Immunization 101

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Massachusetts Department of Public Health Immunization Program
I, Katie Reilly, have been asked to disclose any significant relationships with commercial entities that are either providing financial support for this program or whose products or services are mentioned during my presentations. I have no relationships to disclose.

I may discuss the use of vaccines in a manner not approved by the U.S. Food and Drug Administration

- But in accordance with ACIP recommendations
Outline

- Herd Immunity
- Types of vaccines
- 2018 Adult Immunization Schedule
- Screening prior to vaccination
- Contraindications and precautions to vaccination
- Vaccine Safety
- Vaccine Information Statements (VIS)
- Vaccine administration documentation requirements
- Vaccine adverse events and medical error reporting
- Use of Model Standing Orders
Herd Immunity/Community Immunity

“A situation in which a sufficient proportion of a population is immune to an infectious disease (through vaccination and/or prior illness) to make its spread from person to person unlikely. Even individuals not vaccinated (such as newborns and those with chronic illnesses) are offered some protection because the disease has little opportunity to spread within the community.”

Retrieved from: https://www.cdc.gov/vaccines/terms/glossary.html#commimmunity

Photo credit: Courtesy: The National Institute of Allergy and Infectious Disease (NIAID)
Live Attenuated Vaccines

- Attenuated (weakened) form of the “wild” virus or bacterium
- Must replicate to produce an immune response
- Immune response virtually identical to natural infection
- Usually produce immunity with one dose (except those administered orally)
- Interference from circulating antibody
- Fragile: must be stored and handled carefully

- **Viral**: measles, mumps, rubella, vaccinia, varicella, zoster, yellow fever, rotavirus, intranasal influenza, oral polio*
- **Bacterial**: BCG*, oral typhoid

*not available in the USA

Inactivated Vaccines

- Cannot replicate, and therefore cannot cause infection
- Less affected by circulating antibody than live vaccine
- Require multiple doses
- Immune response mostly humoral
- Antibody titer diminish with time
- May require periodic supplemental booster doses

Whole cell vaccines:
- Viral: polio, hepatitis A, rabies, influenza*
- Bacterial: pertussis*, typhoid*, cholera, plague*

Fractional vaccines
- Subunits: hepatitis B, influenza, acellular pertussis, HPV, anthrax
- Toxoids: diphtheria, tetanus

*not available in the USA


MDPH Adult Immunization Conference 2018
2018 Adult Immunization Schedule

MMWR 2018:67(5):158-160

Available at:
• https://www.cdc.gov/mmwr/volumes/67/wr/pdfs/mm6705e3-H.pdf
• https://www.cdc.gov/vaccines/schedules/index.html
Updates - 2018 Adult Immunization Schedule

- Recommended use of recombinant zoster vaccine
- Recommended use of MMR in mumps outbreak setting
- Footnotes updated/simplified
<table>
<thead>
<tr>
<th>Vaccine</th>
<th>19–21 years</th>
<th>22–26 years</th>
<th>27–49 years</th>
<th>50–64 years</th>
<th>≥65 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Influenza¹</td>
<td></td>
<td></td>
<td>1 dose annually</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tdap² or Td²</td>
<td></td>
<td></td>
<td>1 dose Tdap, then Td booster every 10 yrs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MMR³</td>
<td></td>
<td></td>
<td>1 or 2 doses depending on indication (if born in 1957 or later)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VAR⁴</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RZV³ (preferred) or ZVL⁵</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2 doses RZV (preferred) or 1 dose ZVL</td>
</tr>
<tr>
<td>HPV–Female⁶</td>
<td></td>
<td>2 or 3 doses depending on age at series initiation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HPV–Male⁶</td>
<td></td>
<td></td>
<td>2 or 3 doses depending on age at series initiation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PCV13⁷</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 dose</td>
</tr>
<tr>
<td>PPSV23⁷</td>
<td></td>
<td></td>
<td>1 or 2 doses depending on indication</td>
<td></td>
<td>1 dose</td>
</tr>
<tr>
<td>HepA⁸</td>
<td></td>
<td></td>
<td>2 or 3 doses depending on vaccine</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HepB⁹</td>
<td></td>
<td></td>
<td>3 doses</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MenACWY¹⁰</td>
<td></td>
<td></td>
<td>1 or 2 doses depending on indication, then booster every 5 yrs if risk remains</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MenB¹⁰</td>
<td></td>
<td></td>
<td>2 or 3 doses depending on vaccine</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hib¹¹</td>
<td></td>
<td></td>
<td>1 or 3 doses depending on indication</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Recommended for adults who meet the age requirement, lack documentation of vaccination, or lack evidence of past infection**
- **Recommended for adults with other indications**
- **No recommendation**
Figure 2. Recommended immunization schedule for adults aged 19 years or older by medical condition and other indications, United States, 2018

This figure should be reviewed with the accompanying footnotes. This figure and the footnotes describe indications for which vaccines, if not previously administered, should be administered unless noted otherwise.

