2019 Immunization Update

Washington Immunization Summit, 2019

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Disclosures

- The speaker is a federal government employee with no financial interest in or conflict with the manufacturer of any product named in this presentation
- The speaker will not discuss a vaccine not currently licensed by the FDA
- The speaker will discuss the off-label use of some vaccines in a manner consistent with ACIP recommendations
- Use of trade names is for identification purposes only

Disclosures

- **The recommendations to be discussed are primarily those of the Advisory Committee on Immunization Practices (ACIP):**
  - Composed of 15 nongovernment experts in clinical medicine and public health
  - Provides guidance on use of vaccines and other biologic products to DHHS, CDC, and the U.S. Public Health Service
- **Watch the live webcast**
  - https://www.cdc.gov/vaccines/acip/meetings/webcast-instructions.html

Next ACIP meeting
October 23-24 2019

CDC ACIP meeting website http://www.cdc.gov/vaccines/acip/meetings/upcoming-dates.html

Overview

- Vaccination coverage rates
- Vaccine Product Updates
  - Shingrix
- Influenza
- ACIP Updates
- Vaccine Administration
- Resources

Vaccination Rates

Estimated Vaccination Coverage among Children Aged 19–35 Months, NIS 2017

State/Area	Combined Series* 4:3:1:3:3:1:4
United States	70.4%
Washington	69.9%

*The combined (4:3:1:3:3:1:4) vaccine series includes ≥4 doses of DTaP, ≥3 doses of poliovirus vaccine, ≥1 dose of measles-containing vaccine, full series of Hib vaccine (≥3 or ≥4 doses, depending on product type), ≥3 doses of HepB, ≥1 dose of varicella vaccine, and ≥4 doses of PCV

MMWR 67(40):1123–1128

Estimated Vaccination Coverage among Adolescents Aged 13–17 Years, NIS-Teen, 2018

Vaccine	United States	Washington
≥ 1 Tdap	88.9%	82.0%
≥ 1 HPV (M and F)	68.1%	71.3%
HPV UTD* (M and F)	51.1%	51.6%
≥ 1 MenACWY	86.6%	83.7%
≥ 2 MenACWY	50.8%	NA

**HPV UTD includes those with ≥3 doses, and those with 2 doses when the first HPV vaccine dose was initiated at age <15 years and at least 5 months minus 4 days elapsed between the first and second dose.*

MMWR 68(33);718–723

Estimated Vaccination Coverage among Adults United States, BRFSS, 2016

Vaccine	Washington
Tdap ages 18-64	47.1%
Tdap ages ≥65	33.9%
Pneumococcal ages 18–64 at increased risk	37.6%
Pneumococcal ages ≥65	76.3%

https://www.cdc.gov/vaccines/imz-managers/coverage/adultvaxview/data-reports/general-population/reports/2016.html

Vaccine Products Updates

Adult Vaccine Supply: Shingrix

- Due to high levels of demand for Shingrix vaccine, the manufacterer has implemented order limits and providers have experienced shipping delays
- Order limits and shipping delays will continue throughout 2019
- The manufactuer has increased the U.S. supply available and plans to release more doses on a consistent and reliable basis in 2019

CDC Current Vaccine Shortages and Delays www.cdc.gov/vaccines/hcp/clinical-resources/shortages.html. Accessed 03/21/2019

Ensure Your Patients Get Both Doses!

- **There are currently ordering limits and intermittent shipping delays for Glaxo Shingrix vaccine**
- **Use proven strategies to help patients complete the series, including:**
  - Use a reminder and recall system to contact patients when you have Shingrix
    - Give first consideration to patients due for their second dose of Shingrix
  - If you are out of Shingrix and a patient needs a second dose, refer the patient to another provider in the community that has Shingrix
  - Be sure to enter your patients' current vaccination information into your state's immunization information system (IIS)
  - As supply becomes less constrained, notify eligible patients so they can come in to get their first dose of Shingrix

https://www.cdc.gov/vaccines/vpd/shingles/hcp/shingrix/faqs.html

Influenza

CDC estimates that, from **October 1, 2018,** through **May 4, 2019**, there have been:

37.4 million – 42.9 million
flu **illnesses**

17.3 million – 20.1 million
flu **medical visits**

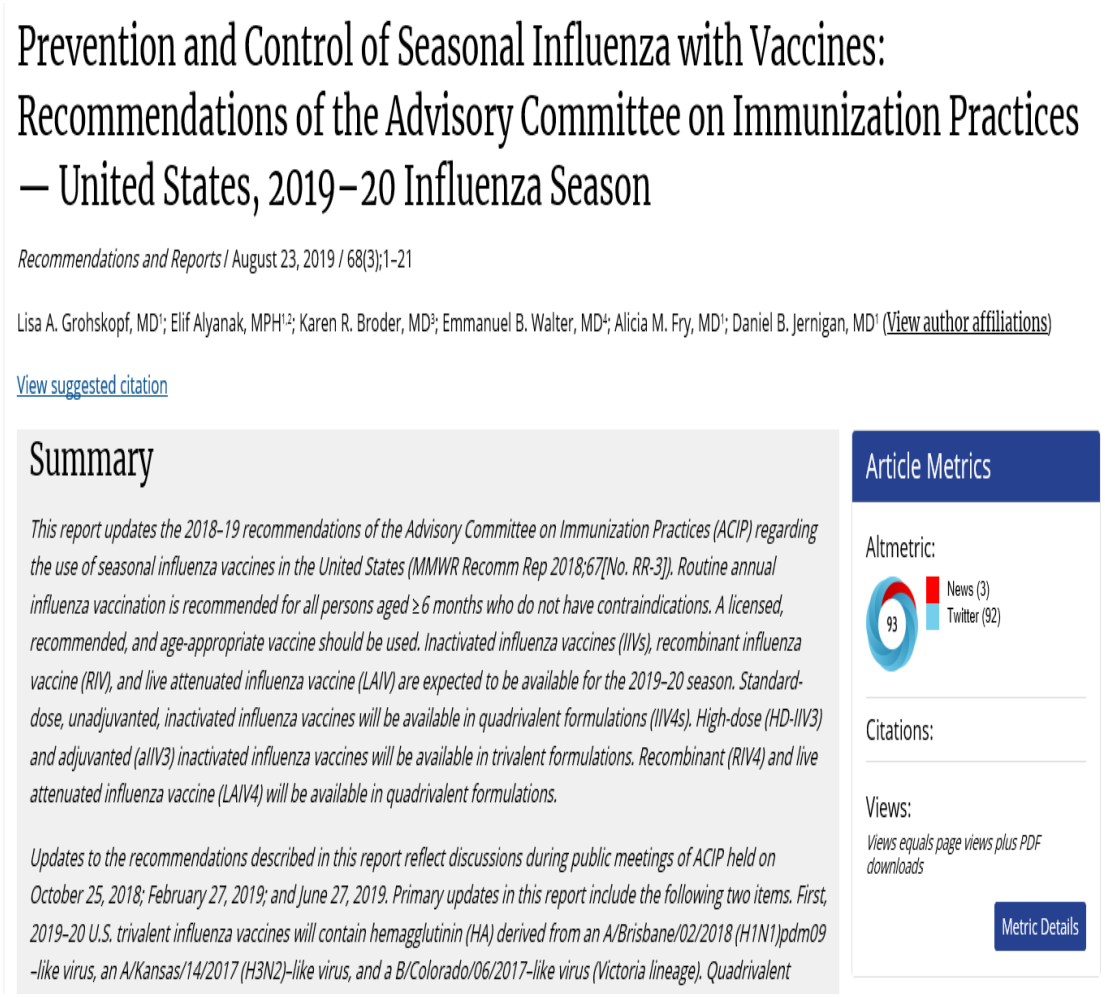
531,000 – 647,000
flu **hospitalizations**

36,400 – 61,200
flu **deaths**

https://www.cdc.gov/flu/about/burden/preliminary-in-season-estimates.htm

2019–20 Influenza Season

- **ACIP recommendations were published August 23**
- **Many products will be available - IIV3, IIV4, and LAIV**
  - Indications vary by product, including age, formulation, and type
  - More than one product may be appropriate for any given person



Prevention and Control of Seasonal Influenza with Vaccines: Recommendations of the Advisory Committee on Immunization Practices — United States, 2019–20 Influenza Season

Recommendations and Reports / August 23, 2019 / 68(3);1–21

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View suggested citation

Summary

This report updates the 2018–19 recommendations of the Advisory Committee on Immunization Practices (ACIP) regarding the use of seasonal influenza vaccines in the United States (MMWR Recomm Rep 2018;67[No. RR-3]). Routine annual influenza vaccination is recommended for all persons aged ≥6 months who do not have contraindications. A licensed, recommended, and age-appropriate vaccine should be used. Inactivated influenza vaccines (IIVs), recombinant influenza vaccine (RIV), and live attenuated influenza vaccine (LAIV) are expected to be available for the 2019–20 season. Standard-dose, unadjuvanted, inactivated influenza vaccines will be available in quadrivalent formulations (IIV4s). High-dose (HD-IIV3) and adjuvanted (aIIV3) inactivated influenza vaccines will be available in trivalent formulations. Recombinant (RIV4) and live attenuated influenza vaccine (LAIV4) will be available in quadrivalent formulations.

Updates to the recommendations described in this report reflect discussions during public meetings of ACIP held on October 25, 2018; February 27, 2019; and June 27, 2019. Primary updates in this report include the following two items. First, 2019–20 U.S. trivalent influenza vaccines will contain hemagglutinin (HA) derived from an A/Brisbane/02/2018 (H1N1)pdm09–like virus, an A/Kansas/14/2017 (H3N2)–like virus, and a B/Colorado/06/2017–like virus (Victoria lineage). Quadrivalent

Article Metrics

Altmetric:

93

News (3)

Twitter (92)

Citations:

Views:

Views equals page views plus PDF downloads

Metric Details

MMWR; 2019 68(3):1-21

2019–2020 Northern Hemisphere Vaccine Strains

- For 2019–2020, trivalent (three-component) vaccines are recommended to contain:
  - A/Brisbane/02/2018 (H1N1)pdm09-like virus*
  - A/Kansas/14/2017 (H3N2)-like virus*
  - B/Colorado/06/2017-like virus (Victoria lineage)
- **Quadrivalent (four-component) vaccines, which protect against a second lineage of B viruses, include:**
  - B/Phuket/3073/2013-like virus (Yamagata lineage)

*New

MMWR; 2019 68(3):1-21

Pediatric Flu Vaccine Products and Dosages (Volume)

Age	Product	Dosage (Amount)
6 through 35 months	Afluria	0.25 mL
	Fluzone	0.25 mL or 0.5 mL
	Fluarix	0.5 mL
	FluLaval	0.5 mL
3 years and older*	All products	0.5 mL

Labeling changes:
Afluria: May be given to children 6 months and older (was 5 years and older)
Fluzone: 0.5 mL dosage may be given to children as young as 6 months of age

*Product eligibility may vary based on the FDA approved age indications

2019–20 ACIP Recommendations: Influenza

- **Annual influenza vaccination continues to be recommended for persons 6 months of age and older without contraindications or precautions**
- **Immunization providers may choose to administer any licensed, age-appropriate influenza vaccine product, including LAIV, IIV, RIV, or ccIIV**
  - ACIP/CDC express no preferences for any one type of influenza vaccine product if more than one is appropriate and available

MMWR; 2019 68(3):1-21

2019–20 Influenza Vaccination Schedule for Children

- **Children 6 months through 8 years* of age with:**
  - No previous doses of influenza vaccine
  - 1 documented dose before July 1, 2019
  - Unknown history

Dose 1 **Dose 2**

Completed series**
No additional doses are needed this flu season

***Two doses are recommended even if the child turns 9 years of age before receiving dose 2**

****Both doses do not have to be the same type of influenza vaccine or product**

MMWR; 2019 68(3):1-21

What Do You Think?

- **Alexis is 4 years old. Her immunization history includes:**
  - Influenza vaccine at 6 months of age
  - Influenza Vaccine at 3 years of age

- **How many doses does she need this flu season?**
  - One
  - Two

2019–20 Influenza Vaccination Schedule for Children

- Children 6 months through 8 years of age who have had 2 doses before July 1, 2019*
- Children 9 years of age and older, regardless of immunization history

1 dose

No additional doses are needed this flu season

***Note: Both doses do not have to be administered during the same season or consecutive seasons**
Both doses do not have to be the same type of influenza vaccine or product

MMWR; 2019 68(3):1-21

CDC Clinical Resources for Health Care Personnel: Influenza

- **Education for health care personnel with free CE**
  - *You Call the Shots*–Influenza www.cdc.gov/vaccines/ed/youcalltheshots.html
  - PB webinar series: Influenza www.cdc.gov/vaccines/ed/webinar-epv/index.html
- **Clinical job aids**
  - Influenza vaccine product labels for storage units
    www.cdc.gov/vaccines/hcp/admin/storage/guide/vaccine-storage-labels-flu.pdf
  - Fact sheet for health care providers of pregnant women
    www.cdc.gov/flu/professionals/vaccination/vaccination-possible-safety-signal.html
  - Tools to Assist Satellite, Temporary, and Off-Site Vaccination Clinics
    www.izsummitpartners.org/naiis-workgroups/influenza-workgroup/off-site-clinic-resources/

Advisory Committee on Immunization Practices (ACIP) Updates and *MMWR* Publications

ACIP Recommendations: HPV Vaccine

HPV recommendations

- Published 8/16/19
- Updated recommendations
  - Catch-up vaccination
  - Vaccination of person 27-45 years

Morbidity and Mortality Weekly Report

Human Papillomavirus Vaccination for Adults: Updated Recommendations of the Advisory Committee on Immunization Practices

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Introduction

Vaccination against human papillomavirus (HPV) is recommended to prevent new HPV infections and HPV-associated diseases, including some cancers. The Advisory Committee on Immunization Practices (ACIP)* routinely recommends HPV vaccination at age 11 or 12 years; vaccination can be given starting at age 9 years. Catch-up vaccination has been recommended since 2006 for females through age 26 years, and since 2011 for males through age 21 years and certain special populations through age 26 years. This report updates ACIP catch-up HPV vaccination recommendations and guidance published in 2014, 2015, and 2016 (*1–3*). Routine recommendations for vaccination of adolescents have not changed. In June 2019, ACIP recommended catch-up HPV vaccination for all persons through age 26 years. ACIP did not recommend catch-up vaccination for all adults aged 27 through 45 years, but recognized that some persons who are not adequately vaccinated might be at risk for new HPV infection and might benefit from vaccination in this age range; therefore, ACIP recommended shared clinical decision-making regarding potential HPV vaccination for these persons.

Background

HPV is a common sexually transmitted infection, with HPV acquisition generally occurring soon after first sexual activity (*1*). Most HPV infections are transient and asymptomatic. Persistent infections with high-risk (oncogenic) HPV types can lead to development of cervical, anal, penile, vaginal, vulvar, and oropharyngeal cancers, usually after several decades (*1*). Most new HPV infections occur in adolescents and young adults. Although most sexually active adults have been exposed to HPV (*4*), new infections can occur with a new sex partner (*5*).

Three prophylactic HPV vaccines are licensed for use in the United States: 9-valent (9vHPV, Gardasil 9, Merck), quadrivalent (4vHPV, Gardasil, Merck), and bivalent (2vHPV, Cervarix, GlaxoSmithKline) (*6–8*). As of late 2016, only 9vHPV is distributed in the United States. The majority of HPV-associated cancers are caused by HPV 16 or 18, types targeted by all three vaccines. In addition, 4vHPV and 9vHPV target HPV 6 and 11, types that cause anogenital warts. 9vHPV also protects against five additional high-risk types: HPV 31, 33, 45, 52, and 58.

In October 2018, using results from 4vHPV clinical trials in women aged 24 through 45 years, and bridging immunogenicity and safety data in women and men, the Food and Drug Administration expanded the approved age range for 9vHPV use from 9 through 26 years to 9 through 45 years in women and men (*6*). In June 2019, after reviewing evidence related to HPV vaccination of adults, ACIP updated recommendations for catch-up vaccination and for vaccination of adults older than the recommended catch-up age.

Methods

During April 2018–June 2019, the ACIP HPV Vaccines Work Group held at least monthly conference calls to review and discuss relevant scientific evidence regarding adult HPV vaccination using the Evidence to Recommendations framework. (https://www.cdc.gov/vaccines/acip/recs/grade/downloads/ACIP-evidence-rec-frame-508.pdf). The Work Group evaluated the quality of evidence for efficacy, safety, and effectiveness for HPV vaccination for primary prevention of HPV infection and HPV-related disease using the Grading of Recommendations Assessment, Development and Evaluation (GRADE) approach (https://www.cdc.gov/vaccines/acip/recs/grade/about-grade.html).

Scientific literature published during January 1, 2006–October 18, 2018, was searched to identify clinical trials of any licensed HPV vaccine in adults aged 27 through 45 years. Detailed search methods and results for the GRADE tables are available at https://www.cdc.gov/vaccines/acip/recs/grade/HPV-adults.html. Benefits were based on per-protocol analyses

* Recommendations for routine use of vaccines in children, adolescents, and adults are developed by the Advisory Committee on Immunization Practices (ACIP). ACIP is chartered as a federal advisory committee to provide expert external advice and guidance to the Director of CDC on use of vaccines and related agents for the control of vaccine-preventable diseases in the civilian population of the United States. Recommendations for routine use of vaccines in children, adolescents, and adults are harmonized to the greatest extent possible with recommendations made by the American Academy of Pediatrics (AAP), the American Academy of Family Physicians (AAFP), and the American College of Obstetricians and Gynecologists (ACOG). Recommendations for routine use of vaccines in adults are harmonized with recommendations of AAFP, ACOG, the American College of Physicians (ACP), and the American College of Nurse-Midwives. ACIP recommendations approved by the CDC Director become agency guidelines on the date published in the *Morbidity and Mortality Weekly Report*. Additional information is available at https://www.cdc.gov/vaccines/acip.

