ

Abbreviations: IM = intramuscular; ROA = route of administration; SQ = subcutaneous;

* Age ranges are inclusive

valid for a maximum of 30 days from the written date. No specific guidelines for adherence to ACIP recommendations is required by law for vaccines to be administered to those under the age of 6 years pursuant to a prescription order.

Fully appreciating the ACIP immunization schedule and its role in SB110/AB137 can position pharmacists to issue and act upon a wide range of age-appropriate vaccination recommendations for their patients. Additionally, the changes to pharmacy practice that will accompany the passage of the bill stand to significantly increase the professional autonomy of pharmacists as immunizers.

Pediatric Vaccine Administration

Appropriately and safely administering vaccines to pediatric patients requires that special considerations be made prior to, during, and following vaccine administration. Before administering vaccines, allergy and immunization history information should be gathered, reviewed for accuracy, and documented. A vaccine should not be administered if the patient has had a hypersensitivity reaction to the vaccine product in the past; however, non-severe allergy to vaccine additive ingredients, including gelatin or egg protein, is not an absolute contraindication to routine vaccination.³ A complete list of contraindications for available pediatric

single-antigen vaccines can be found in Table 1. Unique precautions also exist for several pediatric vaccines; prior to administration, these precautions should be considered in the context of patient allergy history as well as personal medical and family history.

Pediatric vaccines are administered by several routes, but most injectable pediatric vaccines are administered by the intramuscular (IM) route.³ The preferred IM injection site is dependent on patient age; in those 2 years of age and under, the anterolateral thigh is the preferred IM injection site, while the deltoid muscle is preferred for those 3 years of age and older. The preferred site for subcutaneous injection is the thigh for those under the age of 12 months and the triceps region for those 12 months of age or older. Measles-mumps-rubella and varicella vaccines are administered by the subcutaneous route to children at least 12 months of age. Additionally, the subcutaneous route is an option for administration of inactivated polio vaccine as well as pneumococcal polysaccharide vaccine which is indicated for some children at 2 years of age or older. The preferred routes of administration for each available pediatric single-antigen and combination vaccine are shown in Table 1 and Table 2, respectively. In addition to identifying an appropriate injection site, pharmacists should be sure to select a needle of appropriate gauge and length based on the selected site and route of

administration, as well as patient age and body mass. For IM injection, a 22-25 gauge needle should be used; the preferred needle length for IM injection varies by patient age and injection site; this information is displayed in Table 3. For injection by the subcutaneous route, a 23-25 gauge, 5/8 inch needle should be used regardless of age or body mass. Visual schematics demonstrating appropriate injection technique can be found on page 102 of the most recent best practice guidelines for immunization issued by the ACIP (<http://bit.ly/ImmRec7>).³ A video on vaccine administration which demonstrates best practices is available for members on the PSW website.

Vaccines used in current practice are remarkably safe, but adverse reactions are possible.^{3,4} Most reported vaccine-related adverse effects are mild in nature, but each product carries some unique risks; package inserts should be reviewed, and the topic of vaccine-related adverse effects should be sufficiently addressed with the patient or their caregiver, as appropriate.⁴ This conversation can be guided by the CDC-produced Vaccine Information Statement (VIS) that is given to the parent or guardian for each vaccine administered. Although very rare, hypersensitivity reactions may occur following vaccine administration, and immunizers should have the necessary supplies on hand to manage severe allergic reactions including anaphylaxis. The ACIP recommends that

immunizers be trained in cardiopulmonary resuscitation and maintain an appropriate stock of epinephrine along with the supplies necessary to maintain an open airway in the event of an emergency.³ Immunizers should also have actionable contingency plans in place to coordinate emergency medical care for those who experience an anaphylactic reaction following vaccine administration. The Immunization Action Coalition has quick reference documents available for the management of vaccine reactions that can be used for pharmacy-based immunization services (<http://bit.ly/imm4phm>).