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>Pregnancy¹⁶</th>
<th>Immunocompromised (excluding HIV infection)²⁻⁷¹¹</th>
<th>HIV Infection CD4+ count (cells/μL)²⁻⁷¹¹</th>
<th>Asplenia, complement deficiencies⁷¹¹</th>
<th>End-stage renal disease on hemodialysis²⁻⁷¹¹</th>
<th>Heart or lung disease, alcoholism²</th>
<th>Chronic liver disease⁷¹¹</th>
<th>Diabetes²</th>
<th>Health care personnel¹³⁻²²</th>
<th>Men who have sex with men¹³⁻²²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Influenza¹</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tdap² or Td³</td>
<td>1 dose Tdap each pregnancy</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MMR²</td>
<td>contraindicated</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VAR²</td>
<td>contraindicated</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RZV⁵ (preferred)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2 doses RZV at age ≥50 yrs (preferred)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>or</td>
<td>contraindicated</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ZVL⁶</td>
<td>contraindicated</td>
<td></td>
<td></td>
<td></td>
<td>1 dose ZVL at age ≥60 yrs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HPV–Female⁶</td>
<td>3 doses through age 26 yrs</td>
<td>2 or 3 doses through age 26 yrs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HPV–Male⁶</td>
<td>3 doses through age 26 yrs</td>
<td>2 or 3 doses through age 21 yrs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PCV13⁷</td>
<td>1 dose</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PPSV23⁷</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1, 2, or 3 doses depending on indication</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HepA⁸</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2 or 3 doses depending on vaccine</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HepB⁹</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<td>3 doses</td>
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</tr>
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<td>MenACWY¹⁰</td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>MenB¹⁰</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2 or 3 doses depending on vaccine</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hib¹¹</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 dose</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Legend:
- Yellow: Recommended for adults who meet the age requirement, lack documentation of vaccination, or lack evidence of past infection
- Purple: Recommended for adults with other indications
- Red: Contraindicated
- Blank: No recommendation

RZV row added.
Prevention of Hepatitis B Virus Infection in the United States: Recommendations of the Advisory Committee on Immunization Practices

Strategy to eliminate HBV transmission in the United States

- Screening of all pregnant women for HBsAg
  - HBV DNA testing for HBsAg-positive pregnant women, with suggestion of maternal antiviral therapy to reduce perinatal transmission when HBV DNA is >200,000 IU/mL
  - Prophylaxis (HepB vaccine and HBIG) for infants born to HBsAg-positive women

- Universal vaccination of all infants beginning at birth, as a safeguard for infants born to HBV-infected mothers not identified prenatally

- Routine vaccination of previously unvaccinated children aged <19 years

- Vaccination of adults at risk for HBV infection, including those requesting protection from HBV without acknowledgment of a specific risk factor

Retrieved from Box 2 in https://www.cdc.gov/mmwr/volumes/67/rr/pdfs/rr6701-H.pdf
ACIP Updates Hepatitis B Prevention

- **Relevant for adults**
  - Vaccinate persons with chronic liver disease (hepatitis C virus [HCV] infection, cirrhosis, fatty liver disease, alcoholic liver disease, autoimmune hepatitis, alanine aminotransferase [ALT] or aspartate aminotransferase [AST] level greater than twice the upper limit of normal)

- **New or updated ACIP recommendations for children**
  - Universal HepB within 24 hrs of birth for medically stable infants weighing $\geq 2,000$ g
  - Test HBsAg(+) pregnant women for hepatitis B virus deoxyribonucleic acid (HBV DNA)
  - Test postvaccination serology for infants whose mother’s HBsAg status unknown indefinitely (e.g., when a parent or person with lawful custody surrenders an infant confidentially shortly after birth)
  - Single-dose revaccination for infants born to HBsAg(+) women when not respond to initial vaccine series
  - Removal of permissive language for delaying birth dose after hospital discharge

Screening for Risk Factors & Referrals for Perinatal HBV Infection

- Despite post exposure prophylaxis, mother to child transmission occurs in approximately 1% of infants born to HBsAg positive mothers.

- Risk factors for transmission include*:
  - Hepatitis B e-antigen (HBeAg positive)
  - High HBV DNA concentration (DNA >20,000 IU/mL)
  - Elevated alanine aminotransferase (ALT) (>19 IU/L)

- Emerging evidence suggests that HBV treatment of pregnant women with antiviral agents in the 3rd trimester is safe and reduces rates of transmission
  - AASLD suggests maternal antiviral therapy when the maternal HBV DNA is >200,000 IU/mL

- CDC and ACOG have developed a **Screening and Referral Algorithm for HBV Infection among Pregnant Women**

* Another risk factor is low birth weight (<2,000 grams) who receive the 1st dose of hepB vaccine before 1 month of age.

Screening and Referral Algorithm for Hepatitis B Virus (HBV) Infection among Pregnant Women

HBsAg

- Assess if at high risk* for acquiring HBV infection
  - No
    - No further action needed
  - Yes
    - Consider vaccination during pregnancy or postpartum
    - Repeat HBsAg testing when admitted for delivery

HBsAg (hepatitis B surface antigen)

- Order Additional Tests:
  - HBeAg (hepatitis B e-antigen)
  - HBV DNA Concentration
  - ALT (alanine aminotransferase)

- Report HBsAg positive pregnant women to Perinatal Hepatitis B Prevention Program
- Identify all household and sexual contacts and recommend screening by primary care provider

HBsAg

- No
  - Refer for care postpartum

- Yes
  - HBsAg
    - Yes
      - Refer to specialist immediately during pregnancy
    - No
      - HBV DNA >20,000 IU/mL
        - No
          - Refer for care postpartum
        - Yes
          - ALT ≥19 IU/L
            - Yes
              - Refer to specialist immediately during pregnancy
            - No
              - Refer for care postpartum
  - HBV DNA >20,000 IU/mL
    - No
      - Refer for care postpartum
    - Yes
      - ALT ≥19 IU/L
        - Yes
          - Refer to specialist immediately during pregnancy
        - No
          - Refer for care postpartum