ACIP Immunization Recommendations: HPV

- **Children and adults 9 through 26 years:**
  - Routinely recommended at age 11 or 12 years; vaccination can be given starting at age 9 years
  - Catch-up unvaccinated or incompletely vaccinated persons regardless of gender or medical status through age 26 years
- **Recommendations during pregnancy or lactation have not changed**
  - HPV vaccination should be delayed until after pregnancy
  - Pregnancy testing is not needed before vaccination
  - Persons who are breastfeeding or lactating can be given HPV vaccine

MMWR; 2019 68(32);698-702.

ACIP Immunization Recommendations: HPV
Adults 27 through 45 Years of Age

- Shared clinical decision-making regarding HPV vaccination is recommended for some adults who are not adequately vaccinated
- Catch-up HPV vaccination is not recommended for all adults
- Recommendations for special populations and medical conditions apply to all persons 9 through 45 years of age
- HPV vaccines are not licensed for use in adults 46 years of age and older

MMWR; 2019 68(32);698-702

Considerations for shared clinical decision-making regarding human papillomavirus (HPV) vaccination of adults aged 27–45

- Ideally, HPV vaccination should be given in early adolescence because vaccination is most effective before exposure to HPV through sexual activity.
- HPV is a very common sexually transmitted infection. Most HPV infections are transient and asymptomatic and cause no clinical problems.
- Although new HPV infections are most commonly acquired in adolescence and young adulthood, some adults are at risk for acquiring new HPV infections. At any age, having a new sex partner is a risk factor for acquiring a new HPV infection.
- Persons who are in a long-term, mutually monogamous sexual partnership are not likely to acquire a new HPV infection.
- Most sexually active adults have been exposed to some HPV types, although not necessarily all of the HPV types targeted by vaccination.
- No clinical antibody test can determine whether a person is already immune or still susceptible to any given HPV type.
- HPV vaccine efficacy is high among persons who have not been exposed to vaccine-type HPV before vaccination.
- Vaccine effectiveness might be low among persons with risk factors for HPV infection or disease (e.g., adults with multiple lifetime sex partners and likely previous infection with vaccine-type HPV), as well as among persons with certain immunocompromising conditions.
- HPV vaccines are prophylactic (i.e., they prevent new HPV infections). They do not prevent progression of HPV infection to disease, decrease time to clearance of HPV infection, or treat HPV-related disease.

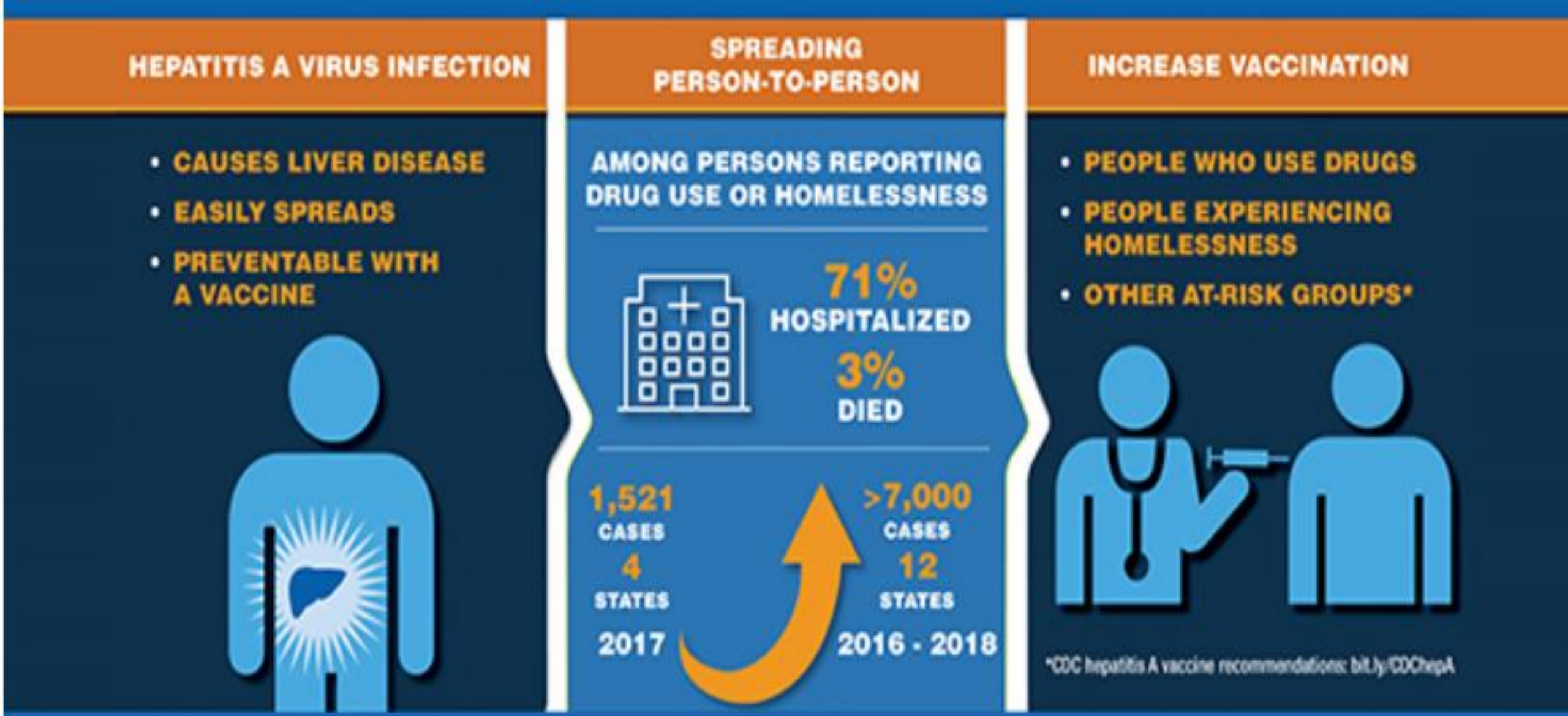
MMWR 68(32);698–702

Updated ACIP Immunization Recommendations: HPV

- **Recommendations for schedules and intervals have not changed**
- **No prevaccination testing (e.g., Pap or HPV testing) is recommended**
- **Recommendations for pregnant or breastfeeding women have not changed**
  - HPV vaccination should be delayed until after pregnancy
  - Pregnancy testing is not needed before vaccination
  - Persons who are breastfeeding or lactating can receive HPV vaccine
- **Cervical cancer screening recommendations should be followed**

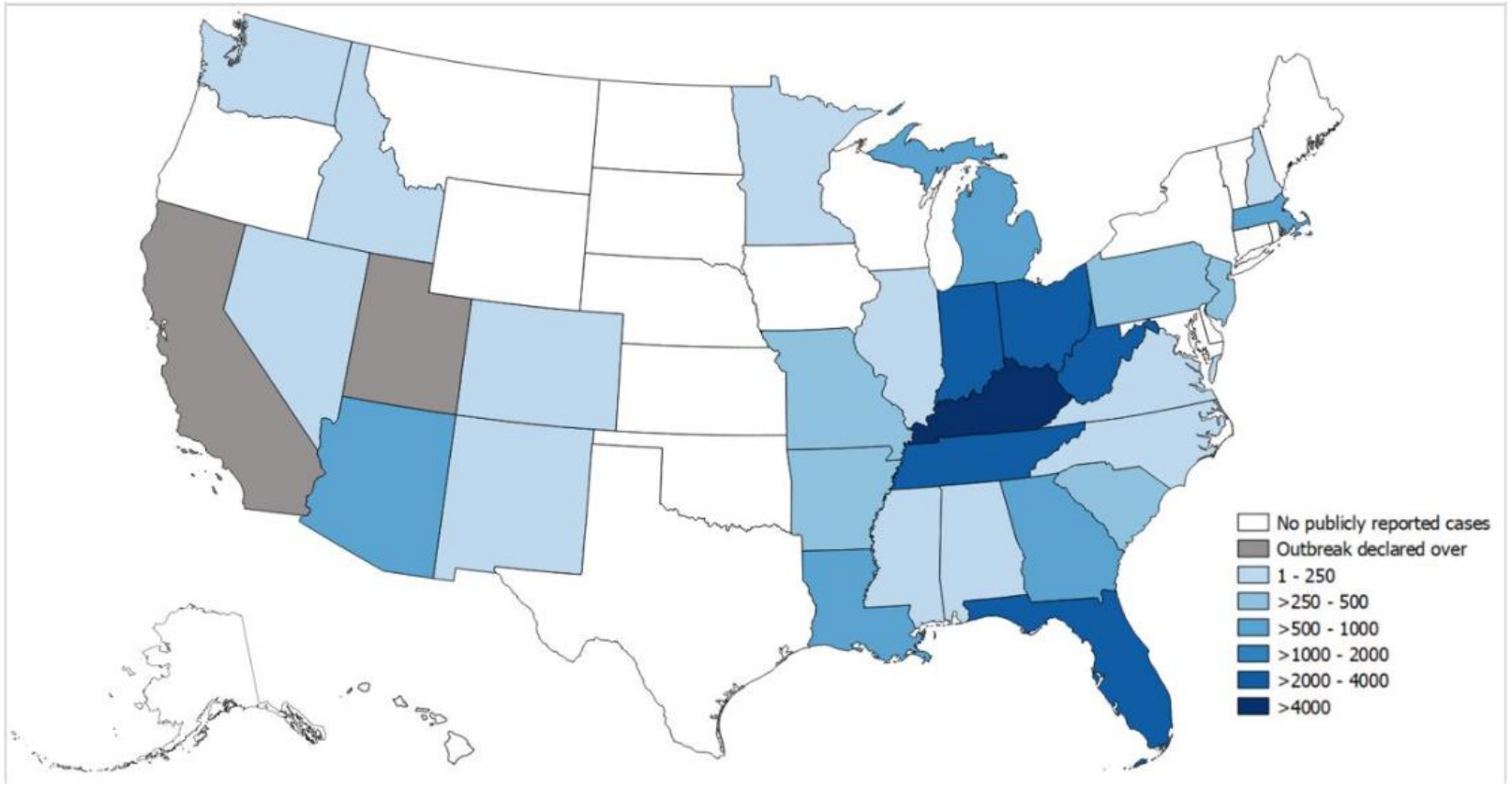
MMWR; 2019 68(32);698-702

ACIP Recommendations: Hepatitis A Vaccine



Data from 2017 outbreaks as reported to CDC from California, Michigan, Kentucky and Utah published in MMWR 2018;67(No.43): 1208–1210

Widespread person-to-person outbreaks of hepatitis A across the United States



- **Since the outbreaks were first identified in 2016, 30 states have reported*:**
  - 25,783 cases
  - 15,517 (60%) hospitalizations
  - 259 deaths
- **Risk factors:**
  - drug use
  - homelessness

*** As of September 13, 2019**

Updated Hepatitis A Immunization Recommendations: Children and Adults

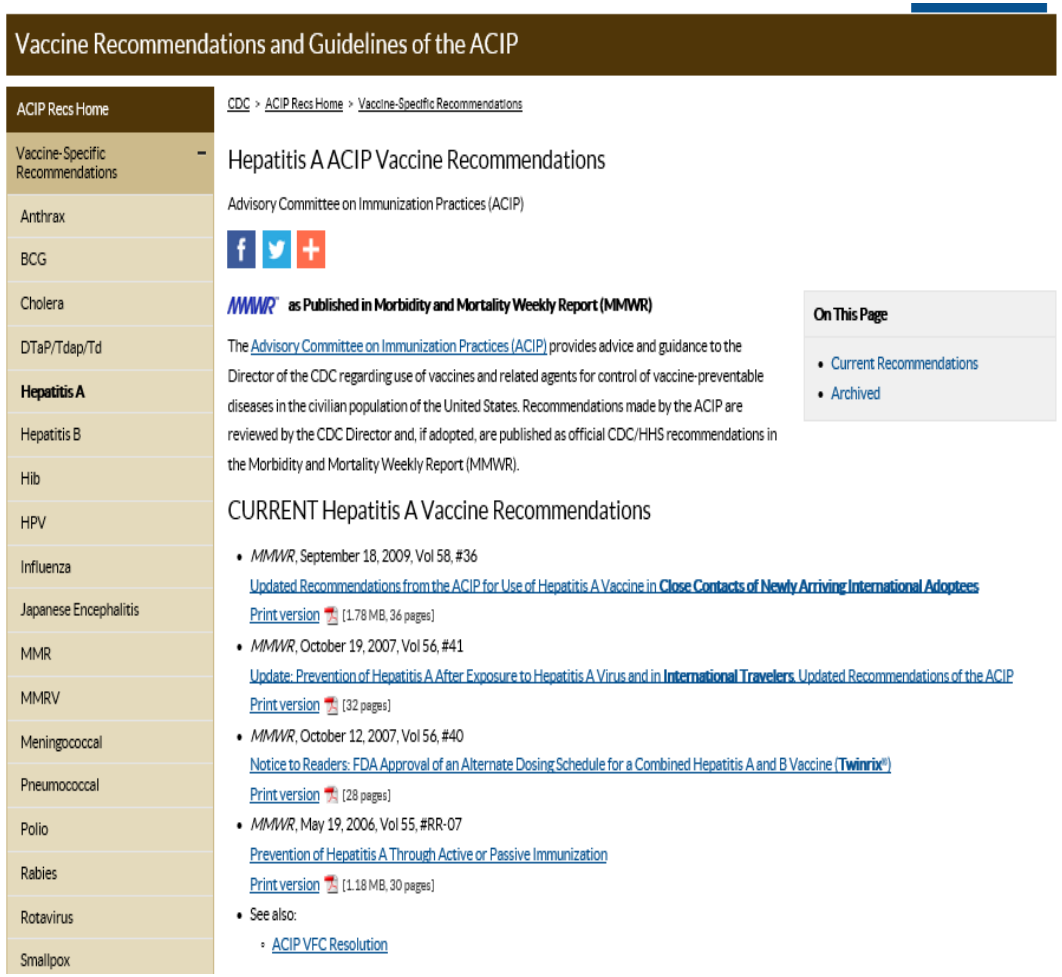
- **Recommended for adults who have a specific risk or lack a risk factor but want protection**
  - **Homelessness**
  - Travel to or work in countries with high or intermediate hepatitis A endemicity
  - Men who have sex with men
  - Injection or noninjection drug use
  - Clotting factor disorders
  - Chronic liver disease
  - Close, personal contact with an international adoptee
  - Healthy adults through age 40 years who have recently been exposed to hepatitis A virus
  - Work with hepatitis A virus in a research laboratory or with nonhuman primates infected with hepatitis A virus

MMWR; 2019 67(43):1208–10

Hepatitis A Vaccine for International Travelers: Infants

- Administer a single dose of HepA vaccine to infants 6–11 months of age

- Infants should restart the 2-dose series of HepA vaccine at 12 months of age or older as recommended



MMWR 2018;(No.43):1216–20

Summary: Hepatitis A Vaccine Recommendations and International Travel

Age	
Infants 5 months of age or younger	IG
Infants 6 through 11 months of age	Vaccine (or IG[1])
Healthy persons 1 year of age or older	Vaccine
Special Populations	
Persons with a vaccine contraindication	IG
Immunocompromised persons	Vaccine with addition of IG[2]
Persons with chronic liver disease	Vaccine
Pregnant women	Vaccine

[1]Based on provider risk assessment and availability of vaccine or IG

[2]If measles is not endemic in the destination area

MMWR 2018;(No.43):1216–20

What Do You Think?

- **Achal is 13 months old. A dose of hepatitis A vaccine was administered at 10 months of age due to international travel. When should the next dose of vaccine be administered?**
  - 15 months of age
  - 18 months of age
  - Now

ACIP Meeting June 2019
Hepatitis A Vote

- ACIP recommends that all children and adolescents aged 2 through 18 years who have not previously received hepatitis A vaccine be vaccinated routinely at any age (i.e., children and adolescents are recommended for catch-up vaccination).
- ACIP recommends all persons with HIV aged 1 year of age and older be routinely vaccinated with hepatitis A vaccine

These recommendations have been adopted by the CDC Director and will become official once published in *MMWR*
Advisory Committee on Immunization Practices (ACIP) www.cdc.gov/vaccines/acip/index.html. Accessed 8/25/2019.

Hepatitis A Immunization Recommendations for Children

- **Routinely recommended for children 12 through 23 months of age**
  - 2-dose schedule (0, 6 months)

- **Routinely catch up children and adolescents 2 through 18 years of age incompletely or unvaccinated with Hepatitis A vaccine***

Recommended Child and Adolescent Immunization Schedule for ages 18 years or younger, United States, 2019. Accessed on 3/26/2019.

*This recommendations have been adopted by the CDC Director and will become official once published in MMWR.