Pediatric Vaccines

Overview

In addition to special administration considerations, some unique precautions must be kept in mind when immunizing pediatric patients. Some vaccines, including diphtheria-tetanus-acellular pertussis, hepatitis A, and hepatitis B vaccines, have different doses for pediatrics than for adults.³ Pharmacists new to providing these vaccines should be certain to stock the pediatric preparations of these products and to verify the dose prior to administration. Vaccines are available for a wide range of diseases and are typically appropriate for use across several age demographics, but rotavirus vaccines are a notable exception as they are indicated solely for infants under the age of 9 months.⁵ Immunizers should be familiar with the various populations for whom vaccines are (and are not) recommended; a summary of this information can be found in Tables 1 and 2. Several combination vaccine products are available for pediatric use; when appropriate, the ACIP recommends that these be used to minimize patient discomfort and promote on-time vaccination.³

Diphtheria

Diphtheria is a bacterial infection caused by *Corynebacterium diphtheriae* that commonly affects the respiratory system.⁶ Common early symptoms of diphtheria include sore throat, malaise, and swollen lymph glands in the neck. Following the early symptoms, a pseudomembranous layer may form from dead tissue in and around the oropharynx;

TABLE 3. Preferred Needle Gauge and Length for Intramuscular Delivery of Vaccine in Pediatric Patients³

Age	Injection Site	Preferred Needle Length
0-28 days	Anterolateral thigh	5/8 inch
1-12 months	Anterolateral thigh	1 inch
1-2 years	Anterolateral thigh*	1 – 1.25 inches
	Deltoid muscle	5/8 – 1 inch**
3-10 years	Deltoid muscle*	5/8 – 1 inch**
	Anterolateral thigh	1 – 1.25 inches
11-18 years	Deltoid muscle*	5/8 – 1 inch**
	Anterolateral thigh	1 – 1.5 inches

*Preferred injection site
**A 5/8 inch needle should only be used for injection into the deltoid muscle if patient weighs less than 60 kg and the skin over the muscle is pulled tightly

this pseudomembrane can impair an individual's ability to comfortably eat, drink, and breathe. Additionally, diphtheria bloodstream infection can cause damage to a variety of organs including the heart and kidney. Approximately 10% of those who develop infection will die as a result, even with prompt medical treatment.

Haemophilus influenzae Disease

Haemophilus influenzae disease is a broad term for infections caused by any type of *H. influenzae* bacteria, including the type b strain (Hib), for which a vaccine is available.⁷ These bacteria may act as harmless colonizers of the nasopharynx in some individuals, but systemic infections can be life-threatening. As a whole, *H. influenzae* bacteria are associated with a wide range of invasive infections including bacteremia, arthritis, and meningitis; less severe infections include bronchitis and otitis. The type b strain was the most common cause of serious infection in young children prior to widespread vaccination.

Hepatitis A

Hepatitis A is an acute illness caused by the hepatitis A virus, which is most commonly transmitted by the fecal-oral route.⁸ Symptoms of hepatitis A may include fever, malaise, and reduced appetite; symptoms of liver failure (e.g. jaundice, tan-colored stools) may also occur. Young children often have asymptomatic infection which potentially increases the risk of spreading the virus to others. Hepatitis A is self-limiting in nature

and does not cause chronic symptoms following resolution of acute infection, but may be serious nonetheless; up to 15% of acutely infected individuals will have symptoms for up to 6 months and infection may cause death in rare cases.

Hepatitis B

Hepatitis B is a liver infection caused by the hepatitis B virus, which is most commonly transmitted by direct contact with body fluids from an individual infected with the virus.⁹ Hepatitis B symptoms are similar to those of hepatitis A but are typically more gradual in onset; some individuals, particularly those under the age of 5 years, may experience no symptoms. In contrast to hepatitis A, acute infection by hepatitis B virus can lead to chronic infection and long-term complications, including hepatic failure. Compared to adults, infants who are acutely infected with hepatitis B are at a far greater risk for developing chronic infection, underscoring the importance of routine immunization practices.

Human Papillomavirus

Human papillomavirus (HPV) is a large family of viruses that together represent the most common cause of sexually transmitted infection in the United States (US).¹⁰ Some types of HPV cause genital warts, while other types of HPV are oncogenic and cause cervical, vulvar, vaginal, penile, anal and oropharyngeal cancers; some types of HPV have unknown long-term effects. More than 20% of Americans have some form of HPV and around 30,000 cases of

HPV-related cancer are diagnosed each year in the US.¹¹

Influenza

Seasonal influenza, also known as 'the flu', is a contagious respiratory illness caused by various strains of the influenza virus which circulate on an annual basis.¹² Symptoms of influenza typically develop rapidly and often include cough, chills, myalgia, and malaise. Gastrointestinal symptoms including diarrhea and vomiting may also occur; though these are more frequently observed in children. Although influenza is typically self-limiting in nature and most individuals recover within 2 weeks, the virus is capable of causing severe complications and death, especially in children under the age of 5 years. Age-appropriate yearly vaccination against influenza is recommended by the ACIP for all children aged 6 months or older who lack contraindication to vaccination.¹³ Influenza vaccine must be administered in a two-dose series in the first season that it is administered to children aged 6 months through 8 years.