*High risk for HBV infection includes: household or sexual contacts of HBsAg-positive persons; injection drug use; more than one sex partner during the past six months; evaluation or treatment for a sexually transmitted disease; HIV infection, chronic liver disease, or end-stage renal disease; and international travel to regions with HBsAg prevalence of ≥2%.


www.cdc.gov/hepatitis
March 2015
Hepatitis B and Healthcare Personnel

- Prevention of Hepatitis B Virus Infection in the United States: Recommendations of the Advisory Committee on Immunization Practices

https://www.cdc.gov/mmwr/volumes/67/rr/pdfs/rr6701-H.PDF (page 22)
Screening

- Is key to preventing serious adverse reactions
- Specific questions intended to identify contraindications or precautions to vaccination
- Screening must occur at every immunization encounter (not just before the first dose)
- Use of a standardized form will facilitate effective screening

Immunization Act Coalition (IAC) Screening Forms

- Child and Teen Immunizations
- Adult Immunizations
- Seasonal Influenza

http://www.immunize.org/handouts/screening-vaccines.asp

MDPH Adult Immunization Conference 2018
Contraindication and Precautions

Contraindication

- A condition that increases the likelihood of a serious adverse reaction to a vaccine for a patient with that condition.
- In general, vaccine should not be administered when a contraindication condition is present.

Precaution

- A condition in a recipient that might increase the chance or severity of a serious adverse reaction, or that might compromise the ability of the vaccine to produce immunity.
- In general, vaccines are deferred with a precaution condition is present. However, situations may arise when the benefit of the protection from the vaccine outweighs the risk of an adverse reaction, and the provider may decide to give the vaccine.

Contraindications & Precautions In Adults

- Summary Table Published Annually by CDC with Adult Schedule: https://www.cdc.gov/vaccines/schedules/downloads/adult/adult-combined-schedule.pdf#page=6

Table. Contraindications and precautions for vaccines recommended for adults aged 19 years or older*  

<table>
<thead>
<tr>
<th>Vaccine (s)</th>
<th>Contraindications</th>
<th>Precautions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Influenza, inactivated (IV)</td>
<td>Severe allergic reaction (e.g., anaphylaxis) after a previous dose or to a vaccine component</td>
<td>Moderate or severe acute illness with or without fever</td>
</tr>
<tr>
<td></td>
<td></td>
<td>History of Guillain-Barré Syndrome (GBS) within 6 weeks of previous influenza vaccination</td>
</tr>
<tr>
<td></td>
<td></td>
<td>For IV vaccine only: Egg allergy other than hives (e.g., angioedema, respiratory distress, lightheadedness, or recurrent urticaria); or required epinephrine or another emergency medical intervention (IV may be administered in a medical setting, under the supervision of a healthcare provider who is able to recognize and manage serious allergic conditions)</td>
</tr>
<tr>
<td>Influenza, recombinant (RIV)</td>
<td>Severe allergic reaction (e.g., anaphylaxis) after a previous dose or to a vaccine component</td>
<td>Moderate or severe acute illness with or without fever</td>
</tr>
<tr>
<td></td>
<td></td>
<td>GBS within 6 weeks of a previous dose of tetanus toxoid-containing vaccine</td>
</tr>
<tr>
<td></td>
<td></td>
<td>History of Arthus-type hypersensitivity reactions after a previous dose of tetanus or diphtheria toxoid-containing vaccine; defer vaccination until at least 10 years have elapsed since the last tetanus toxoid-containing vaccine</td>
</tr>
<tr>
<td></td>
<td></td>
<td>For Tdap only: progressive or unstable neurologic disorders; uncontrolled seizures; or progressive encephalopathy; delay until a treatment regimen has been established and the condition has stabilized</td>
</tr>
<tr>
<td>Tetanus, diphtheria, pertussis (Tdap)</td>
<td>Severe allergic reaction (e.g., anaphylaxis) after a previous dose or to a vaccine component</td>
<td>Moderate or severe acute illness with or without fever</td>
</tr>
<tr>
<td></td>
<td></td>
<td>GBS within 6 weeks of a previous dose of tetanus toxoid-containing vaccine</td>
</tr>
<tr>
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<td>History of Arthus-type hypersensitivity reactions after a previous dose of tetanus or diphtheria toxoid-containing vaccine; defer vaccination until at least 10 years have elapsed since the last tetanus toxoid-containing vaccine</td>
</tr>
<tr>
<td></td>
<td></td>
<td>For Tdap only: progressive or unstable neurologic disorders; uncontrolled seizures; or progressive encephalopathy; delay until a treatment regimen has been established and the condition has stabilized</td>
</tr>
<tr>
<td>Tetanus, diphtheria (Td)</td>
<td>Severe allergic reaction (e.g., anaphylaxis) after a previous dose or to a vaccine component</td>
<td>Moderate or severe acute illness with or without fever</td>
</tr>
<tr>
<td></td>
<td></td>
<td>GBS within 6 weeks of a previous dose of tetanus toxoid-containing vaccine</td>
</tr>
<tr>
<td></td>
<td></td>
<td>History of Arthus-type hypersensitivity reactions after a previous dose of tetanus or diphtheria toxoid-containing vaccine; defer vaccination until at least 10 years have elapsed since the last tetanus toxoid-containing vaccine</td>
</tr>
<tr>
<td></td>
<td></td>
<td>For Tdap only: progressive or unstable neurologic disorders; uncontrolled seizures; or progressive encephalopathy; delay until a treatment regimen has been established and the condition has stabilized</td>
</tr>
<tr>
<td>HPV vaccine</td>
<td>Severe allergic reaction to any vaccine containing diphtheria toxoid</td>
<td>Moderate or severe acute illness with or without fever</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Recent (within 11 months) receipt of antibody-containing blood product (specific interval depends on product)</td>
</tr>
<tr>
<td>MMR</td>
<td>Severe immune deficiency (e.g., hematologic and solid tumors, chemotherapies, or immune suppression therapy), HIV infection, or severe immunocompromised state</td>
<td>Moderate or severe acute illness with or without fever</td>
</tr>
<tr>
<td></td>
<td></td>
<td>History of Guillain-Barré Syndrome (GBS) within 6 weeks of previous influenza vaccination</td>
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<tr>
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<td></td>
<td>For IV vaccine only: Egg allergy other than hives (e.g., angioedema, respiratory distress, lightheadedness, or recurrent urticaria); or required epinephrine or another emergency medical intervention (IV may be administered in a medical setting, under the supervision of a healthcare provider who is able to recognize and manage serious allergic conditions)</td>
</tr>
</tbody>
</table>