Updated Hepatitis A Immunization Recommendations: Adults

- **Recommended for adults who have a specific risk or lack a risk factor but want protection**
  - **HIV***
  - **Homelessness**
  - Travel to or work in countries with high or intermediate hepatitis A endemicity
  - Men who have sex with men
  - Injection or noninjection drug use
  - Clotting factor disorders
  - Chronic liver disease
  - Close, personal contact with an international adoptee
  - Healthy adults through age 40 years who have recently been exposed to hepatitis A virus
  - Work with hepatitis A virus in a research laboratory or with nonhuman primates infected with hepatitis A virus

- **Pending publication in the MMWR*
- *MMWR;* 2019 67(43):1208–10

Other Recently Updated ACIP Immunization Recommendations

ACIP Meeting June 2019
Meningococcal B Vote

- **For persons 10 years of age and older with complement deficiency, complement inhibitor use, asplenia, or who are microbiologists:**
  - ACIP recommends a MenB booster dose 1 year following completion of a MenB primary series, followed by MenB booster doses every 2–3 years thereafter, for as long as increased risk remains
- **For persons 10 years of age and older determined by public health officials to be at increased risk during an outbreak:**
  - ACIP recommends a one-time booster dose if it has been 1 year or more since completion of a MenB primary series
  - A booster dose interval of 6 months or longer may be considered by public health officials depending on the specific outbreak, vaccination strategy, and projected duration of elevated risk

These recommendations have been adopted by the CDC Director and will become official once published in *MMWR*
Advisory Committee on Immunization Practices (ACIP) www.cdc.gov/vaccines/acip/index.html. Accessed 8/25/2019 .

ACIP Meeting June 2019
Pneumococcal Vote

- ACIP recommends PCV13 based on shared clinical decision-making for adults 65 years or older who do not have an immunocompromising condition and who have not previously received PCV13
- All adults 65 years or older should receive a dose of PPSV23

These recommendations have been adopted by the CDC Director and will become official once published in *MMWR*
Advisory Committee on Immunization Practices (ACIP) www.cdc.gov/vaccines/acip/index.html. Accessed 8/25/2019

Vaccine Administration: Make No Mistake!

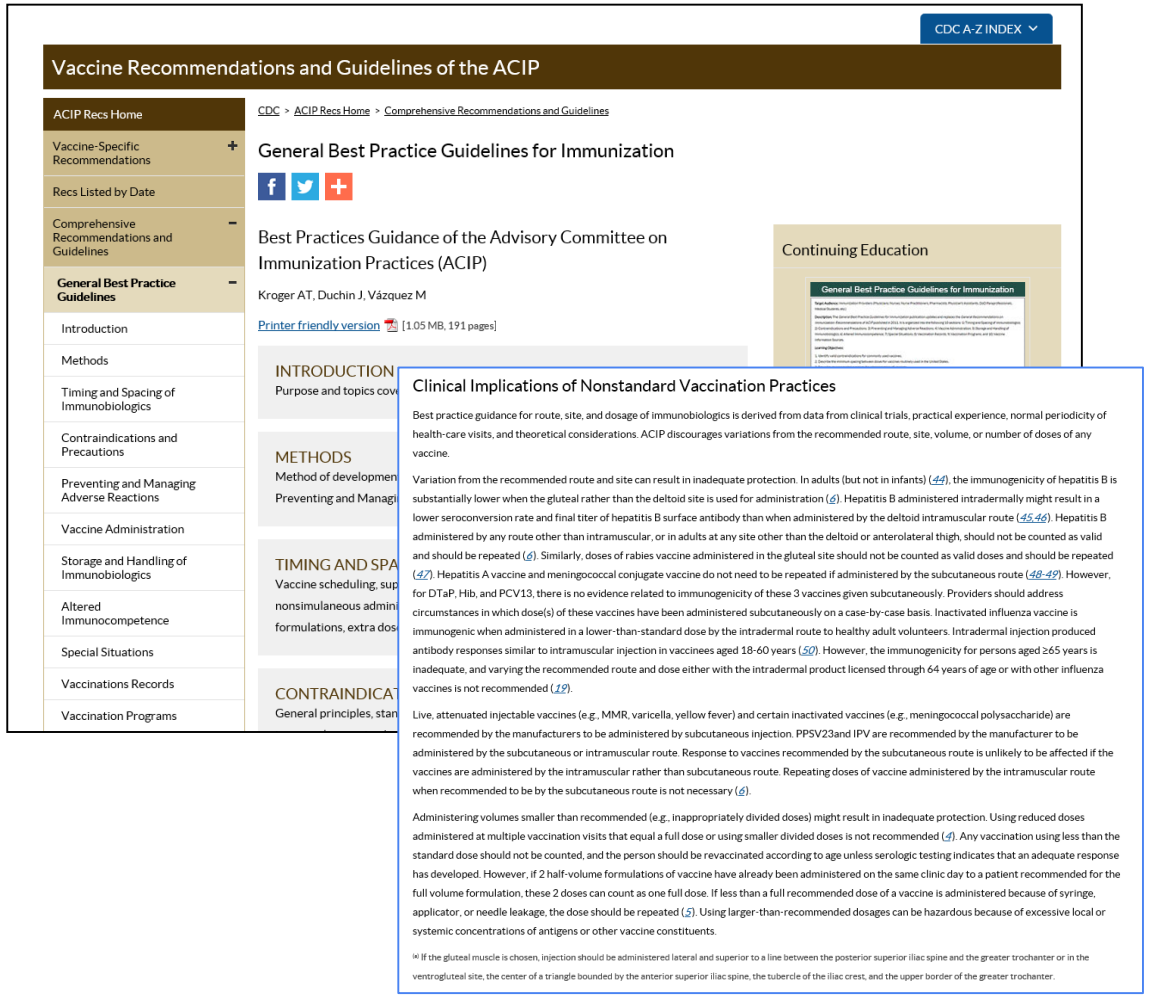
What is a Vaccine Administration Error?

Any preventable event that may cause or lead to inappropriate use or patient harm. Such events may be related to professional practice, immunization products (vials, needles, syringes), storage, dispensing, and administration.

Advisory Committee on Immunization Practices
General Best Practice Guidelines for Immunization

- Failure to adhere to recommendations for storage and handling of vaccines can reduce or destroy their potency, resulting in inadequate or no immune response in the recipient

- Recommendations for route, site, and dosage of vaccines are derived from data from clinical trials, practical experience, preventive health care visits, schedule, and theoretical considerations



General Best Practice Guidelines for Immunization www.cdc.gov/vaccines/hcp/acip-recs/general-recs/timing.html

Real-Life Vaccine Administration Errors

- **During a worksite occupational flu vaccination clinic, 67 persons were vaccinated:**
  - With improperly stored vaccine
  - Using the same syringe
  - Using an incorrect dosage (amount)

Morbidity and Mortality Weekly Report (*MMWR*)

Notes from the Field: Injection Safety and Vaccine Administration Errors at an Employee Influenza Vaccination Clinic – New Jersey, 2015

Weekly
December 18, 2015 / 64(49);1363-4

Laura Taylor, PhD[1]; Rebecca Greeley, MPH[1]; Jill Dinitz-Sklar, MPH[1]; Nicole Mazur, MPH[1]; Jill Swanson, MPH[2]; JoEllen Wolicki, BSN[3]; Joseph Perz, DrPH[4]; Christina Tan, MD[1]; Barbara Montana, MD[1]

On September 30, 2015, the New Jersey Department of Health (NJDOH) was notified by an out-of-state health services company that an experienced nurse had reused syringes for multiple persons earlier that day. This occurred at an employee influenza vaccination clinic on the premises of a New Jersey business that had contracted with the health services company to provide influenza vaccinations to its employees. The employees were to receive vaccine from manufacturer-prefilled, single-dose syringes. However, the nurse contracted by the health services company brought three multiple-dose vials of vaccine that were intended for another event. The nurse reported using two syringes she found among her supplies to administer vaccine to 67 employees of the New Jersey business. She reported wiping the syringes with alcohol and using a new needle for each of the 67 persons. One of the vaccine recipients witnessed and questioned the syringe reuse, and brought it to the attention of managers at the business who, in turn, reported the practice to the health services company contracted to provide the influenza vaccinations.

Reuse of syringes for multiple patients, with or without reuse of needles, is recognized as a serious infection control breach that poses risks for bloodborne pathogen transmission (*1*–*2*). Upon investigation additional concerns regarding vaccine administration and storage and handling were identified for this event. The nurse used only two multiple dose vials of vaccine (10 doses/vial) to administer vaccines to 67 adult participants; thus, participants did not receive the recommended dose of influenza vaccine. The health services company had shipped the vaccine to the nurse's home, where it was stored in her home refrigerator without temperature monitoring until the event. Vaccine doses were then transported from the nurse's home to the vaccination site using a styrofoam container and cold packs. After the event, unused vaccine doses were transported back to the nurse's home and stored in her refrigerator before being shipped back to the health services company in a container with cold packs.

In response to these injection safety and vaccine administration errors, the NJDOH, in consultation with CDC, recommended notification and testing of the New Jersey business employees who participated in the vaccination clinic for human immunodeficiency virus (HIV), hepatitis C virus, and hepatitis B virus. Postexposure prophylaxis with hepatitis B vaccine and readministration of influenza vaccination were also recommended. NJDOH sent an e-mail on October 2, informing the participants of the potential bloodborne pathogen exposures and recommendations for testing and vaccination. Certified follow-up letters also were sent. A dedicated NJDOH phone number and e-mail address were created to assist the affected patients. The West Windsor Health Department collaborated with an urgent care center to perform blood draws and administer the vaccines on October 5 and 6; HIV and mental health counselors were available on-site. NJDOH also provided letters for participants to bring to their private physicians outlining the situation, risk assessment, and public health recommendations. Forty-seven of 67 participants received services through the urgent care center and the West Windsor Health Department; an unknown number of participants received treatment from their private health care providers. Follow-up clinics were arranged at 1 month and at 4 months for hepatitis B vaccination and testing.

Recommendations for appropriate injection safety and vaccine storage, handling, and administration were not followed at the influenza vaccination clinic (*1*–*6*). Response to this event required rapid and extensive communication and coordination among public health partners, including CDC, NJDOH, the New Jersey State Board of Nursing, and the West Windsor Health Department, as well as private entities. The contracted nurse voluntarily surrendered her license within 1 week of the initial report.

***MMWR* 2015;64(49):1363-4. www.cdc.gov/mmwr/preview/mmwrhtml/mm6449a3.htm**

Real-Life Vaccine Administration Error

- **155 reports to VAERS regarding Shingrix, 13 (8%) documented a vaccine administration error, including:**
  - **Improper storage**: Administered Shingrix after frozen storage
  - **Wrong preparation**: Administered the adjuvanted diluent without reconstitution with the vaccine antigen
  - **Wrong route**: Given subcut route rather than the IM
  - **Wrong age**: Vaccine administered to persons less than 50 years of age
  - **Wrong vaccine**: Shingrix instead of varicella (Varivax) vaccine

Morbidity and Mortality Weekly Report

Notes from the Field

Vaccine Administration Errors Involving Recombinant Zoster Vaccine — United States, 2017–2018

Tom T. Shimabukuro, MD[1]; Elaine R. Miller, MPH[1]; Raymond A. Strikas, MD[2]; Beth F. Hibbs, MPH[1]; Kathleen Dooling, MD[3]; Ravi Goud, MD[4]; Maria V. Cano, MD[1]

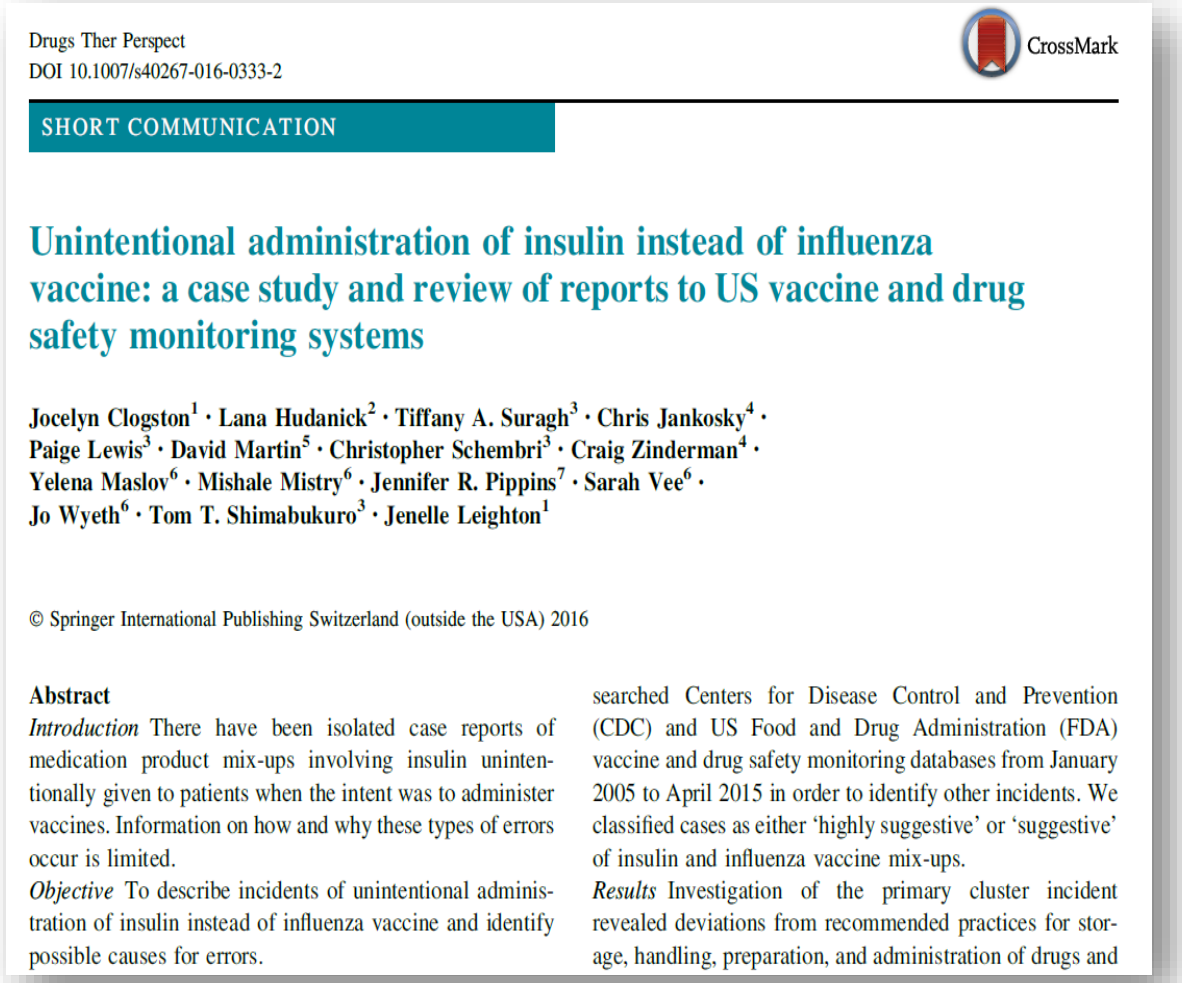
Two vaccines for the prevention of herpes zoster (shingles) are licensed for use in the United States and recommended by the Advisory Committee on Immunization Practices (ACIP). Zoster vaccine live (ZVL; Zostavax, Merck), licensed in 2006,* is a live attenuated virus vaccine administered as a single subcutaneous (SQ) dose. Although the Food and Drug Administration (FDA) approved ZVL for adults aged ≥50 years, ACIP recommends ZVL for immunocompetent adults aged ≥60 years (*1*). Recombinant zoster vaccine (RZV; Shingrix, GlaxoSmithKline), licensed October 2017,† is also approved by the FDA for adults

also described vaccination of a person aged 48 years (inappropriate age), and two described patients receiving the vaccine information statement for ZVL instead of RZV and not being instructed to return for the second RZV dose. The remaining four reports included 1) administration of RZV instead of the intended varicella (Varivax) vaccine to a person of unreported age, 2) administration of RZV after incorrect frozen storage, 3) administration of RZV to a person aged 39 years, and 4) administration of only the adjuvant component without reconstitution with the vaccine antigen. Vaccine administration errors occurred in a pharmacy (nine reports), a health care provider's office (two), and unknown sites (two). CDC also received 13 public inquiries concerning RZV administration errors or questions asked to avoid errors. Topics included SQ administration (five), reconstitution (five), incorrect interval or schedule (two), and administration of previously frozen vaccine (one).

MMWR 2018;67:20

Real-Life Vaccine Administration Error

- Unintentional administration of insulin instead of influenza vaccine



Drugs Ther Perspect
DOI 10.1007/s40267-016-0333-2

CrossMark

SHORT COMMUNICATION

Unintentional administration of insulin instead of influenza vaccine: a case study and review of reports to US vaccine and drug safety monitoring systems

Jocelyn Clogston[1] · Lana Hudanick[2] · Tiffany A. Suragh[3] · Chris Jankosky[4] · Paige Lewis[3] · David Martin[5] · Christopher Schembri[3] · Craig Zinderman[4] · Yelena Maslov[6] · Mishale Mistry[6] · Jennifer R. Pippins[7] · Sarah Vee[6] · Jo Wyeth[6] · Tom T. Shimabukuro[3] · Jenelle Leighton[1]

Abstract

Introduction There have been isolated case reports of medication product mix-ups involving insulin unintentionally given to patients when the intent was to administer vaccines. Information on how and why these types of errors occur is limited.

Objective To describe incidents of unintentional administration of insulin instead of influenza vaccine and identify possible causes for errors.

searched Centers for Disease Control and Prevention (CDC) and US Food and Drug Administration (FDA) vaccine and drug safety monitoring databases from January 2005 to April 2015 in order to identify other incidents. We classified cases as either 'highly suggestive' or 'suggestive' of insulin and influenza vaccine mix-ups.