Measles

Measles is an extremely contagious viral illness that has been at the center of several recent well-publicized outbreaks in the US.¹⁴ The most common symptoms of measles infection are fever, cough, and rash; complications of the disease can include secondary bacterial infection, blindness, encephalitis, seizures, and death. Relative to healthy adults, very young children who contract the illness are at a much greater risk for severe complications. The infection can be transmitted to others prior to symptom development, and a single infected individual may spread the virus to more than a dozen others in completely unvaccinated communities.¹⁵ The virus is highly contagious and individuals who lack immunity have a 90% chance of contracting the virus following close contact with an infected individual.¹⁶ Due to the exceptionally high transmissibility of the measles virus, at least 95% of those in a community must be immune in order to stop outbreaks from occurring and under-vaccination has been a consistent theme across the US communities that have experienced outbreaks in recent years.¹⁵

Meningococcal Disease

Meningococcal disease is an umbrella term for infections caused by the bacteria, *Neisseria meningitidis*, a common colonizer of the nasopharynx.¹⁷ Many serotypes of *N. meningitidis* have been identified to date, three (B, C, Y) of which are responsible for the majority of cases of invasive meningococcal disease in the US and are preventable by vaccination. Cases of meningococcal disease are associated with significant morbidity and mortality: up to 15% of affected individuals die and up to 20% of survivors suffer long-term complications ranging from hearing loss to cognitive dysfunction. Infants, adolescents, and young adults are at the greatest risk for contracting meningococcal disease; the disease also represents an area of special concern for individuals living in close quarters with many other individuals (e.g. university residence halls).

Mumps

Mumps is a contagious viral illness that, like measles, has caused several outbreaks in the US in recent years.¹⁸ Early symptoms of mumps are generally non-specific in nature and include malaise, fever, and muscle aches; these frequently progress to the characteristic symptoms of the illness which include swollen salivary glands and puffy cheeks.¹⁹ Transmission of the virus most commonly occurs through direct contact with saliva or respiratory droplets, and transmission events may occur prior to the onset of characteristic symptoms of the virus. Although the apparent transmissibility of mumps is not as high as that of measles, low vaccination rates have contributed to recent outbreaks; additionally, waning vaccine-mediated immunity has played an apparent role in the resurgence of the disease.^{15,20}

Pertussis

Pertussis, often referred to as 'whooping cough' due to the unique sound of the associated cough, is a highly contagious respiratory illness caused by the bacterium *Bordetella pertussis*.¹⁸ During early stages of infection, common symptoms are typically mild and include runny nose, fever, and cough. Symptoms frequently worsen as the infection progresses, and the late stage of infection is characterized by

incessant coughing fits and post-tussive vomiting; this phase of the infection may last for several months. Globally, pertussis is a major cause of childhood morbidity, and approximately 1% of those who develop infection will die as a result.²¹ The introduction of effective pertussis vaccines reduced the incidence of disease in the US dramatically, however, over the past two decades, pertussis incidence in the US has increased appreciably despite good vaccination rates, potentially due in part to emerging genetic diversity in the bacterial population.¹⁸ Despite existing vaccine effectiveness concerns, routine vaccination has been shown to reduce disease severity and plays an important role in limiting the incidence of outbreaks.^{15,22}

Pneumococcal Disease

Pneumococcal disease is a broad term for infections caused by the bacteria *Streptococcus pneumoniae*, which frequently colonizes the nasopharynx (especially in children).²³ Children under the age of 2 years old are at the greatest risk for infections caused by these bacteria, which can occur at several sites in the body and range in severity from mild to life-threatening. Common sites of pneumococcal disease in young children include the lungs, bloodstream, middle ear, and meninges. Although thousands of cases of pneumococcal disease still occur annually in the US, vaccination has dramatically reduced the incidence of severe disease. Pneumococcal meningitis was a major cause of morbidity in children prior to the introduction of effective vaccines; since then, invasive disease incidence has decreased by approximately 90%.^{23,24}

Polio

Polio is caused by the poliovirus that is transmitted by the fecal-oral route and is on the verge of global eradication.²⁵ Although the majority of those who become infected with the virus remain asymptomatic, roughly 1 out of every 25 will suffer from meningitis and 1 out of every 200 will suffer some degree of limb paralysis; more common symptoms of polio include lethargy, sore throat, and fever. Four major global regions are considered polio free and cases of the disease today

occur sporadically in just a few countries. Successful elimination of polio in the US and elsewhere highlight the tremendous efforts of those involved in the vaccination campaigns launched against the disease.