* The Advisory Committee on Immunization Practices (ACIP) recommendations and package inserts for vaccines that increase the chances of a serious adverse reaction in vaccine recipients and the vaccine should not be administered. Additional contraindications and precautions for commonly used vaccines in adults are provided in the table.
Contraindications & Precautions in Adults & Children

Guide to Contraindications and Precautions to Commonly Used Vaccines

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>Contraindications</th>
<th>Precautions</th>
</tr>
</thead>
</table>
| Hepatitis B (HepB)              | • Severe allergic reaction (e.g., anaphylaxis) after a previous dose or to a vaccine component  
                                 | • Hypersensitivity to yeast                                                     | • Moderate or severe acute illness with or without fever                    |
|                                 |                                                                                  | • Infant weighing less than 2000 grams (4 lbs, 6.4 oz)²                       |                                                                           |
| Rotavirus (RV5 [RotaTeq], RV1 [Rotarix]) | • Severe allergic reaction (e.g., anaphylaxis) after a previous dose or to a vaccine component  
                                 | • Severe combined immunodeficiency (SCID)                                       | • Moderate or severe acute illness with or without fever                    |
|                                 | • History of intussusception                                                     | • Altered immunocompetence other than SCID                                    |                                                                           |
| Diphtheria, tetanus, pertussis (DTaP) | • Severe allergic reaction (e.g., anaphylaxis) after a previous dose or to a vaccine component  
                                 | • For pertussis-containing vaccines: Encephalopathy (e.g., coma, decreased level of consciousness, prolonged seizures) not attributable to another identifiable cause within 7 days of administration of a previous dose of DTP or DTaP (for DTaP); or of previous dose of DTP, DTaP, or Tdap (for Tdap) | • Guillain-Barré syndrome (GBS) within 6 weeks after a previous dose of tetanus toxoid-containing vaccine  
                                 |                                                                                  | • History of Arthus-type hypersensitivity reactions after a previous dose of diphtheria- or tetanus toxoid-containing vaccine; defer vaccination until at least 10 years have elapsed since the last tetanus toxoid containing vaccine  
                                 |                                                                                  | • For DTaP and Tdap only: Progressive or unstable neurologic disorder (including infantile spasms for DTaP), uncontrolled seizures, or progressive encephalopathy; defer until a treatment regimen has been established and the condition has stabilized  
                                 |                                                                                  | For DTaP only                                                                   |


MDPH Adult Immunization Conference 2018
Vaccination of Pregnant Women

- Live vaccines should not be administered to women known to be pregnant.

- In general, inactivated vaccines may be administered to pregnant women for whom they are indicated.

- HPV vaccine should be deferred during pregnancy.

CDC Guidelines for Vaccinating Pregnant Women

- Guidelines for vaccination
- Travel and other vaccines
- Breastfeeding and vaccination
- Prenatal screening

http://www.cdc.gov/vaccines/pregnancy/hcp/guidelines.html
## Immunizations and Pregnancy

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>Before pregnancy</th>
<th>During pregnancy</th>
<th>After pregnancy</th>
<th>Type of vaccine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Influenza</td>
<td>Yes</td>
<td>Yes, during flu season</td>
<td>Yes</td>
<td>Inactivated</td>
</tr>
<tr>
<td>Tdap</td>
<td>May be recommended; it is better to vaccinate during pregnancy when possible</td>
<td>Yes, during each pregnancy</td>
<td>Yes, immediately postpartum, if Tdap never received in lifetime; it is better to vaccinate during pregnancy</td>
<td>Toxoid/ Inactivated</td>
</tr>
<tr>
<td>Td</td>
<td>May be recommended</td>
<td>May be recommended, but Tdap is preferred</td>
<td>May be recommended</td>
<td>Toxoid</td>
</tr>
<tr>
<td>Hepatitis A</td>
<td>May be recommended</td>
<td>May be recommended</td>
<td>May be recommended</td>
<td>Inactivated</td>
</tr>
<tr>
<td>Hepatitis B</td>
<td>May be recommended</td>
<td>May be recommended</td>
<td>May be recommended</td>
<td>Inactivated</td>
</tr>
<tr>
<td>Meningococcal</td>
<td>May be recommended</td>
<td>Base decision on risk vs. benefit; inadequate data for specific recommendation</td>
<td>May be recommended</td>
<td>Inactivated</td>
</tr>
<tr>
<td>Pneumococcal</td>
<td>May be recommended</td>
<td>Base decision on risk vs. benefit; inadequate data for specific recommendation</td>
<td>May be recommended</td>
<td>Inactivated</td>
</tr>
<tr>
<td>HPV</td>
<td>May be recommended (through 26 years of age)</td>
<td>No</td>
<td>May be recommended (through 26 years of age)</td>
<td>Inactivated</td>
</tr>
<tr>
<td>MMR</td>
<td>May be recommended; once received, avoid conception for 4 weeks</td>
<td>No</td>
<td>May be recommended</td>
<td>Live</td>
</tr>
<tr>
<td>Varicella</td>
<td>May be recommended; once received, avoid conception for 4 weeks</td>
<td>No</td>
<td>May be recommended</td>
<td>Live</td>
</tr>
</tbody>
</table>