Results Investigation of the primary cluster incident revealed deviations from recommended practices for storage, handling, preparation, and administration of drugs and

Clogston, et al. Unintentional administration of insulin instead of influenza vaccine: a case study and review of reports to US vaccine and drug safety monitoring systems. *Drugs & Therapy Perspectives* 2016;32:439-446.

Data and Research

Vaccine Adverse Event Reporting System (VAERS)

- Authorized by National Childhood Vaccine Injury Act of 1986
- Jointly administered CDC and FDA
- National, post-marketing, passive reporting system for adverse events occurring after receipt of U.S.-licensed vaccines
- Began receiving reports in 1990
- Data available to the public

[1]Numbers include both U.S. and foreign reports, primary and non-primary

Vaccine Adverse Event Reporting System http://wonder.cdc.gov/vaers.html and https://vaers.hhs.gov/data/data

Vaccination Errors Categorized into 11 Error Groups, VAERS, 2000-2016

Vaccination Error Groups[1]	N (%[3])
1. Storage and dispensing	37,782 (57)
2. Inappropriate schedule	10,662 (16)
3. Wrong vaccine	4,996 (8)
Incorrect dose	4,772 (7)
Administration errors	3,382 (5)
General errors	2,634 (4)
Accidental	504 (1)
Product quality	442 (1)
Equipment	434 (1)
Contraindication	281 (<1)
Product labeling/packaging	124 (<1)
Total errors [2]	**66,013**

81% of reported errors

[1]Vacciantion error groups contain multiple MedDRA Codes

[2]Vaccination error groups are not mutually exclusive; Total Vaccination Error Reports =63,759

[3]Percent of total errors

Top 3 Vaccination Error Reports
1. Storage and Handling

- **57% of VAERS error reports[1]**
- **Storage and handling errors reported included:**
  - Expired vaccine (55%)
    - Live, attenuated influenza vaccine most common
  - Vaccines exposed to inappropriate temperatures (44%)
    - Vaccines kept outside of proper storage temperatures commonly reported (88%)[1]
    - 55% of these reports involved vaccine exposed to temperatures below recommended storage temperature

[1]Based on 5% random sample review of reports

Hibbs, et al. Vaccination errors reported to the Vaccine Adverse Event Reporting System, (VAERS) United States, 2000-2013 *Vaccine*. 2015;33:3171-8.

Top 3 Vaccination Error Reports
2. Inappropriate Schedule

- **16% of VAERS error reports[1]**
- **Inappropriate schedule errors included:**
  - Wrong age
  - Wrong timing/spacing between doses in a series
- **Wrong age errors were most common for children 0–18 years (57%)**
  - 53% of these errors were reported in children younger than 1 year of age
- **Wrong timing errors were most common in:**
  - Quadrivalent human papillomavirus vaccine
    - Third dose given too soon (12-week minimum interval)
  - Rotavirus vaccine
    - First dose given after 15 weeks[1]
    - Last dose given after 32 weeks[1]

[1]Based on 5% random sample review of reports wrong age inappropriate schedule (n=297)

Hibbs, et al. Vaccination errors reported to the Vaccine Adverse Event Reporting System, (VAERS) United States, 2000-2013 *Vaccine*. 2015;33:3171-8

Top 3 Vaccination Error Reports
3. Wrong Vaccine Administered

- 8% of VAERS administration error reports[1]
- Occurred among vaccines with similar names, acronyms, antigens

Common Vaccine Mix-Ups[1]		
Varicella	with	Zostavax
Diphtheria, tetanus, and pertussis (DTaP)	with	Tetanus, diphtheria, and pertussis (Tdap)
Trivalent inactivated influenza vaccine (IIV)	with	Another IIV with different age indications
Pneumococcal conjugate	with	Pneumococcal polysaccharide
Hepatitis A	with	Hepatitis B

[1]Vaccine mix-ups can be either combination (e.g., varicella vaccine instead of herpes zoster vaccine or herpes zoster vaccine instead of varicella vaccine)

Vaccine Administration Error Reports: Adverse Health Events and Errors

- **Most common adverse health events (AHEs) included:**
  - Injection site erythema (13%)
  - Injection site pain (11%)
  - Fever (11%)
- **All serious reports[1] were clinically reviewed and reports included:**
  - Injection site reactions (25%)
  - Musculoskeletal (e.g., shoulder pain) (13%)
  - Neurological (e.g., headache) (12%)
- **Error groups and reported AHEs**
  - Administration errors (e.g., wrong site, wrong technique, incorrect route) had the highest percentage of AHEs for its group (1,176 of 1,951 error reports; 60%)

[1]Based on the Code of Federal Regulations, a report is classified as serious if one of the following is reported: death, life-threatening illness, hospitalization or prolongation of hospitalization, or permanent disability.

Vaccine Administration Error Reports: Adverse Health Reports

- **Wrong site: Shoulder injuries related to vaccine administration are injuries to the musculoskeletal structure of the shoulder, including the ligaments, bursa, and tendons**
  - They are thought to occur as a result of the unintended injection of vaccine antigen and/or trauma from the needle going into and around the underlying bursa of the shoulder
  - Symptoms include shoulder pain and limited mobility after the injection
- **Shoulder injury related to vaccine administration (SIRVA) was added to the Vaccine Injury Compensation Table in March 2017**

Vaccine Administration Error Clusters: Same Error, Multiple Individuals, Same Location

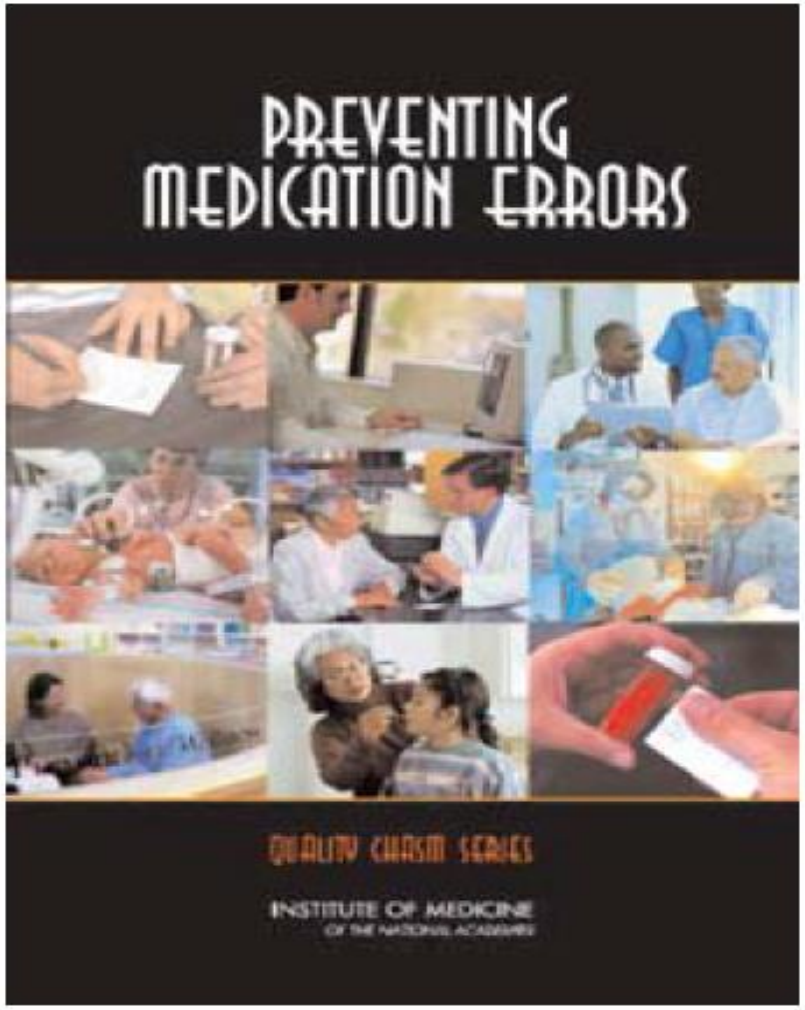
- **936 error clusters, all errors**
  - Cluster size: 2–501 patients (median: 5)
  - 110 clusters involved 10+ patients
  - 586 clusters, the specific number of patients affected stated as “unknown” or “several”

- **Storage errors most common error cluster (72% of all cluster reports)**
  - Incorrect product storage (582 clusters, 1,715 patients)
  - Expired vaccine administered (96 clusters, 1,340 patients)
    - LAIV (45 clusters, 990 patients)

Best Practice Strategies and Resources

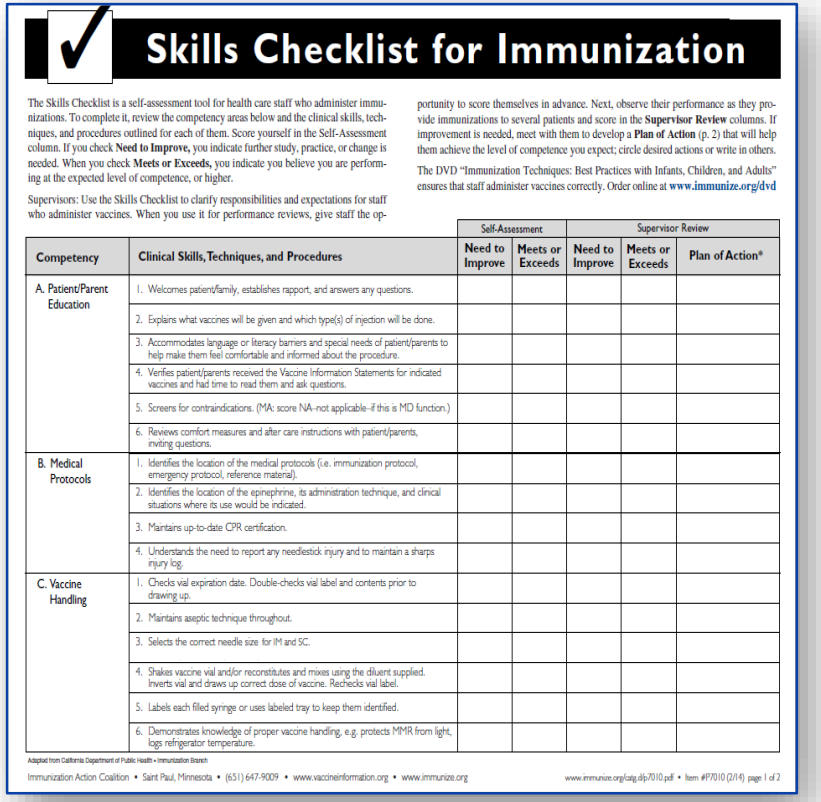
Preventing Medication Errors

- **Institute of Medicine recommends implementing proven medication safety practices, including:**
  - Reducing reliance on memory
  - Standardization
  - Protocols and checklists
  - Differentiating look-alike and sound-alike products
  - Monitoring error frequencies and correcting system problems associated with errors



Strategies to Prevent Vaccination Errors
Knowledgeable Staff

- **Before administering vaccines, all personnel who will administer vaccines should:**
  - Receive competency-based training
  - Have knowledge and skills validated
- **Integrate competency-based training into:**
  - New staff orientation (and temporary staff)
  - Annual education requirements
- **Ongoing education:**
  - Whenever vaccine administration recommendations are updated
  - When new vaccines are added to inventory



Skills Checklist for Immunization

The Skills Checklist is a self-assessment tool for health care staff who administer immunizations. To complete it, review the competency areas below and the clinical skills, techniques, and procedures outlined for each of them. Score yourself in the Self-Assessment column. If you check **Need to Improve,** you indicate further study, practice, or change is needed. When you check **Meets or Exceeds,** you indicate you believe you are performing at the expected level of competence, or higher.

Supervisors: Use the Skills Checklist to clarify responsibilities and expectations for staff who administer vaccines. When you use it for performance reviews, give staff the opportunity to score themselves in advance. Next, observe their performance as they provide immunizations to several patients and score in the **Supervisor Review** columns. If improvement is needed, meet with them to develop a **Plan of Action** (p. 2) that will help them achieve the level of competence you expect; circle desired actions or write in others.

The DVD "Immunization Techniques: Best Practices with Infants, Children, and Adults" ensures that staff administer vaccines correctly. Order online at **www.immunize.org/dvd**

		Self-Assessment		Supervisor Review		
Competency	**Clinical Skills, Techniques, and Procedures**	**Need to Improve**	**Meets or Exceeds**	**Need to Improve**	**Meets or Exceeds**	**Plan of Action***
A. Patient/Parent Education	1. Welcomes patient/family, establishes rapport, and answers any questions.					
	2. Explains what vaccines will be given and which type(s) of injection will be done.					
	3. Accommodates language or literacy barriers and special needs of patient/parents to help make them feel comfortable and informed about the procedure.					
	4. Verifies patient/parents received the Vaccine Information Statements for indicated vaccines and had time to read them and ask questions.					
	5. Screens for contraindications. (MA: score NA–not applicable–if this is MD function.)					
	6. Reviews comfort measures and after care instructions with patient/parents, inviting questions.					
B. Medical Protocols	1. Identifies the location of the medical protocols (i.e. immunization protocol, emergency protocol, reference material).					
	2. Identifies the location of the epinephrine, its administration technique, and clinical situations where its use would be indicated.					
	3. Maintains up-to-date CPR certification.					
	4. Understands the need to report any needlestick injury and to maintain a sharps injury log.					
C. Vaccine Handling	1. Checks vial expiration date. Double-checks vial label and contents prior to drawing up.					
	2. Maintains aseptic technique throughout.					
	3. Selects the correct needle size for IM and SC.					
	4. Shakes vaccine vial and/or reconstitutes and mixes using the diluent supplied. Inverts vial and draws up correct dose of vaccine. Rechecks vial label.					
	5. Labels each filled syringe or uses labeled tray to keep them identified.					
	6. Demonstrates knowledge of proper vaccine handling, e.g. protects MMR from light, logs refrigerator temperature.					

Adapted from California Department of Public Health • Immunization Branch

Immunization Action Coalition • Saint Paul, Minnesota • (651) 647-9009 • www.vaccineinformation.org • www.immunize.org

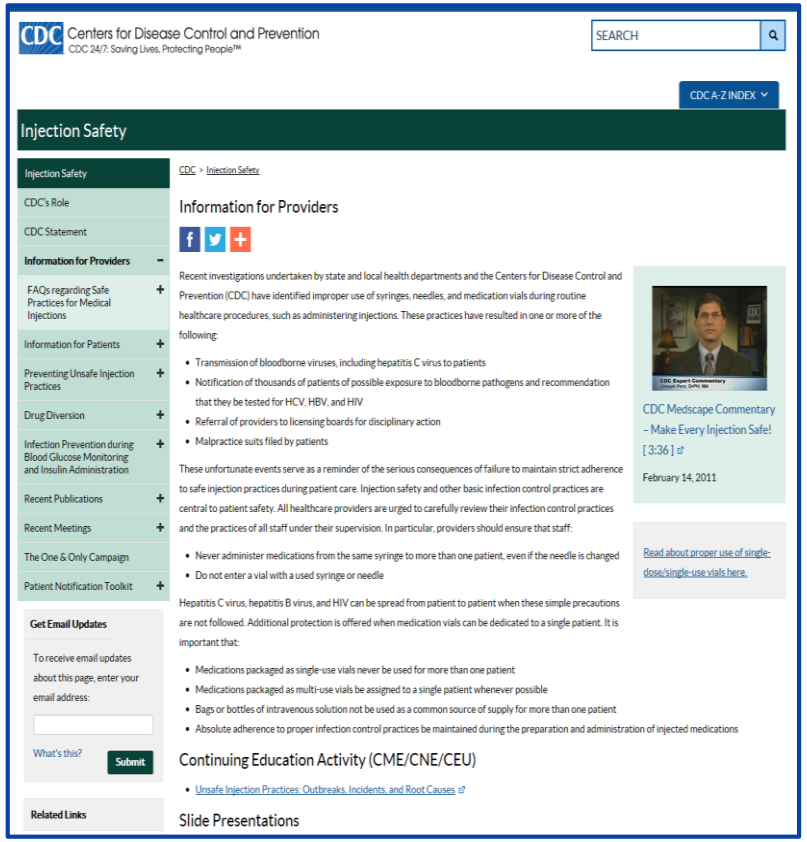
www.immunize.org/catg.d/p7010.pdf • Item #P7010 (2/14) page 1 of 2

Skills Checklist for Immunization

Immunization Action Coalition: Skills Checklist for Immunization www.immunize.org/catg.d/p7010.pdf

Safe Injection Practices

- **To ensure vaccination is as safe and effective as possible, incorporate:**
  - Professional standards for medication administration
  - Manufacturer's vaccine-specific guidelines
  - Evidence-based safe medication administration practices, including proper injection practices