Rotavirus

Rotavirus is a contagious viral pathogen transmitted by the fecal-oral route that primarily infects newborns and young children and is the most commonly identified pathogen in severe cases of gastroenteritis.⁵ Rotavirus circulates on a seasonal and regional basis, and infections most commonly occur between the months of December and June. Infection symptoms typically occur 2 days after exposure and persist for 3-8 days; symptoms commonly include vomiting, watery diarrhea, and reduced appetite. The diarrhea caused by rotavirus can lead to life-threatening fluid loss, and infection contributes to approximately 200,000 deaths globally each year.

Rubella

Sometimes referred to as ‘German measles’, rubella is a viral illness that is frequently self-limiting in nature and mild in severity.²⁶ Common symptoms of rubella include rash, sore throat, swollen lymph nodes, and mild fever, but up to half of all cases are asymptomatic. The virus is most commonly transmitted via respiratory droplets (coughing, sneezing) and may be spread in the absence of symptoms. Though serious rubella infection is uncommon in most populations, it is of potentially significant consequence if contracted by a pregnant female, especially during the first trimester, as this may result in passage to the unborn child. Infection in developing fetuses, known as congenital rubella syndrome, can result in severe congenital defects, cognitive impairment, miscarriage, or stillbirth. Due to the effectiveness of the MMR vaccine in terms of rubella prevention, the disease has been eliminated from the US for more than a decade, though it remains a disease of significance globally.²⁷

Tetanus

Tetanus, also known as ‘lockjaw’, is a disease caused by the toxin produced by *Clostridium tetani*, a common soil-

dwelling bacteria, that is not transmitted person-to-person.²⁸ Spores from the bacteria most commonly gain entry into the body through puncture wounds, burns, and other broken skin sites; once inside the body the spores germinate, and the bacteria produce the toxin responsible for disease symptoms. Severe muscle spasms, especially those of the jaw, are the most notable manifestations of tetanus infection; other symptoms include headache, fever, and hemodynamic abnormalities. Complications of tetanus can be serious; broken bones may occur as a result of muscle spasms and respiratory difficulties lead to death in more than 10% of cases, highlighting the importance of effective prevention efforts.

Varicella

Also known as chickenpox, varicella (or varicella zoster) is a contagious viral illness that causes an itchy rash, fatigue, and fever.²⁹ Potential consequences of varicella infection can include secondary bacterial infection and dehydration; infants and adolescents who contract the virus may be at greater risk for these complications relative to young children who develop illness. In addition to these complications, those with a history of varicella infection are at risk for secondary reactivation of the virus later in life; this reactivation is known as herpes zoster or shingles. Though not used in pediatric populations, vaccines to prevent zoster are also available.

Quality Measures

Pediatric immunization rates are measured and reported by health departments across the country. Infant or early childhood immunization is defined as up-to-date with 4 or more DTaP, 3+ polio, 1+ MMR doses, 3+ Hib doses, 3+ hepatitis B doses, 1+ varicella doses, and 4+ doses of PCV at age 19-35 months and is reported as 4:3:1:3:3:1:4.³⁰ School-aged immunization rates are also monitored according to the school entry requirements. The Wisconsin Immunization Program maintains an interactive map (<http://bit.ly/WI19map>) and reports immunization rates for school districts and individual schools.

Use of the Wisconsin Immunization Registry (WIR) is not only the standard

of practice but will be required for pharmacists with the passage of SB110/AB137.¹ The WIR is a robust, cradle-to-grave web-based immunization information system designed to enable immunizers to share immunization records. The WIR is a useful tool that has been shown to improve immunization rates and decrease unnecessary duplicate immunization. Although pharmacists entered over 400,000 vaccine records into the WIR in 2017 (personal communication from the Wisconsin Immunization Program), some pharmacy-based immunization programs may not yet be WIR users. To become a WIR user, contact the WIR help desk by phone at 608-266-9691, or by email at dhsuirhelp@dhs.wisconsin.gov, for required training and access to the system.