Importance of Vaccine Safety

Decreases in disease risks and increased attention on vaccine risks

Public confidence in vaccine safety critical
  - Higher standard of safety is expected of vaccines
  - Vaccinees generally healthy (vs. ill for drugs)
  - Lower risk tolerance = need to search for rare reactions
  - Vaccination universally recommended and mandated

http://www.cdc.gov/vaccines/pubs/pinkbook/safety.html
# US Post-licensure Vaccine Safety System

<table>
<thead>
<tr>
<th>System</th>
<th>Collaboration</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vaccine Adverse Event Reporting System (VAERS)</td>
<td>CDC and FDA</td>
<td>Frontline spontaneous reporting system to detect potential vaccine safety issues</td>
</tr>
</tbody>
</table>
| Vaccine Safety Datalink (VSD)               | CDC and 9 Integrated Health Care Systems | Large linked database system used for active surveillance and research  
~9.4 million members (~3% of US pop.)  
- Conducts monitoring & evaluation            |
| Clinical Immunization Safety Assessment (CISA) Project | CDC and 7 Academic Centers | Expert collaboration that conducts individual clinical vaccine safety assessments and clinical research |
| Post-Licensure Rapid Immunization Safety Monitoring Program (PRISM) | FDA and 4 partner organizations | Large distributed database system used for active surveillance and research  
~170 million individuals                   |

Source: HPV Safety Presentation by Julianne Gee, MPH Immunization Safety Office  
Centers for Disease Control and Prevention (CDC) August 4, 2016
The Provider’s Role

Immunization providers can help to ensure the safety and efficacy of vaccines through proper:

- Vaccine storage and administration
- Timing and spacing of vaccine doses
- Observation of contraindications and precautions
- Management of adverse reactions
- Reporting to VAERS
- Benefit and risk communication

http://www.cdc.gov/vaccines/pubs/pinkbook/safety.html
Seven Rights of Vaccine Administration

- Right Patient
- Right Time
- Right Vaccine (and Diluent)
- Right Dosage
- Right Route, Needle, Technique
- Right Injection Site
- Right Documentation

http://www.immunize.org/technically-speaking/20141101.asp
# Influenza Vaccine Products for the 2017–2018 Influenza Season

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Trade Name (vaccine abbreviation)</th>
<th>How Supplied</th>
<th>Mercury Content (mcg Hg/0.5mL)</th>
<th>Age Group</th>
<th>Vaccine Product Billing Code²</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>CPT</td>
</tr>
<tr>
<td>GlaxoSmithKline</td>
<td>Fluarix (IIV4)</td>
<td>0.5 mL (single-dose syringe)</td>
<td>0</td>
<td>6 months &amp; older</td>
<td>90686</td>
</tr>
<tr>
<td>ID Biomedical Corp. of Quebec, a subsidiary of GlaxoSmithKline</td>
<td>FluLaval (IIV4)</td>
<td>0.5 mL (single-dose syringe)</td>
<td>&lt;25</td>
<td>6 months &amp; older</td>
<td>90688</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5.0 mL (multi-dose vial)</td>
<td></td>
<td></td>
<td>90688</td>
</tr>
<tr>
<td>MedImmune</td>
<td>FluMist³ (LAIV4)</td>
<td>0.2 mL (single-use nasal spray)</td>
<td>0</td>
<td>2 through 49 years</td>
<td>90672</td>
</tr>
<tr>
<td>Protein Sciences Corp.</td>
<td>Flublok (RIV3)</td>
<td>0.5 mL (single-dose vial)</td>
<td>0</td>
<td>18 years &amp; older</td>
<td>90673</td>
</tr>
<tr>
<td></td>
<td>Flublok (RIV4)</td>
<td>0.5 mL (single-dose vial)</td>
<td>0</td>
<td>18 years &amp; older</td>
<td>90682</td>
</tr>
<tr>
<td>Sanofi Pasteur, Inc.</td>
<td>Fluzone (IIV4)</td>
<td>0.25 mL (single-dose syringe)</td>
<td>0</td>
<td>6 through 35 months</td>
<td>90685</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.5 mL (single-dose syringe)</td>
<td>0</td>
<td>3 years &amp; older</td>
<td>90686</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.5 mL (single-dose vial)</td>
<td>0</td>
<td>3 years &amp; older</td>
<td>90686</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5.0 mL (multi-dose vial)</td>
<td>25</td>
<td>6 through 35 months</td>
<td>90687</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5.0 mL (multi-dose vial)</td>
<td>25</td>
<td>3 years &amp; older</td>
<td>90688</td>
</tr>
<tr>
<td></td>
<td>Fluzone High-Dose (IIV3-HD)</td>
<td>0.5 mL (single-dose syringe)</td>
<td>0</td>
<td>65 years &amp; older</td>
<td>90662</td>
</tr>
<tr>
<td></td>
<td>Fluzone Intradermal (IIV4-ID)</td>
<td>0.1 mL (single-dose microinjection system)</td>
<td>0</td>
<td>18 through 64 years</td>
<td>90630</td>
</tr>
<tr>
<td>Seqirus</td>
<td>Afluria (IIV3)</td>
<td>0.5 mL (single-dose syringe)</td>
<td>0</td>
<td>5 years &amp; older</td>
<td>90656 ⁴</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5.0 mL (multi-dose vial)</td>
<td>24.5</td>
<td></td>
<td>90658</td>
</tr>
<tr>
<td></td>
<td>Afluria (IIV4)</td>
<td>0.5 mL (single-dose syringe)</td>
<td>0</td>
<td>5 years &amp; older</td>
<td>90686</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5.0 mL (multi-dose vial)</td>
<td>24.5</td>
<td></td>
<td>90688</td>
</tr>
<tr>
<td></td>
<td>Fluad (aIIV3)</td>
<td>0.5 mL (single-dose syringe)</td>
<td>0</td>
<td>65 years &amp; older</td>
<td>90653</td>
</tr>
<tr>
<td></td>
<td>Fluvirin (IIV3)</td>
<td>0.5 mL (single-dose syringe)</td>
<td>≤1</td>
<td>4 years &amp; older</td>
<td>90656 ⁴</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5.0 mL (multi-dose vial)</td>
<td>25</td>
<td></td>
<td>90658</td>
</tr>
<tr>
<td></td>
<td>Flucelvax (ccIIV4)</td>
<td>0.5 mL (single-dose syringe)</td>
<td>0</td>
<td>4 years &amp; older</td>
<td>90674</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5.0 mL (multi-dose vial)</td>
<td>25</td>
<td></td>
<td>90749/90756³</td>
</tr>
</tbody>
</table>