CDC Injection Safety website

CDC Injection Safety www.cdc.gov/injectionsafety/

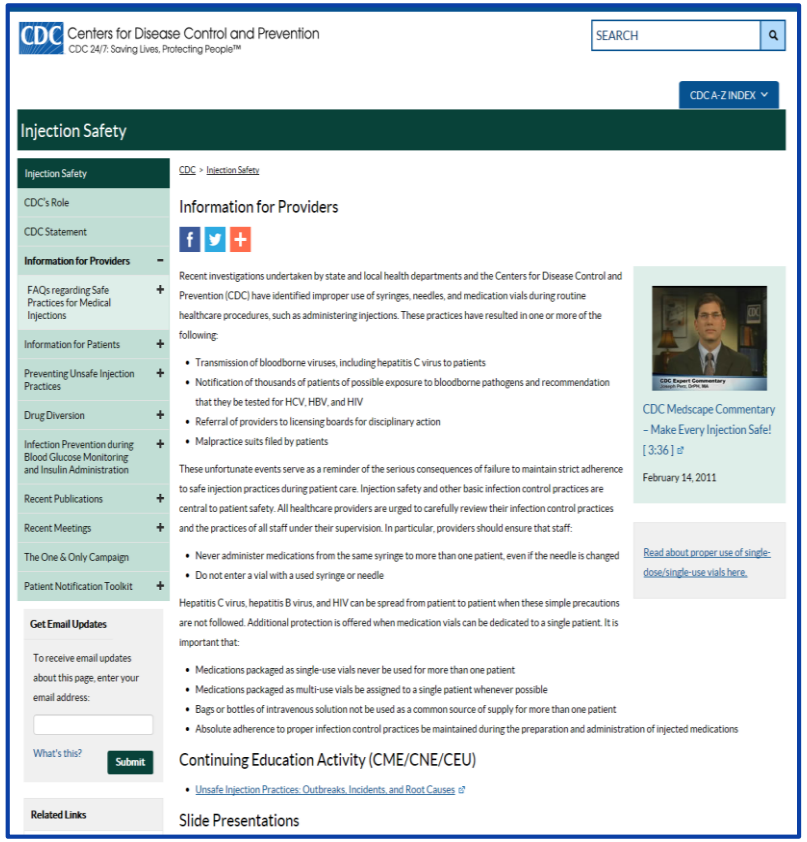
Infection Control

- **Perform hand hygiene:**
  - Before preparing and administering vaccines
  - Between patients
  - Anytime hands become soiled
- **Gloves are not required to be worn when administering vaccines unless the person administering the vaccine is likely to come into contact with potentially infectious body fluids or has open lesions on hands**
  - If gloves are worn, they should be changed between patients and
  - Perform hand hygiene between patients even if wearing gloves
- **Maintain proper infection control practices while preparing and administering vaccines**
  - Draw up and prepare vaccines in a clean medication preparation area
- **Equipment disposal:**
  - Puncture-proof biohazard container
  - Empty or expired vaccine vials are medical waste

MMWR 2011;60(2):17

Injection Safety Best Practices

- **Prepare and administer vaccines using aseptic technique:**
  - Use a new needle and syringe for every injection
  - Disinfect the medication vial by rubbing the diaphragm with a sterile alcohol wipe
- **Use a single-dose vial for a SINGLE patient for a SINGLE procedure or injection:**
  - Discard after “entering” the vial, even if there is leftover vaccine



CDC Injection Safety website

CDC Injection Safety website https://www.cdc.gov/injectionsafety/providers.html

What Can Happen?

- **Over 1,000 persons vaccinated by business A in 54 locations in fall, 2018 with multiple vaccines**
  - Employees from 23 companies
  - Worksite clinics run by business A in Kentucky, Ohio, and Indiana

- **Of ~1,000 vaccinated persons, 101 (~10%!) with skin infections and/or abscesses!**
  - 30 *Mycobacterium fortuitum/porcinum* infections documented

- **Kentucky staff found numerous problems with Business A**
  - hand hygiene
  - vaccine handling (including storage, preparation, administration, and transportation off-site)
  - medical record documentation

Mycobacterium fortuitum Skin Infections, KY/IN/OH Outbreak, 2018

This should not happen!

Patient A

Patient B

Outcomes

CNN: "Kentucky doctor reprimanded after his wife improperly handled flu vaccines and wrote prescriptions under his name"

- **Business A physician sanctioned by KY regulatory agency**
  - Five years' probation
  - $5,000 fine for delegating medical care to someone without a medical license
  - Required to pass a course addressing medical ethics and misconduct
  - Education required about proper vaccine storage and handling

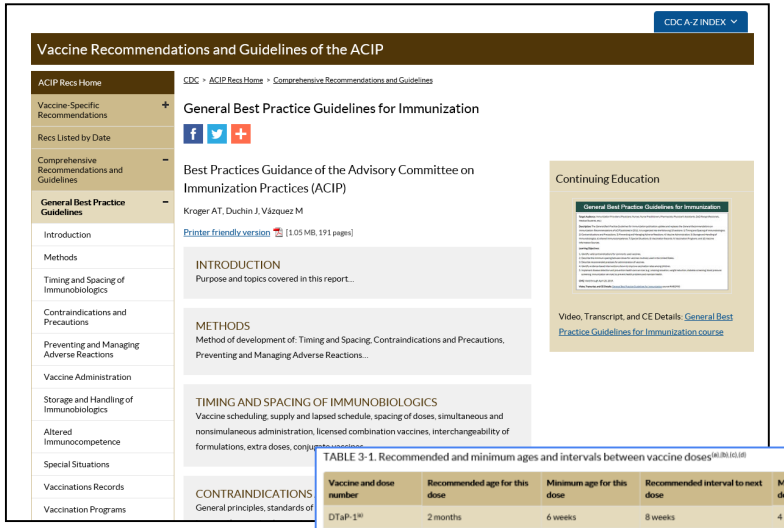
- **Patients treated with**
  - antibiotics, and
  - some with abscess incision and drainage, or nodule removal

- **All patients recommended to be revaccinated because of poor vaccine storage and handling practices**

https://www.cnn.com/2019/07/23/health/kentucky-vaccines-outbreak/index.html

Strategies to Prevent Vaccination Errors: Schedule and Timing

- **Keep current reference materials available for staff, including:**
  - Recommended childhood and adult schedules
  - Minimum age and interval table (Table 1)
- **Educate staff administering vaccines about vaccines in the facility's inventory**
- **Educate staff to schedule immunization appointments AFTER the child's birthday**
- **Assess for indicated vaccines using your state's immunization information system**



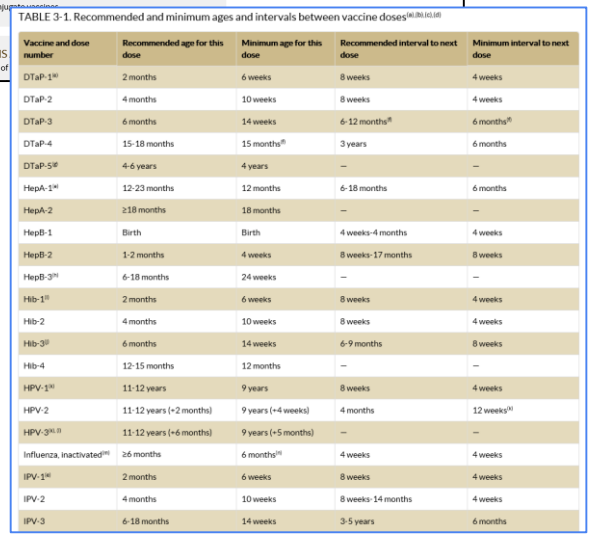


TABLE 3-1. Recommended and minimum ages and intervals between vaccine doses[a],[b],[c],[d]

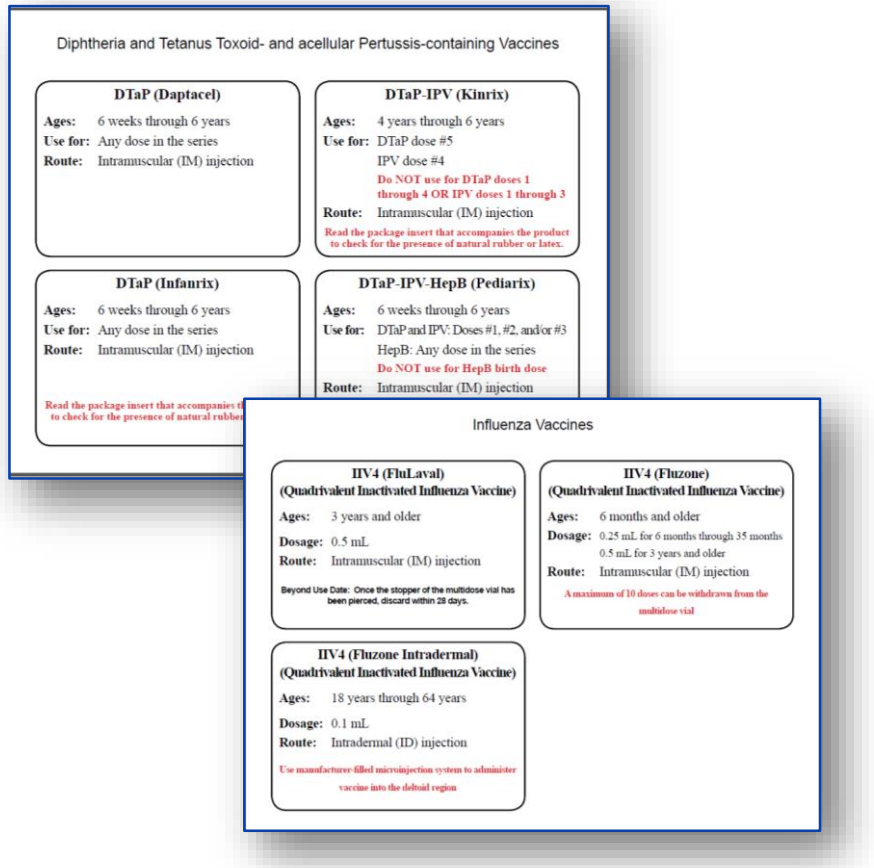
Vaccine and dose number	Recommended age for this dose	Minimum age for this dose	Recommended interval to next dose	Minimum interval to next dose
DTaP-1[e]	2 months	6 weeks	8 weeks	4 weeks
DTaP-2	4 months	10 weeks	8 weeks	4 weeks
DTaP-3	6 months	14 weeks	6-12 months[f]	6 months[f]
DTaP-4	15-18 months	15 months[f]	3 years	6 months
DTaP-5[g]	4-6 years	4 years	–	–
HepA-1[e]	12-23 months	12 months	6-18 months	6 months
HepA-2	≥18 months	18 months	–	–
HepB-1	Birth	Birth	4 weeks-4 months	4 weeks
HepB-2	1-2 months	4 weeks	8 weeks-17 months	8 weeks
HepB-3[h]	6-18 months	24 weeks	–	–
Hib-1[i]	2 months	6 weeks	8 weeks	4 weeks
Hib-2	4 months	10 weeks	8 weeks	4 weeks
Hib-3[j]	6 months	14 weeks	6-9 months	8 weeks
Hib-4	12-15 months	12 months	–	–
HPV-1[e]	11-12 years	9 years	8 weeks	4 weeks
HPV-2	11-12 years (+2 months)	9 years (+4 weeks)	4 months	12 weeks[k]
HPV-3[k],[l]	11-12 years (+6 months)	9 years (+5 months)	–	–
Influenza, inactivated[m]	≥6 months	6 months[n]	4 weeks	4 weeks
IPV-1[e]	2 months	6 weeks	8 weeks	4 weeks
IPV-2	4 months	10 weeks	8 weeks-14 months	4 weeks
IPV-3	6-18 months	14 weeks	3-5 years	6 months

ACIP General Best Practice Guidelines: Table 3-1

General Best Practice Guidelines for Immunization www.cdc.gov/vaccines/hcp/acip-recs/general-recs/timing.html
ACIP Immunization schedules for children and adults www.cdc.gov/vaccines/schedules/
Immunization information systems www.cdc.gov/vaccines/programs/iis/index.html

Strategies to Prevent Vaccination Errors: Wrong Vaccine

- **Store some vaccines on separate shelves:**
  - Pediatric and adult formulations of the same vaccine
  - Sound-alike and look-alike vaccines
- **Label vaccines with type and age:**
  - Color coding labels can help
- **Only administer vaccines you have prepared and triple-checked**
- **Use standardized ACIP vaccine abbreviations**



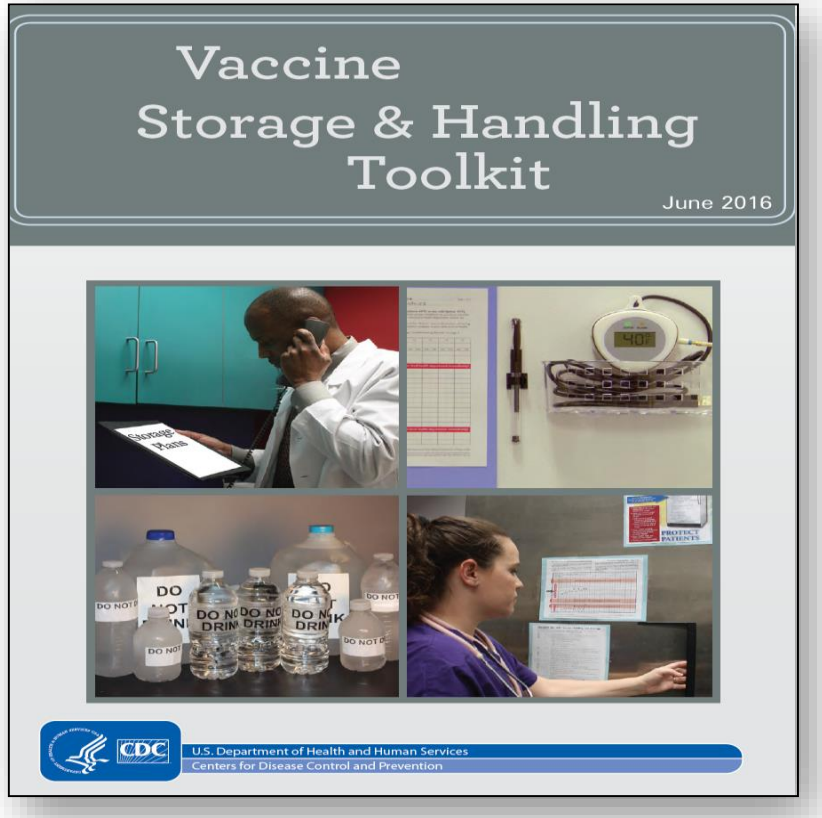
CDC vaccine labels

CDC vaccine label examples www.cdc.gov/vaccines/hcp/admin/storage/guide/vaccine-storage-labels.pdf

ACIP vaccine abbreviations www.cdc.gov/vaccines/acip/committee/guidance/vac-abbrev.html

Strategies to Prevent Vaccination Errors: Storage and Handling

- **Monitor the vaccine storage unit temperature:**
  - If using a digital data logger (DDL) to monitor the storage unit temperature, read the minimum and maximum temperatures each workday–preferably in the morning before clinic opens
  - If NOT using a DDL to monitor the storage unit temperature read the temperature TWICE each work day – in the morning and at the end of the workday
  - Record temperature readings on temperature log, along with time of the reading and initials of person recording data
  - Review electronic temperature data at least 1 time each week
- **Take immediate action and isolate vaccine(s) exposed to improper temperatures**



CDC Vaccine Storage and Handling Toolkit

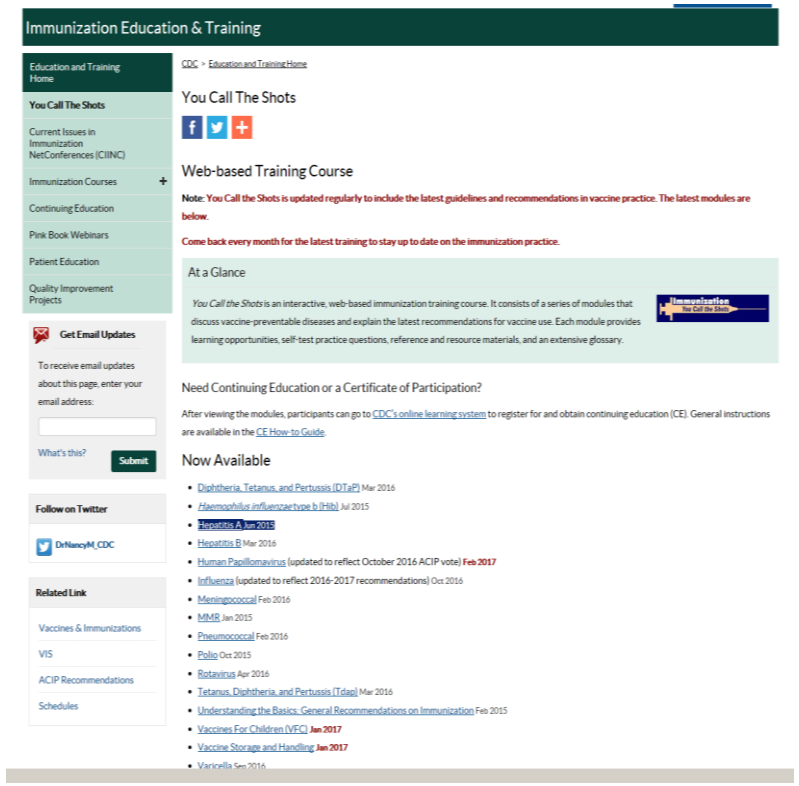
CDC Vaccine Storage and Handling Toolkit www.cdc.gov/vaccines/hcp/admin/storage/toolkit/index.html

Strategies to Prevent Vaccination Errors: Storage and Handling

- **Check expiration dates weekly and promptly remove expired vaccines from the storage unit**

- **Designate a primary vaccine coordinator for your facility**
  - Choose a second staff member to act as an alternate vaccine coordinator

- **Use a continuous temperature monitoring device**
  - CDC recommends using digital data loggers