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- ## Assessment Questions
1. In order to comply with SB110/AB137, pharmacists must record the immunization in the WIR within how many days of vaccine administration?
 - a. 3 days
 - b. 7 days
 - c. 30 days
 - d. 90 days
 - e. Documentation in the WIR is not required by SB110/AB137
 2. Available rotavirus vaccine products are approved for use in which of the following populations?
 - a. Infants under the age of 6 months
 - b. Children under the age of 5 years
 - c. Children between the age of 5 and 12 years
 - d. Adults over the age of 18 years
 - e. Adults over the age of 60 years
 3. Which of the following vaccines used for the prevention of diphtheria, tetanus, and pertussis is appropriate for administration to a child under the age of 7 years?
 - a. Td
 - b. MMR
 - c. Tdap
 - d. DTaP
 - e. PCV13
 4. How many doses of this year's influenza vaccine are recommended by the ACIP for a 1 year old who has not previously received influenza vaccine?
 - a. No doses
 - b. 1 dose
 - c. 2 dose series
 - d. 3 doses one time
 5. According to SB110/AB137, for how long is a prescription order for an MMR vaccine to be administered to a 4 year old child valid?
 - a. 48 hours from written date
 - b. 7 days from written date
 - c. 14 days from written date
 - d. 30 days from written date
 - e. 60 days from written date
 6. Which of the following administration sites and needle sizes is preferred for IM injection of MMR vaccine in a **4 year old** child?
 - a. Anterolateral thigh, 1 inch, 22 gauge
 - b. Deltoid muscle, 1 inch, 22 gauge
 - c. Gluteal muscle, 1.5 inches, 20 gauge
 - d. Triceps muscle, 5/8 inch, 25 gauge
 7. Which of the following infectious vaccine-preventable diseases has caused several outbreaks in the United States in recent years?
 - a. Tetanus
 - b. Polio
 - c. Herpes zoster
 - d. Diphtheria
 - e. Mumps
 8. Use of influenza antiviral medication within the past 48 hours is considered a contraindication to administration of which of the following vaccines?
 - a. IIV
 - b. MMRV
 - c. VAR
 - d. LAIV
 - e. Tdap
 9. Which of the following are recommended by the ACIP for a healthy **2 year old** child who received all recommended vaccinations on time through 15 months but has not received any vaccines since then?
 - a. DTaP, HepA, HepB, IPV, IIV
 - b. DTaP, HepA, IIV
 - c. HepA, HepB, IPV, Tdap
 - d. HepA, HepB, IIV, Td
 - e. HepA, HepB, MMR, Tdap, VAR
 10. Did the activity meet the stated learning objectives? (if you answer no, please email sarahs@pswi.org to explain)
 - a. Yes
 - b. No
 11. On a scale of 1 – 10 (1-no impact; 10-strong impact), please rate how this program will impact the medication therapy management outcomes or safety

- of your patients.
12. On a scale of 1 – 10 (1-did not enhance; 10-greatly enhanced), please rate how this program enhanced your competence in the clinical areas covered.
 13. On a scale of 1 – 10 (1-did not help; 10-great help), please rate how this program helped to build your management and leadership skills.
 14. How useful was the educational material?
 - a. Very useful
 - b. Somewhat useful
 - c. Not useful
 15. How effective were the learning methods used for this activity?
 - a. Very effective
 - b. Somewhat effective
 - c. Not effective
 16. Learning assessment questions were appropriate.
 - a. Yes

CE FOR PHARMACISTS

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Quiz Answer Form *circle one answer per question*

- | | |
|---------------------------|---------------------|
| 1) a b | 10) _____ |
| 2) a b c d | 11) _____ |
| 3) a b | 12) _____ |
| 4) a b c d | 13) a b c |
| 5) a b c d | 14) a b c |
| 6) a b c d | 15) a b |
| 7) a b c d | 16) a b |
| 8) a b c d | 17) _____ |
| 9) a b | 18) _____ |

November/December 2019

Pediatric Immunization Update

ACPE Universal Activity Number:
0175-0000-19-149-H06-P

Target Audience: Pharmacists

Activity Type: Knowledge-based

Release Date: November 1, 2019

(No longer valid for CE credit after November 1, 2022)

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