MDPH Adult Immunization Conference 2018
Administering Vaccines to Adults: Dose, Route, Site, and Needle Size

## Vaccines with Diluents: How to Use Them

Be sure to reconstitute the following vaccines correctly before administering them! Reconstitution means that the lyophilized (freeze-dried) vaccine powder or wafer in one vial must be reconstituted (mixed) with the diluent (liquid) in another.

- Only use the diluent provided by the manufacturer for that vaccine as indicated on the chart.
- ALWAYS check the expiration date on the diluent and vaccine. NEVER use expired diluent or vaccine.

### Vaccine product name | Manufacturer | Lyophilized vaccine (powder) | Liquid diluent (may contain vaccine) | Time allowed between reconstitution and use, as stated in package insert (min) | Diluent storage environment
--- | --- | --- | --- | --- | ---
ActHIB (Hib) | Sanofi Pasteur | Hib | 0.4% sodium chloride | 24 hrs | Refrigerator
Hiberix (Hib) | GlaxoSmithKline | Hib | 0.9% sodium chloride | 24 hrs | Refrigerator or room temp
Innovax (RAB-HDCV) | Sanofi Pasteur | Rabies virus | Sterile water | Immediately† | Refrigerator
MMR | Merck | MMR | Sterile water | 8 hrs | Refrigerator or room temp
Menveo (MenACWY) | GlaxoSmithKline | MenA | MenCWY | 8 hrs | Refrigerator
Pentacel (DTaP-IPV/Hib) | Sanofi Pasteur | Hib | DTaP-IPV | Immediately† | Refrigerator
ProQuad (MMRV) | Merck | MMRV | Sterile water | 30 min | Refrigerator or room temp
RabAvert (RAB-KDO) | GlaxoSmithKline | Rabies virus | Sterile water | Immediately† | Refrigerator
Rotarix (RV1)‡ | GlaxoSmithKline | RVI | Sterile water, calcium carbonate, and xanthan | 24 hrs | Refrigerator or room temp
Shingrix (RZV) | GlaxoSmithKline | RZV | AS01b adjuvant suspension | 6 hours | Refrigerator
Varivax (VAR) | Merck | VAR | Sterile water | 30 min | Refrigerator or room temp
YF-VAX (YF) | Sanofi Pasteur | YF | 0.9% sodium chloride | 60 min | Refrigerator or room temp
Zostavax (LZV) | Merck | LZV | Sterile water | 30 min | Refrigerator or room temp

Vaccine Information Statements (VISs)

Healthcare provider requirements

- Public and private providers
- Give VISs **before** vaccine is administered
- Applies to **every dose** of a vaccine series not just the first dose
- Opportunities for questions should be provided before each vaccination
- Offer a copy of the VISs to take away
- Available in multiple languages

[http://www.cdc.gov/vaccines/hcp/vis/about/facts-vis.html#give](http://www.cdc.gov/vaccines/hcp/vis/about/facts-vis.html#give)
Your Sources for VISs

http://www.cdc.gov/vaccines/hcp/vis/index.html

http://www.immunize.org/vis/
Healthcare Provider Documentation Requirements

Providers must ensure that the recipient's permanent medical record (whether paper-based or electronic) contains all of the required vaccine administration documentation, which shall consist of the following:

- Date of administration of the vaccine
- Vaccine manufacturer and lot number of the vaccine
- Name and title of person administering the vaccine
- Address of clinic where vaccine was given
- The address of the facility where the permanent record will reside (if appropriate)
- Edition date printed on the appropriate VIS
- Date the VIS was given to the vaccine recipient, or the parents/legal representative

- We also recommend that the vaccine type, dose, site, route of administration, and vaccine expiration date be documented, and any vaccine refusal (if appropriate).