CDC *You Call the Shots* web-based education program: Storage and Handling

CDC *You Call the Shots* https://www.cdc.gov/vaccines/ed/youcalltheshots.html

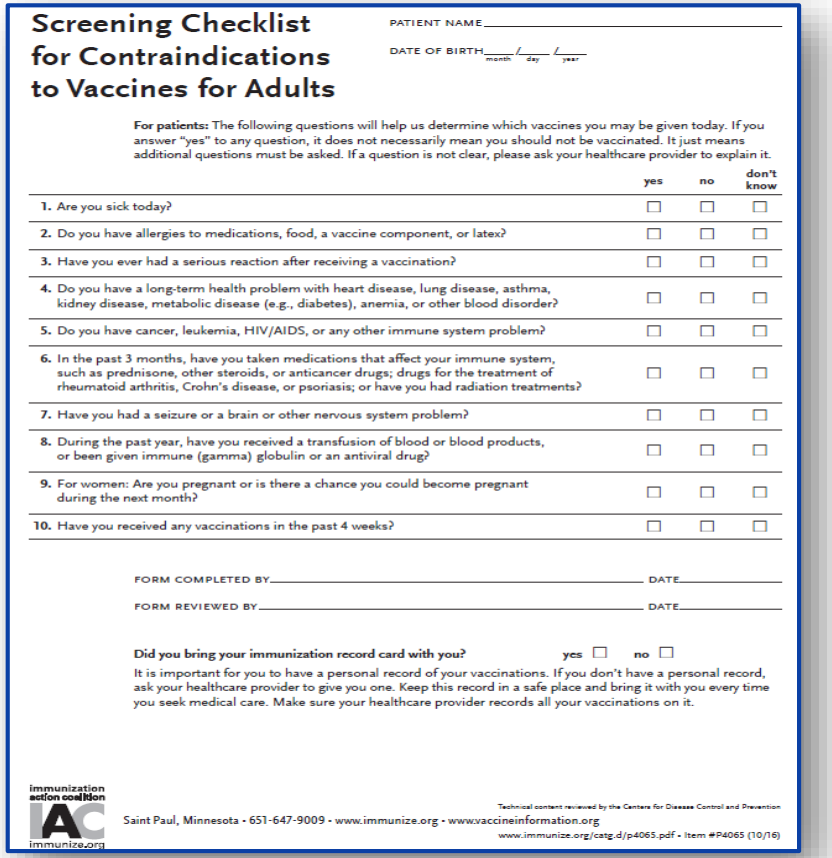
Multidose Vials and Expiration Dates

- **A multidose vial (MDV) that has been stored and handled properly may be used more than once**
- **Double-check the manufacturer's package insert (PI) for information on beyond-use date or dose limits (if applicable)**
  - IPV MDV may be used through the expiration date if stored and handled correctly and not contaminated
- **Some IIV products have a beyond-use date and should be used within a certain number of days after being entered**
- **Fluzone inactivated influenza vaccine PI indicates only 10 doses may be withdrawn from an MDV**
  - After the maximum number of doses has been withdrawn from the MDV, the vial should be discarded, even if the expiration date has not been reached or there is vaccine left in the vial

IAC Food and Drug Administration (FDA) product approval: vaccine index http://www.immunize.org/fda/

Strategies to Prevent Vaccination Errors: Adverse Health Events

- Screen for contraindications and precautions every time vaccines are needed
- Use a standardized form
- Integrate into office procedures and flow



Screening Checklist for Contraindications to Vaccines for Adults

PATIENT NAME _____

DATE OF BIRTH ____ / ____ / ____ (month / day / year)

For patients: The following questions will help us determine which vaccines you may be given today. If you answer "yes" to any question, it does not necessarily mean you should not be vaccinated. It just means additional questions must be asked. If a question is not clear, please ask your healthcare provider to explain it.

	yes	no	don't know
1. Are you sick today?	☐	☐	☐
2. Do you have allergies to medications, food, a vaccine component, or latex?	☐	☐	☐
3. Have you ever had a serious reaction after receiving a vaccination?	☐	☐	☐
4. Do you have a long-term health problem with heart disease, lung disease, asthma, kidney disease, metabolic disease (e.g., diabetes), anemia, or other blood disorder?	☐	☐	☐
5. Do you have cancer, leukemia, HIV/AIDS, or any other immune system problem?	☐	☐	☐
6. In the past 3 months, have you taken medications that affect your immune system, such as prednisone, other steroids, or anticancer drugs; drugs for the treatment of rheumatoid arthritis, Crohn's disease, or psoriasis; or have you had radiation treatments?	☐	☐	☐
7. Have you had a seizure or a brain or other nervous system problem?	☐	☐	☐
8. During the past year, have you received a transfusion of blood or blood products, or been given immune (gamma) globulin or an antiviral drug?	☐	☐	☐
9. For women: Are you pregnant or is there a chance you could become pregnant during the next month?	☐	☐	☐
10. Have you received any vaccinations in the past 4 weeks?	☐	☐	☐

FORM COMPLETED BY _____ DATE _____

FORM REVIEWED BY _____ DATE _____

Did you bring your immunization record card with you? yes ☐ no ☐

It is important for you to have a personal record of your vaccinations. If you don't have a personal record, ask your healthcare provider to give you one. Keep this record in a safe place and bring it with you every time you seek medical care. Make sure your healthcare provider records all your vaccinations on it.

immunization action coalition IAC immunize.org

Technical content reviewed by the Centers for Disease Control and Prevention

Saint Paul, Minnesota • 651-647-9009 • www.immunize.org • www.vaccineinformation.org

www.immunize.org/catg.d/p4065.pdf • Item #P4065 (10/16)

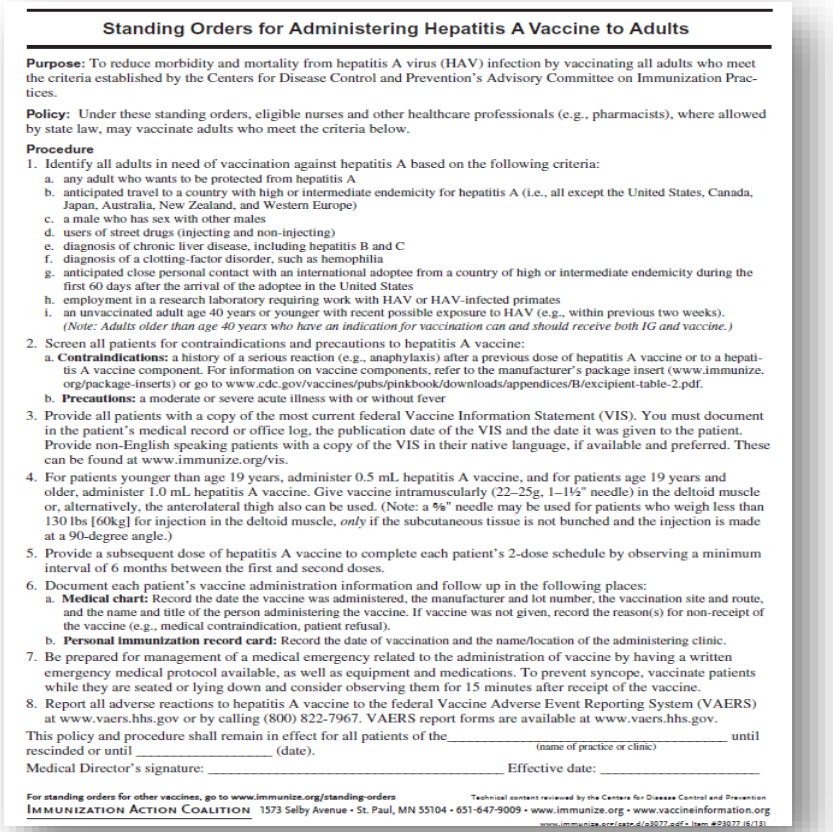
IAC Screening Checklist for Contraindications and Precautions

IAC Screening Checklist for Contraindications and Precautions to Vaccines for Adults http://www.immunize.org/catg.d/p4065.pdf

IAC Screening Checklist for Contraindications and Precautions to Vaccines for Children and Teens http://immunize.org/catg.d/p4060.pdf

Strategies to Prevent Vaccination Errors: Adverse Health Events

- **Use standing orders**
- **Comprehensive standing order includes:**
  - Who should be vaccinated
  - Indications, contraindications, and precautions
  - Procedures for administering the vaccine
  - Federal requirements (e.g., Vaccine information statement)
  - Documentation in the patient record
  - Protocol for the management of any medical emergency related to the administration of the vaccine
  - Reporting possible adverse events occurring after vaccination



Standing Orders for Administering Hepatitis A Vaccine to Adults

Purpose: To reduce morbidity and mortality from hepatitis A virus (HAV) infection by vaccinating all adults who meet the criteria established by the Centers for Disease Control and Prevention's Advisory Committee on Immunization Practices.

Policy: Under these standing orders, eligible nurses and other healthcare professionals (e.g., pharmacists), where allowed by state law, may vaccinate adults who meet the criteria below.

Procedure

1. Identify all adults in need of vaccination against hepatitis A based on the following criteria:
   a. any adult who wants to be protected from hepatitis A
   b. anticipated travel to a country with high or intermediate endemicity for hepatitis A (i.e., all except the United States, Canada, Japan, Australia, New Zealand, and Western Europe)
   c. a male who has sex with other males
   d. users of street drugs (injecting and non-injecting)
   e. diagnosis of chronic liver disease, including hepatitis B and C
   f. diagnosis of a clotting-factor disorder, such as hemophilia
   g. anticipated close personal contact with an international adoptee from a country of high or intermediate endemicity during the first 60 days after the arrival of the adoptee in the United States
   h. employment in a research laboratory requiring work with HAV or HAV-infected primates
   i. an unvaccinated adult age 40 years or younger with recent possible exposure to HAV (e.g., within previous two weeks).
   (Note: Adults older than age 40 years who have an indication for vaccination can and should receive both IG and vaccine.)
2. Screen all patients for contraindications and precautions to hepatitis A vaccine:
   a. **Contraindications:** a history of a serious reaction (e.g., anaphylaxis) after a previous dose of hepatitis A vaccine or to a hepatitis A vaccine component. For information on vaccine components, refer to the manufacturer's package insert (www.immunize.org/package-inserts) or go to www.cdc.gov/vaccines/pubs/pinkbook/downloads/appendices/B/excipient-table-2.pdf.
   b. **Precautions:** a moderate or severe acute illness with or without fever
3. Provide all patients with a copy of the most current federal Vaccine Information Statement (VIS). You must document in the patient's medical record or office log, the publication date of the VIS and the date it was given to the patient. Provide non-English speaking patients with a copy of the VIS in their native language, if available and preferred. These can be found at www.immunize.org/vis.
4. For patients younger than age 19 years, administer 0.5 mL hepatitis A vaccine, and for patients age 19 years and older, administer 1.0 mL hepatitis A vaccine. Give vaccine intramuscularly (22–25g, 1–1½" needle) in the deltoid muscle or, alternatively, the anterolateral thigh also can be used. (Note: a ⅝" needle may be used for patients who weigh less than 130 lbs [60kg] for injection in the deltoid muscle, *only* if the subcutaneous tissue is not bunched and the injection is made at a 90-degree angle.)
5. Provide a subsequent dose of hepatitis A vaccine to complete each patient's 2-dose schedule by observing a minimum interval of 6 months between the first and second doses.
6. Document each patient's vaccine administration information and follow up in the following places:
   a. **Medical chart:** Record the date the vaccine was administered, the manufacturer and lot number, the vaccination site and route, and the name and title of the person administering the vaccine. If vaccine was not given, record the reason(s) for non-receipt of the vaccine (e.g., medical contraindication, patient refusal).
   b. **Personal immunization record card:** Record the date of vaccination and the name/location of the administering clinic.
7. Be prepared for management of a medical emergency related to the administration of vaccine by having a written emergency medical protocol available, as well as equipment and medications. To prevent syncope, vaccinate patients while they are seated or lying down and consider observing them for 15 minutes after receipt of the vaccine.
8. Report all adverse reactions to hepatitis A vaccine to the federal Vaccine Adverse Event Reporting System (VAERS) at www.vaers.hhs.gov or by calling (800) 822-7967. VAERS report forms are available at www.vaers.hhs.gov.

This policy and procedure shall remain in effect for all patients of the _____ until rescinded or until _____ (date).
(name of practice or clinic)

Medical Director's signature: _____ Effective date: _____

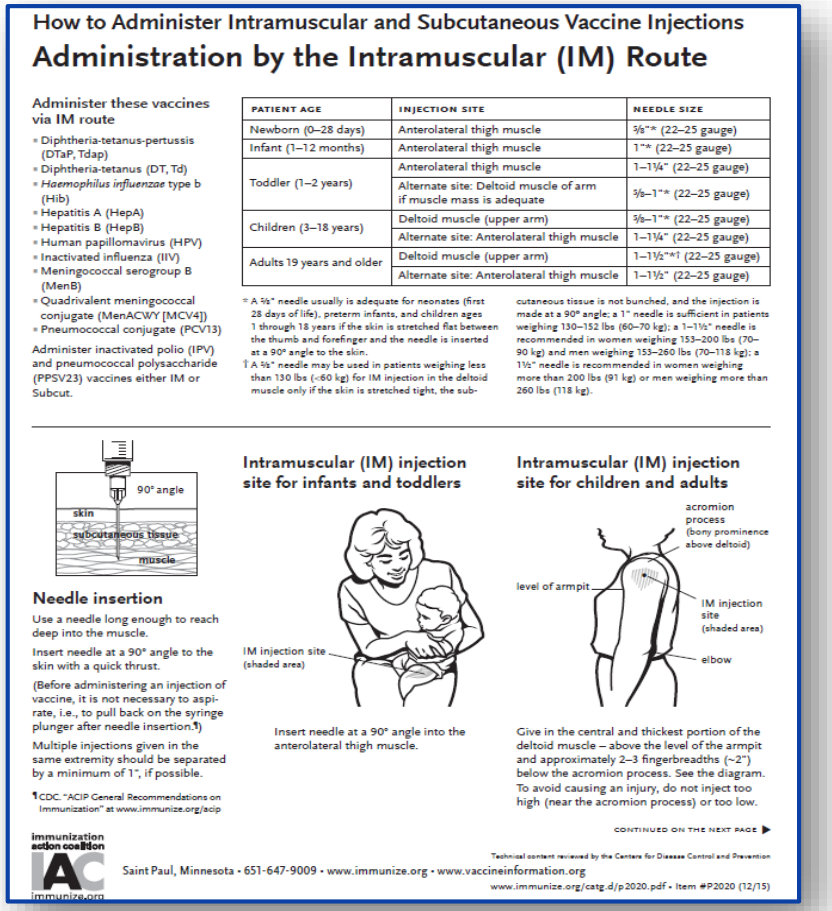
For standing orders for other vaccines, go to www.immunize.org/standing-orders
Technical content reviewed by the Centers for Disease Control and Prevention
IMMUNIZATION ACTION COALITION 1573 Selby Avenue • St. Paul, MN 55104 • 651-647-9009 • www.immunize.org • www.vaccineinformation.org

IAC Standing Orders

IAC Standing orders http://www.immunize.org/standing-orders/

Strategies to Prevent Vaccination Errors: Adverse Health Events

- **Administer injectable vaccines in the correct site based on the age, muscle mass, and size of the patient**
- **Proper needle length based on the age, patient size, and injection technique**
- **Identify IM injection site using proper anatomical landmarks**
  - Vastus lateralis muscle (anterolateral thigh)
  - Deltoid muscle (upper arm)



How to Administer Intramuscular and Subcutaneous Vaccine Injections

Administration by the Intramuscular (IM) Route

Administer these vaccines via IM route

- Diphtheria-tetanus-pertussis (DTaP, Tdap)
- Diphtheria-tetanus (DT, Td)
- *Haemophilus influenzae* type b (Hib)
- Hepatitis A (HepA)
- Hepatitis B (HepB)
- Human papillomavirus (HPV)
- Inactivated influenza (IIV)
- Meningococcal serogroup B (MenB)
- Quadrivalent meningococcal conjugate (MenACWY [MCV4])
- Pneumococcal conjugate (PCV13)

Administer inactivated polio (IPV) and pneumococcal polysaccharide (PPSV23) vaccines either IM or Subcut.

PATIENT AGE	INJECTION SITE	NEEDLE SIZE
Newborn (0–28 days)	Anterolateral thigh muscle	⅝"* (22–25 gauge)
Infant (1–12 months)	Anterolateral thigh muscle	1"* (22–25 gauge)
Toddler (1–2 years)	Anterolateral thigh muscle	1–1¼" (22–25 gauge)
	Alternate site: Deltoid muscle of arm if muscle mass is adequate	⅝–1"* (22–25 gauge)
Children (3–18 years)	Deltoid muscle (upper arm)	⅝–1"* (22–25 gauge)
	Alternate site: Anterolateral thigh muscle	1–1¼" (22–25 gauge)
Adults 19 years and older	Deltoid muscle (upper arm)	1–1½"*† (22–25 gauge)
	Alternate site: Anterolateral thigh muscle	1–1½" (22–25 gauge)

* A ⅝" needle usually is adequate for neonates (first 28 days of life), preterm infants, and children ages 1 through 18 years if the skin is stretched flat between the thumb and forefinger and the needle is inserted at a 90° angle to the skin.

† A ⅝" needle may be used in patients weighing less than 130 lbs (<60 kg) for IM injection in the deltoid muscle only if the skin is stretched tight, the subcutaneous tissue is not bunched, and the injection is made at a 90° angle; a 1" needle is sufficient in patients weighing 130–152 lbs (60–70 kg); a 1–1½" needle is recommended in women weighing 153–200 lbs (70–90 kg) and men weighing 153–260 lbs (70–118 kg); a 1½" needle is recommended in women weighing more than 200 lbs (91 kg) or men weighing more than 260 lbs (118 kg).

Needle insertion

Use a needle long enough to reach deep into the muscle.

Insert needle at a 90° angle to the skin with a quick thrust.

(Before administering an injection of vaccine, it is not necessary to aspirate, i.e., to pull back on the syringe plunger after needle insertion.¶)

Multiple injections given in the same extremity should be separated by a minimum of 1", if possible.

¶ CDC. "ACIP General Recommendations on Immunization" at www.immunize.org/acip

Intramuscular (IM) injection site for infants and toddlers

Insert needle at a 90° angle into the anterolateral thigh muscle.

Intramuscular (IM) injection site for children and adults

Give in the central and thickest portion of the deltoid muscle – above the level of the armpit and approximately 2–3 fingerbreadths (~2") below the acromion process. See the diagram. To avoid causing an injury, do not inject too high (near the acromion process) or too low.

CONTINUED ON THE NEXT PAGE ▶

immunization action coalition
IAC immunize.org
Saint Paul, Minnesota • 651-647-9009 • www.immunize.org • www.vaccineinformation.org
Technical content reviewed by the Centers for Disease Control and Prevention
www.immunize.org/catg.d/p2020.pdf • Item #P2020 (12/15)

IAC How to Administer Intramuscular and Subcutaneous Vaccine Injections

IAC How to Administer Intramuscular and Subcutaneous Vaccine Injections http://immunize.org/catg.d/p2020.pdf

Reporting Vaccine Administration Errors

Reporting Vaccine Administration Errors

First step:

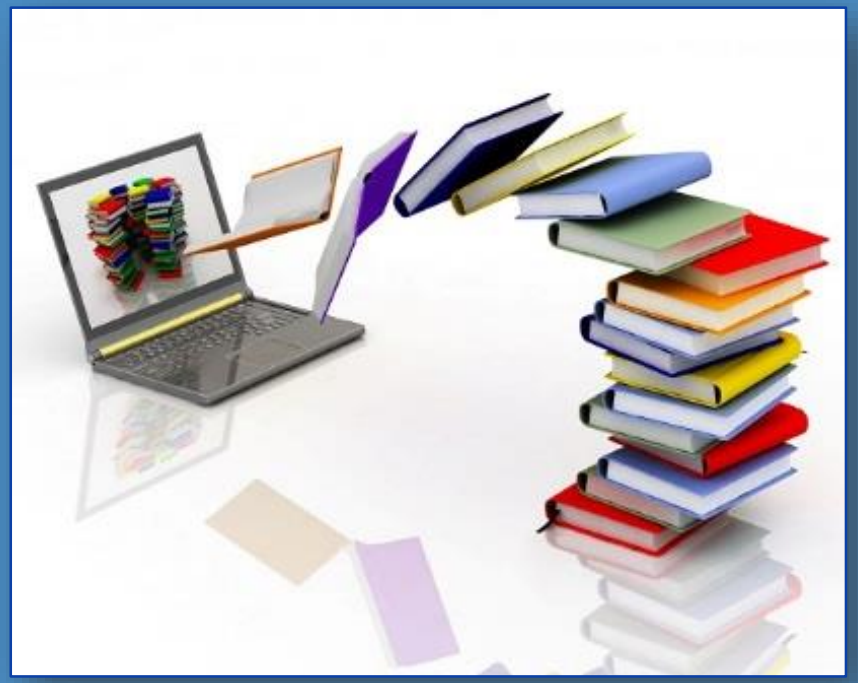
- **Establish an environment that values reporting and investigating errors as part of risk management and quality improvement**

What if a Vaccination Error Occurs?

- **Inform the patient/parent of the error and explain any needed next steps**
- **Determine the status of the patient**
- **Know how to "correct" the error**
  - Contact your local health department, the vaccine manufacturer, or nipinfo@cdc.gov for guidance
  - Not all errors require revaccination!
- **Record the vaccination as it was given on the medical record**
- **Contact the immunization information system (IIS) for additional information as needed**
- **Follow the policies and procedures of your facility for medication errors**
- **Report Vaccination Errors to VAERS**

Take Home Messages

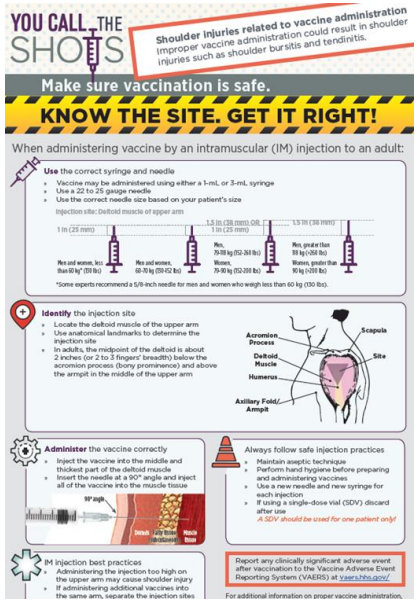
- **Comprehensive, skills-based education is needed for all staff that administer vaccines**
- **Integrate best practice strategies into clinical procedures and office flow**
  - Check the IIS BEFORE administering vaccines
  - Use immunization job aids and resource materials to keep staff on the same page
- **Report administration errors to VAERS**

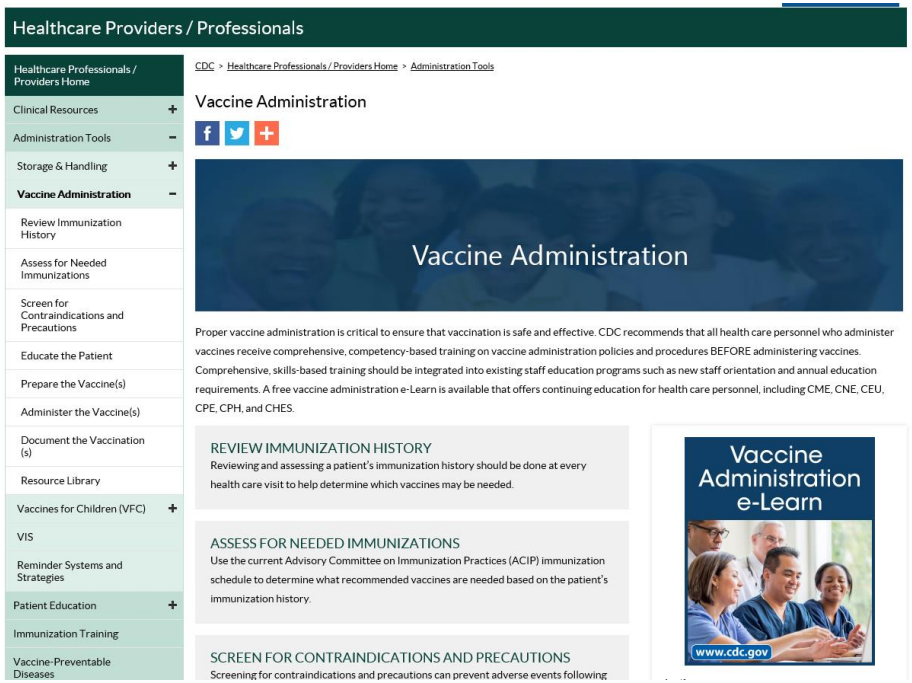


Additional Immunization Resources

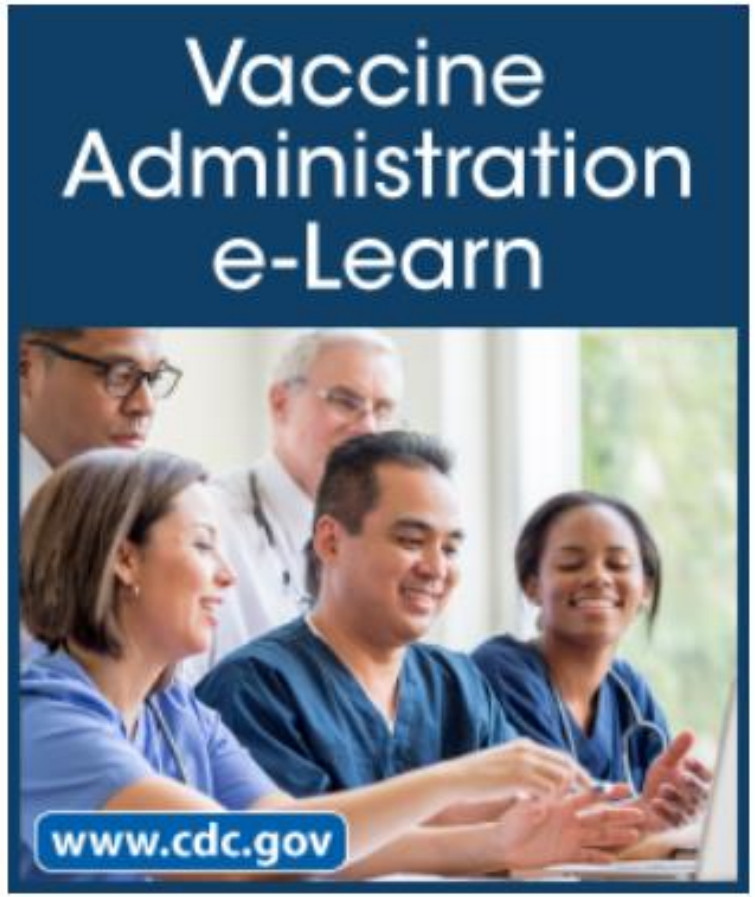
Vaccine Administration Resources for Health Care Personnel

- **CDC vaccine administration materials for health care personnel include:**
  - Printable clinical job aids and infographics
  - Vaccine administration e-Learn
  - Vaccine Administration Videos





CDC Vaccine Administration: www.cdc.gov/vaccines/hcp/admin/admin-protocols.html
www.cdc.gov/vaccines/hcp/infographics/call-the-shots.pdf



A self-paced vaccine administration course that provides comprehensive training using videos, job aids, and other resources

Resource Library

Note: The materials listed on this page might be more current than vaccine administration information in previously published CDC documents, including the 13th edition of *Epidemiology and Prevention of Vaccine-Preventable Diseases* (the Pink Book). Always follow the most up-to-date guidelines in the Vaccine Storage and Handling Toolkit or more recently dated materials.

On This Page

Web-based Training Courses

Vaccine Administration e-Learn

A self-paced vaccine administration course that provides comprehensive training using videos, job aids, and other resources.

You Call the Shots

An interactive, web-based immunization training course that includes the latest guidelines and recommendations in vaccine practice.

Videos

Title: Comfort and Restraint Techniques

Short Description: This training demonstrates comfort and restraint techniques. Determine the best position for the patient based on comfort, age, activity level, administration site, and safety. Instruct the parent on how to help the infant or child stay still so you can administer the vaccine(s) safely.

Title: Assemble a Manufacturer-filled Syringe

Short Description: This training addresses how to assemble a manufacturer-filled syringe, available for a variety of vaccines. CDC recommends that providers only prepare vaccines just prior to administration. Always prepare vaccines in a designated area that is not near any area where potentially contaminated items are placed.

Title: Single-Dose Vial

Short Description: This training addresses how to prepare vaccine from a single-dose vial. A single-dose vial contains one dose and should be administered one time to one patient. CDC recommends that providers only prepare and draw up any vaccine just prior to administration.

Title: Expiration Date

Short Description: This training addresses how to determine when a vaccine or diluent expires—a critical step in vaccine preparation. All vaccines and diluents have an expiration date that indicates the date by which the product must be used. Vaccines and diluents may be used up to and including the expiration date unless the manufacturer indicates otherwise.

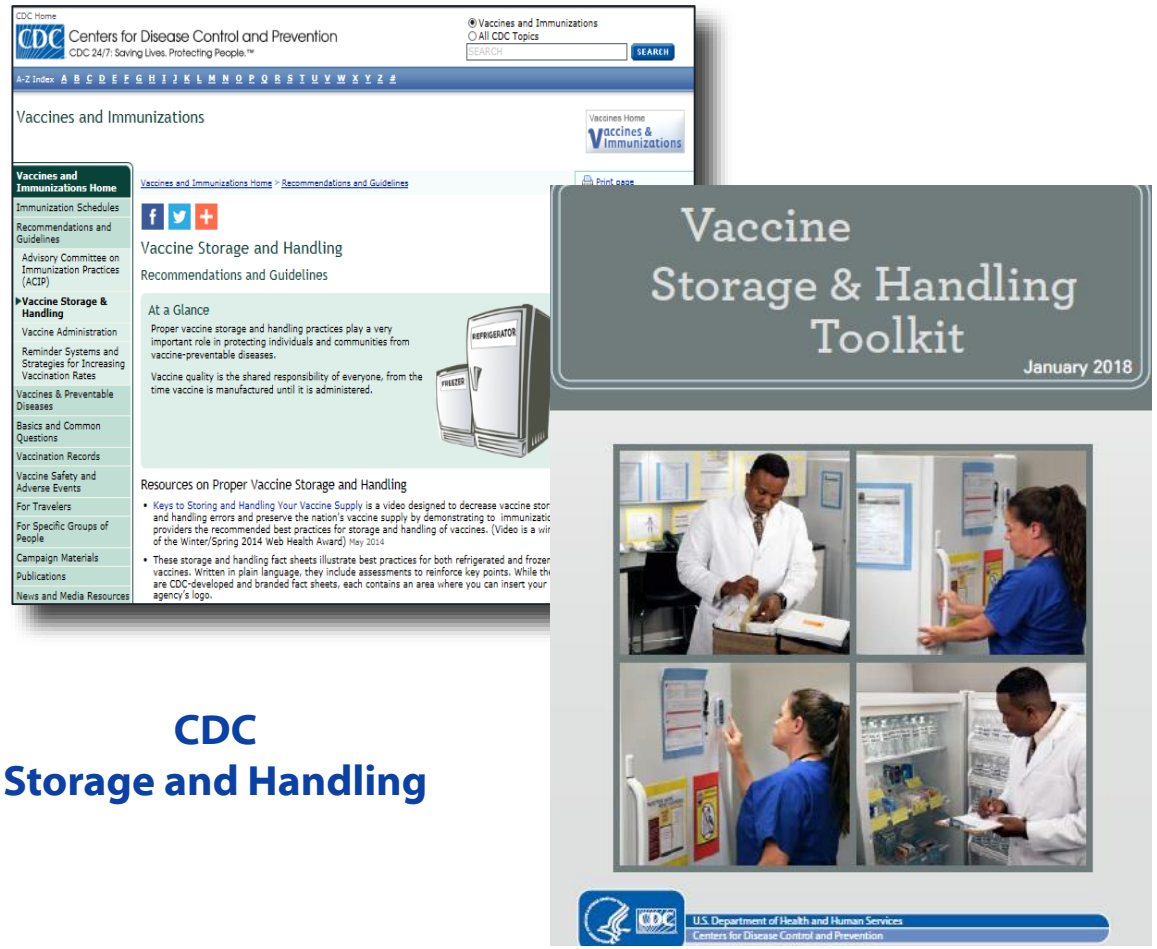
Title: Multidose Vial (MDV)

Short Description: This training addresses how to prepare vaccine from a multidose vial (MDV), which contains more than one dose of vaccine. CDC recommends that providers only prepare and draw up any vaccine just prior to administration.