# MDPH Vaccine Administration Record

**Vaccine Administration Record – All Ages**

- **Record No. / Insurance No.:**
- **Patient Name:**
- **Address:**
- **Birth Date:**
- **Male**
- **Female**

**Clinic Name and Address:**

**Use Reverse Side for Names and Initials of Vaccine Administrators**

**Vaccine**

**Type of Vaccine**

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>Date Given M/D/Y</th>
<th>Dose</th>
<th>Route (PO, SC, IM, ID, IN, MP)</th>
<th>Site (RA, LA, RT, LT)</th>
<th>Vaccine Information Statement</th>
<th>Vaccine Admin Initials</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hepatitis B (e.g., HepB, HepB-Hib, DTaP-HepB-IPV, HepA-HepB)</td>
<td></td>
<td>IM</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diphtheria, Tetanus, Pertussis (e.g., DTP, DTaP, DT, DTaP-Hib, DTaP-IPV/Hib, DTaP-HepB-IPV, DTaP-IPV, Td, Tdap)</td>
<td></td>
<td>IM</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Haemophilus influenzae type b (e.g., Hib, HepB-Hib, DTaP-Hib, DTaP-IPV/Hib, Hib-MenCY)</td>
<td></td>
<td>IM</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

MIIS Reporting Requirements

Legislation passed in June 2010, charging MDPH to establish an immunization registry (M.G.L. c. 111, s.24M)

- Mandatory reporting of all immunizations administered in MA

Regulations were promulgated January 2015

- outline information on system access, confidentiality, and requirements for data elements to be reported
- describe a provider's duty to inform patients, and a patient's right to object to data sharing across providers

See MIIS table or www.contactmiis.info for more information
Vaccine Adverse Reactions

Adverse reaction
- Extraneous effect caused by vaccine
- Side effect

Adverse event
- Any medical event following vaccination
- May be true adverse reaction
- May be only coincidental

**Vaccine Adverse Reactions**

**Local**
- Pain, swelling, redness at site of injection
- Occur within a few hours of injection
- Usually mild and self-limited

**Systemic**
- Fever, malaise, headache
- Nonspecific
- May be unrelated to vaccine

**Severe Allergic (anaphylaxis)**
- Due to vaccine or vaccine component
- Rare
- Risk minimized by screening

Reporting of Vaccine Errors and Adverse Events

**VAERS**: Vaccine Adverse Event Reporting System
- Report all vaccine adverse events to VAERS at [vaers.hhs.gov](http://vaers.hhs.gov) or (800) 822-7967. Report directly online or upload PDF.

**ISMP**: Institute for Safe Medication Practice
- Report vaccine administration errors (e.g., wrong route, wrong dose, and wrong age) to the (ISMP) via the Vaccine Error Reporting Program (VERP) website [http://ismp.org](http://ismp.org).
- Vaccine administration errors should also be reported to VAERS (as described above), and MUST be reported if they resulted in an adverse event.
Vaccine Injury Compensation Program (VICP)

- Established by National Childhood Vaccine Injury Act (1986)
- “No fault” program
- Covers all routinely recommended childhood vaccines
- Vaccine Injury Table
  - Lists conditions associated with each vaccine

Tips to Increase Immunization Rates

- Assess immunization status of all patients in every clinical encounter
  - Avoid missed opportunities
- Strongly recommend vaccines that patients need
  - Speak from personal experience
- Administer needed vaccines or refer to a vaccinating provider and confirm receipt
  - Utilize standing orders
  - Offer vaccine only visits
- Reminder recall
- Provide information in foreign languages
- Document vaccines received by patients, including entering immunization into immunization registry (MIIS)
Benefits of Standing Orders

- Overcome administrative barriers and save time
- Shown to be effective in both adults and children\(^1\)
  - For children, use of standing orders is associated with a median increase in vaccination coverage of 28%
  - Most effective evidence-based method
- REDUCES MISSED OPPORTUNITIES
- Consider implementing standing orders for vaccination, particularly for the adolescent immunization ‘bundle’
- ‘Presumptive’ recommendation in action

IAC model standing orders available at:
http://www.immunize.org/standing-orders/

MDPH model standing orders available at:
RESOURCES
General Best Practice Guidelines for Immunization

Best Practices Guidance of the Advisory Committee on Immunization Practices (ACIP)

Kroger AT, Duchin J, Vázquez M

1. Introduction

The Centers for Disease Control and Prevention (CDC) recommends routine vaccination to prevent 17 vaccine-preventable diseases that occur in infants, children, adolescents, or adults. This report provides information for clinicians and other health care providers about concerns that commonly arise when vaccinating persons of various ages.

Minimum Interval Table


ACIP Best Practice Guidelines for Immunization

- Replaces General Recommendations on Immunization in MMWR last updated in 2011
- Describes recommendations and guidelines on vaccination practice
- Updates on vaccination record policy, impact of ACA, characterization and protocol for anaphylaxis, definition of precaution; new information on simultaneous vaccination and febrile seizures

https://www.cdc.gov/vaccines/hcp/acip-recs/general-recs/downloads/general-recs.pdf
# Immunization Action Coalition

[www.immunize.org](http://www.immunize.org)