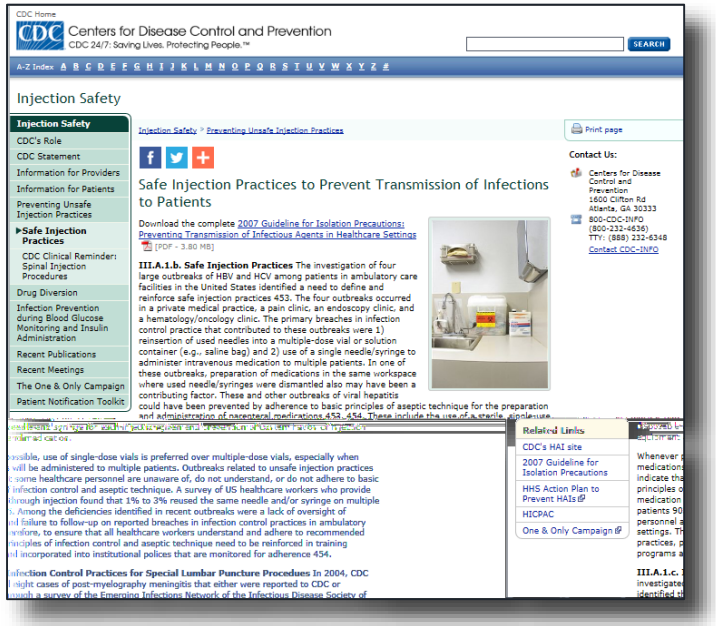
Title: Beyond Use Date (BUD)

Short Description: This training addresses beyond use dates (BUDs) and how to calculate them. Sometimes vaccines must be used before the expiration

Additional Resources



CDC
Storage and Handling



CDC
Injection Safety

CDC Injection Safety web page www.cdc.gov/injectionsafety/IP07_standardPrecaution.html
CDC Vaccine Storage and Handling web page http://www.cdc.gov/vaccines/recs/storage/default.htm

Name and credentials of clinic coordinator/supervisor: _____

Name of facility where clinic was held: _____

Address where clinic was held (street, city, state): _____

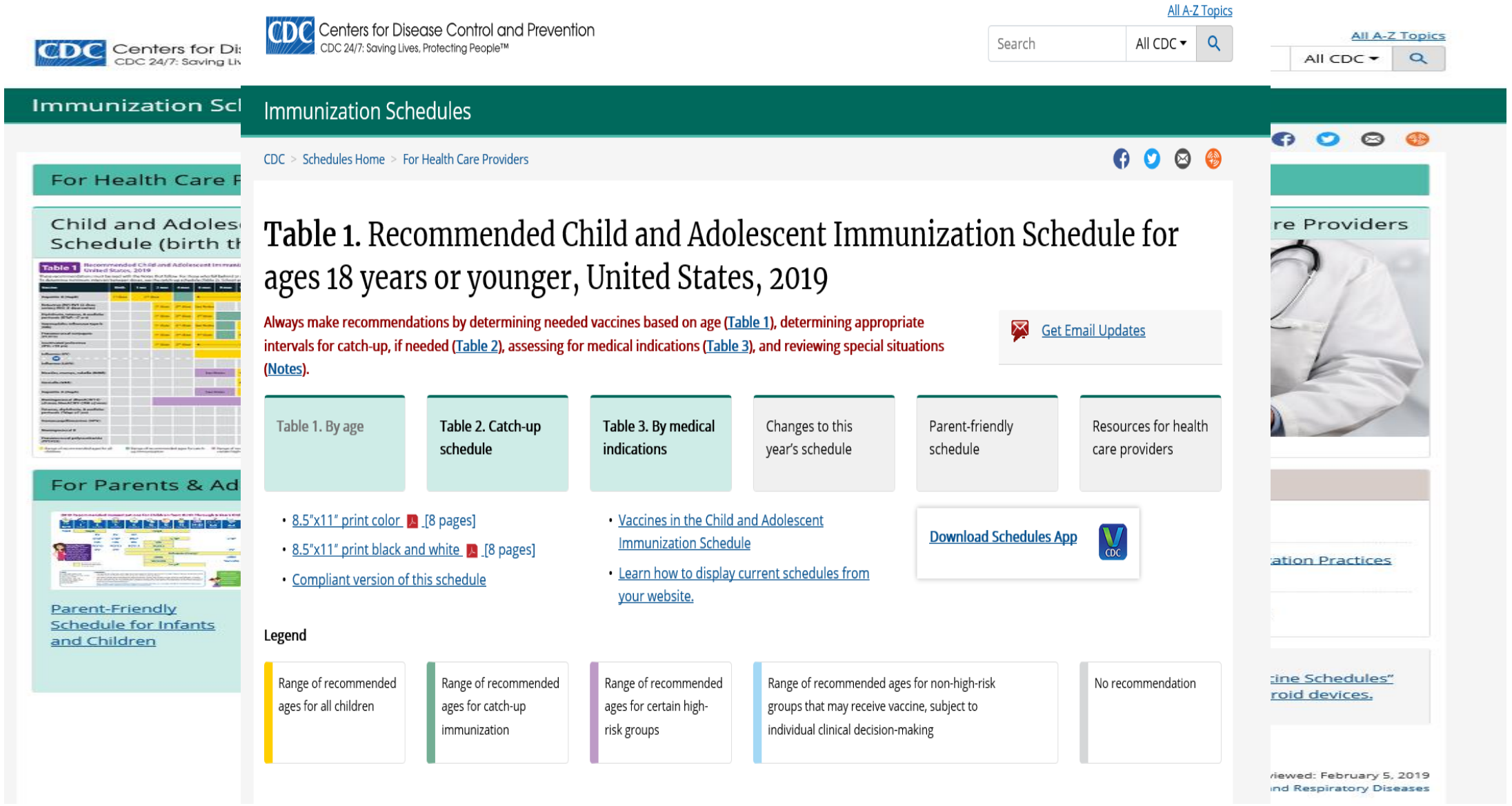
Time and date of vaccination clinic shift (the portion you oversaw): _____ _____
Time (AM/

Time and date form was completed: _____ _____
Time (AM/PM)

Signature of clinic coordinator/supervisor: _____

This checklist was created by the Influenza Workgroup of the Nat

New Design for Schedule Web Pages



Recommended Child and Adolescent Immunization Schedule for ages 18 years or younger www.cdc.gov/vaccines/schedules/hcp/imz/child-adolescent.html Accessed 3/31/2019

Catch-Up Guidance for Healthy[1] Children 4 Months through 4 Years of Age

Pneumococcal Conjugate Vaccine: PCV

The table below provides guidance for children whose vaccinations have been delayed. Start with the child's age and information on previous doses (previous doses must be documented and must meet minimum age requirements and minimum intervals between doses). Use this table in conjunction with table 2 of the Recommended Child and Adolescent Immunization Schedule for Ages 18 Years or Younger, found at www.cdc.gov/vaccines/schedules/hcp/child-adolescent.html.

IF current age is	AND # of previous doses is	AND		THEN	Next dose due
4 through 6 months	0 or unknown	→	→	Give Dose 1 today	Give Dose 2 at least 4 weeks after Dose 1
	1	→	It has been at least 4 weeks since Dose 1	Give Dose 2 today	Give Dose 3 at least 4 weeks after Dose 2
		→	It has **not** been at least 4 weeks since Dose 1	No dose today	Give Dose 2 at least 4 weeks after Dose 1
	2	→	It has been at least 4 weeks since Dose 2	Give Dose 3 today	Give Dose 4 (**Final Dose**) at 12 months of age or older
		→	It has **not** been at least 4 weeks since Dose 2	No dose today	Give Dose 3 at least 4 weeks after Dose 2
7 through 11 months	0	→	→	Give Dose 1 today	Give Dose 2 at least 4 weeks after Dose 1
	1	Dose 1 was given **before** 7 months of age	It has been at least 4 weeks since Dose 1	Give Dose 2 today	Give Dose 3 (**Final Dose**) at least 8 weeks after Dose 2 **and** at 12 months of age or older
			It has **not** been 4 weeks since Dose 1	No dose today	Give Dose 2 at least 4 weeks after Dose 1
		Dose 1 was given at 7 months or older	It has been at least 4 weeks since Dose 1	Give Dose 2 today	Give Dose 3 (**Final Dose**) at least 8 weeks after Dose 2 **and** at 12 months of age or older
			It has **not** been 4 weeks since Dose 1	No dose today	Give Dose 2 at least 4 weeks after Dose 1
	2	Dose 2 was given **before** 7 months of age	It has been at least 4 weeks since Dose 2	Give Dose 3 today	Give Dose 4 (**Final Dose**) at least 8 weeks after Dose 3 **and** at 12 months of age or older
			It has **not** been 4 weeks since Dose 2	No dose today	Give Dose 3 at least 4 weeks after Dose 2
		Dose 2 was given at 7 months or older	→	No dose today	Give Dose 3 (**Final Dose**) at least 8 weeks after Dose 2 **and** at 12 months of age or older

[1]Refer to the notes of the 2019 Recommended Child and Adolescent Immunization Schedule for Ages 18 Years or Younger for immunization guidance for children at increased risk for pneumococcal disease.

Reference: Recommended Child and Adolescent Immunization Schedule for Ages 18 Years or Younger–United States, 2019. www.cdc.gov/vaccines/schedules/downloads/child/0-18yrs-child-combined-schedule.pdf.

U.S. Department of Health and Human Services
Centers for Disease Control and Prevention

Catch-Up Guidance for Healthy[1] Children 4 Months through 4 Years of Age

Haemophilus influenzae type B Vaccines: ActHIB, Pentacel, Hiberix, or Unknown

The table below provides guidance for children whose vaccinations have been delayed. Start with the child's age and information on previous doses (previous doses must be documented and must meet minimum age requirements and minimum intervals between doses). Use this table in conjunction with table 2 of the Recommended Child and Adolescent Immunization Schedule for Ages 18 Years or Younger, found at www.cdc.gov/vaccines/schedules/hcp/child-adolescent.html.

IF current age is	AND # of previous doses is	AND		THEN	Next dose due
4 through 6 months	Unknown or 0	→		Give Dose 1 today	Give Dose 2 at least 4 weeks after Dose 1
	1	It has been at least 4 weeks since Dose 1		Give Dose 2 today	Give Dose 3 at least 4 weeks after Dose 2
		It has **not** been 4 weeks since Dose 1		No dose today	Give Dose 2 at least 4 weeks after Dose 1
	2	It has been at least 4 weeks since Dose 2		Give Dose 3 today	Give Dose 4 (**Final Dose**) at 12 months of age or older
		It has **not** been 4 weeks since Dose 2		No dose today	Give Dose 3 at least 4 weeks after Dose 2
7 through 11 months	Unknown or 0	→	→	Give Dose 1 today	Give Dose 2 at least 4 weeks after Dose 1
	1	It has been at least 4 weeks since Dose 1	→	Give Dose 2 today	IF Dose 1 was given **before** 7 months of age, give Dose 3 at least 4 weeks after Dose 2 IF Dose 1 was given at 7 months of age or older, give Dose 3 (**Final Dose**) at least 8 weeks after Dose 2 **and** no earlier than 12 months of age or older
		It has **not** been 4 weeks since Dose 1	→	No dose today	Give Dose 2 at least 4 weeks after Dose 1
	2	Dose 1 was given **before** 7 months of age	It has been at least 4 weeks since Dose 2	Give Dose 3 today	Give Dose 4 (**Final Dose**) at least 8 weeks after Dose 3 **and** no earlier than 12 months of age or older
			It has **not** been 4 weeks since Dose 2	No dose today	Give Dose 3 at least 4 weeks after Dose 2
		Dose 1 was given at 7 months of age or older	→	No dose today	Give Dose 3 (**Final Dose**) at least 8 weeks after Dose 2, **and** no earlier than 12 months of age or older

[1]Refer to notes of the Recommended Child and Adolescent Immunization Schedule for Ages 18 Years or Younger – United States, 2019, for immunization guidance for children at increased risk for *Haemophilus influenzae* type b disease.

Reference: Recommended Child and Adolescent Immunization Schedule for Ages 18 Years or Younger–United States, 2019. www.cdc.gov/vaccines/schedules/downloads/child/0-18yrs-child-combined-schedule.pdf

U.S. Department of Health and Human Services
Centers for Disease Control and Prevention

Catch-Up Guidance for Children 4 Months through 6 Years of Age

Diphtheria-, Tetanus-, and Pertussis-Containing Vaccines: DTaP/DT[1]

The table below provides guidance for children whose vaccinations have been delayed. Start with the child's age and information on previous doses (previous doses must be documented and must meet minimum age requirements and minimum intervals between doses). Use this table in conjunction with table 2 of the Recommended Child and Adolescent Immunization Schedule for Ages 18 Years or Younger, found at www.cdc.gov/vaccines/schedules/hcp/child-adolescent.html.

IF current age is	AND # of previous doses of DTaP or DT is	AND	THEN	Next dose due
4 months through 11 months	Unknown or 0	→	Give Dose 1 (DTaP) today	Give Dose 2 (DTaP) at least 4 weeks after Dose 1
	1	It has been at least 4 weeks since Dose 1	Give Dose 2 (DTaP) today	Give Dose 3 (DTaP) at least 4 weeks after Dose 2
		It has **not** been at least 4 weeks since Dose 1	No dose today	Give Dose 2 (DTaP) at least 4 weeks after Dose 1
	2	It has been at least 4 weeks since Dose 2	Give Dose 3 (DTaP) today	Give Dose 4 (DTaP) at least 6 calendar months after Dose 3 **and** at 15 months of age or older[2]
		It has **not** been at least 4 weeks since Dose 2	No dose today	Give Dose 3 (DTaP) at least 4 weeks after Dose 2
1 through 3 years	Unknown or 0	→	Give Dose 1 (DTaP) today	Give Dose 2 (DTaP) at least 4 weeks after Dose 1
	1	It has been at least 4 weeks since Dose 1	Give Dose 2 (DTaP) today	Give Dose 3 (DTaP) at least 4 weeks after Dose 2
		It has **not** been 4 weeks since Dose 1	No dose today	Give Dose 2 (DTaP) at least 4 weeks after Dose 1
	2	It has been at least 4 weeks since Dose 2	Give Dose 3 (DTaP) today	Give Dose 4 (DTaP) at least 6 calendar months after Dose 3
		It has **not** been 4 weeks since Dose 2	No dose today	Give Dose 3 (DTaP) at least 4 weeks after Dose 2
	3	It has been at least 6 calendar months since Dose 3	If 12 through 14 months of age, no dose today[2]	Give Dose 4 (DTaP) at 15 through 18 months of age
			If 15 months of age or older, give Dose 4 (DTaP) today	Give Dose 5 (DTaP) at least 6 months after Dose 4 **and** at 4 through 6 years of age
		It has **not** been 6 calendar months since Dose 3	No dose today	Give Dose 4 (DTaP) at least 6 months after Dose 3

[1]Vaccine information: DTaP–Administer to children 6 weeks through 6 years of age without a contraindication or precaution to diphtheria, tetanus, or pertussis vaccine. DTaP products include Daptacel, Kinrix, Infanrix, Pediarix, Pentacel, and Quadracel. Use the correct product based on the approved age indications. DT–Administer to children 6 weeks through 6 years of age with a contraindication to pertussis vaccine.

[2]The fourth dose may be administered as early as age 12 months, provided at least 6 months have elapsed since the third dose.

Reference: Recommended Child and Adolescent Immunization Schedule for Ages 18 Years or Younger—United States, 2019. www.cdc.gov/vaccines/schedules/downloads/child/0-18yrs-child-combined-schedule.pdf

U.S. Department of Health and Human Services
Centers for Disease Control and Prevention

Revised January 2019

https://www.cdc.gov/vaccines/schedules/hcp/imz/catchup.html

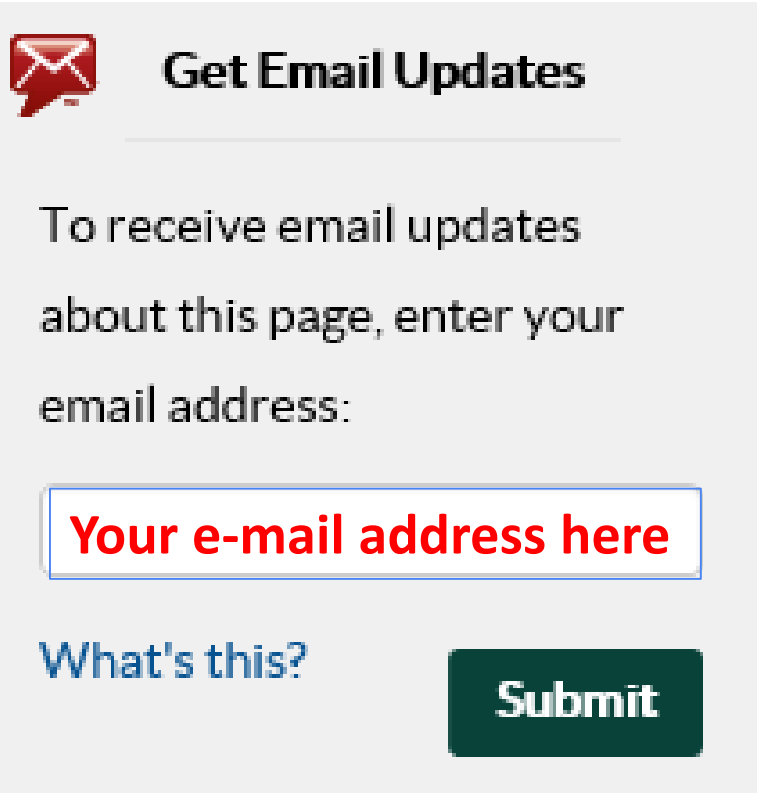
CDC Resources for Staff Education

- **Multiple education products available free through the CDC website:**
  - Immunization courses (webcasts and online self-study)
  - *You Call the Shots* self-study modules
- **Continuing education available**

Immunization Education and Training: www.cdc.gov/vaccines/ed/index.html

Current Issues in Immunization Netconferences (CIINC) and 2019 EpiVac Pink Book Webinars

- Provide clinicians with the most up-to-date information on immunizations
- Archived versions available
- Sign up for e-mail alerts at
  - www.cdc.gov/vaccines/ed/ciinc/index.html
  - www.cdc.gov/vaccines/ed/webinar-epv/index.html



Immunization Questions?

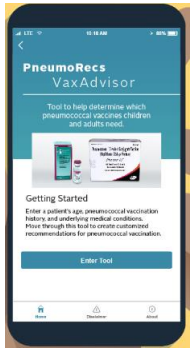
- Questions? E-mail CDC nipinfo@cdc.gov or www.cdc.gov/cdcinfo
- Vaccines and Immunizations website www.cdc.gov/vaccines
- HCP education www.cdc.gov/vaccines/hcp.htm
- Twitter @DrNancyM_CDC
- Influenza www.cdc.gov/flu
- Vaccine safety www.cdc.gov/vaccinesafety

CDC Immunization Apps for Health Care Personnel

Childhood and adult immunization schedules
www.cdc.gov/vaccines/schedules/hcp/schedule- app.html

Influenza information
www.cdc.gov/flu/apps/cdc-influenza-hcp.html

***Morbidity and Mortality Weekly Report* (MMWR)**
www.cdc.gov/mobile/applications/mobileframework/mmwrpromo.html



PneumoRecs VaxAdvisor
www.cdc.gov/vaccines/vpd/pneumo/hcp/pneumoapp.html