<table>
<thead>
<tr>
<th>Most Popular</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Vaccine Information Statements</td>
</tr>
<tr>
<td>2. Ask the Experts</td>
</tr>
<tr>
<td>3. Handouts for Patients and Staff</td>
</tr>
<tr>
<td>4. Photos</td>
</tr>
<tr>
<td>5. CDC Schedules</td>
</tr>
<tr>
<td>6. IAC Express</td>
</tr>
<tr>
<td>7. Shop IAC</td>
</tr>
<tr>
<td>8. Clinic Resources</td>
</tr>
<tr>
<td>9. Unprotected People Reports</td>
</tr>
<tr>
<td>10. Needle Tips</td>
</tr>
<tr>
<td>11. Journal Articles</td>
</tr>
<tr>
<td>12. Directory of Resources</td>
</tr>
<tr>
<td>13. Talking About Vaccines</td>
</tr>
<tr>
<td>14. State Laws</td>
</tr>
<tr>
<td>15. ACIP Recommendations</td>
</tr>
</tbody>
</table>

## IAC Publications
- Needle Tips [NEW]
- Vaccinate Adults [NEW]
- IAC Express - Email news

## Ask the Experts
Experts from CDC answer challenging and timely questions about vaccines and their administration
- Questions & Answers

## Unprotected People Reports
Real-life accounts of people who have suffered or died from vaccine-preventable diseases: compelling personal testimonies, case reports, and articles
- Read Reports

## Downloads
- Needle Tips
- Vaccinate Adults
- IAC Express

## Series: Understanding risk communication theory and having tools such as the CASE model encourages fruitful discussion with families about their vaccine safety concerns. The series of videos introduce risk communication and the CASE model, role play two examples of the CASE model in action, and provide feedback on each of the scenarios. These can be viewed individually or as part of a larger group for discussion.

Visit the VOTW archive
Immunization Action Coalition

Vaccinating Adults: A Step-by-Step Guide

http://www.immunize.org/guide/
National Adult Immunization Plan

- Goal 1: Strengthen the adult immunization infrastructure
- Goal 2: Improve access to adult vaccines
- Goal 3: Increase community demand for adult immunizations
- Goal 4: Foster innovation in adult vaccine development and vaccination-related techniques

MA Adult Immunization Coalition (MAIC)

- MAIC is a collaborative partnership dedicated to increasing adult immunization through education, networking, and sharing innovative and best practices.
- There are currently over 200 members representing:
  - Local and state public health organizations
  - Community health centers
  - Health insurance plans
  - Pharmacies
  - Physicians
  - Vaccine manufacturers
  - Long-term-care and senior service organizations
  - Consumer advocacy groups
  - Hospitals
  - Home health
  - College health services

Learn more at http://maic.jsi.com/
CDC’s Toolkit for Prenatal Providers

Pregnancy and Vaccination

Toolkit for Prenatal Care Providers

Increasing the Use of Maternal Vaccines by Ob-gyns, Nurse-Midwives, and Other Healthcare Professionals

This comprehensive toolkit is intended to increase maternal immunization. Ob-gyns, nurse-midwives, and other healthcare providers can all use this toolkit, along with pregnant women, to increase awareness and uptake of maternal vaccines.

We want your feedback for the toolkit. Is there anything missing? Your input is valuable. Please contact adultvaccines@cdc.gov.

Why Maternal Vaccines Are Important

Implementation Resources

https://www.cdc.gov/vaccines/pregnancy/hcp-toolkit/index.html
CDC Resources for Staff Education

- Competency-based education for staff is critical
- Multiple education products available free through the CDC website:
  - Immunization courses
  - “You Call the Shots” self-study modules
  - Netconferences
- Continuing education is available

http://www.cdc.gov/vaccines/ed/index.html
Vaccine Administration e-Learn

- The e-Learn is a free, interactive, online educational program that serves as a useful introductory course or a great refresher on vaccine administration
- Continuing education available for nurses, physicians, pharmacists, and other health care personnel
- It is available on the Continuing Education web page at: https://www.cdc.gov/vaccines/ed/courses.html#elearn-vaccadmin
Clinical Resources for Shoulder Injury Related to Vaccine Administration

- CDC Vaccine administration webpage for information and materials for health care personnel including
  - IM demonstration video
  - Job aids and infographics

https://www.cdc.gov/vaccines/hcp/admin/admin-protocols.html

www.cdc.gov/vaccines/hcp/admin/administer-vaccines.html
www.cdc.gov/vaccines/hcp/infographics/call-the-shots.pdf
Regional Immunization Nurses

- **Denise Dillon** – Northeast  978-851-7261  
denise.dillon@state.ma.us

- **Linda Jacobs** – Southeast  508-441-3980  
linda.jacobs@state.ma.us

- **VACANT** – Metro Boston & Central Region  617-983-6811

- **Theodora Wohler** – Metro West & Western Region  617-983-6837  
theodora.wohler@state.ma.us

- **Katie Reilly**, Nurse Manager  617-983-6833(T/Th)  508-441-3982(M/W/F)  
catherine.reilly@state.ma.us
MDPH Immunization Program Contact Information

**Immunization Program Main Number**
For questions about immunization recommendations, disease reporting, etc.
**Phone:** 617-983-6800  
**Fax:** 617-983-6840  
**Website:** [www.mass.gov/dph/imm](http://www.mass.gov/dph/imm)

**MIIS Help Desk**
**Phone:** 617-983-4335  
**Fax:** 617-983-4301  
**Email:** miishelpdesk@state.ma.us  
**Website:** [www.contactmiis.info](http://www.contactmiis.info) | [www.mass.gov/dph/miis](http://www.mass.gov/dph/miis)

**MDPH Vaccine Unit**
**Phone:** 617-983-6828  
**Fax:** 617-983-6924  
**Email:** dph-vaccine-management@state.ma.us  
**Website:** [www.mass.gov/dph/imm](http://www.mass.gov/dph/imm)
THANK YOU!