Immunization Update 2017

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Western New York Immunization Coalition Conference
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Disclosures

- Candice Robinson is a federal government employee with no financial interest or conflict with the manufacturer of any product named in this presentation.

- The speaker will discuss the off-label use of Tdap.

- The speaker will not discuss a vaccine not currently licensed by the FDA.
Disclosures

- The recommendations to be discussed are primarily those of the Advisory Committee on Immunization Practices (ACIP):
  - Composed of 15 non-government 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.

Next ACIP Meeting
June 21-22, 2017

http://www.cdc.gov/vaccines/acip/meetings/upcoming-dates.html

Overview

- Recent ACIP Updates
- Vaccine Updates
- 2017 Immunization Schedules
- Vaccination Coverage Rates
- Influenza
- Vaccine Administration and Vaccine Errors
- Resources
Advisory Committee on Immunization Practices (ACIP) Updates and MMWR Publications

**Hepatitis B**

- Monovalent Hepatitis B vaccine should be administered within 24h of birth for medically stable infants weighing ≥2,000 grams born to hepatitis B surface antigen (HBsAg)-negative mothers

- The recommendations for vaccination of infants <2,000 grams remain unchanged
  - Preterm infants weighing <2,000 g born to HBsAg-negative mothers should receive the first dose of vaccine 1 month after birth or at hospital discharge

- The recommendation for infants born to HBsAg-positive mothers or mothers whose hepatitis B status is unknown also remain unchanged

Influenza Recommendations

- ACIP recommendations for the 2016-17 season were published in the MMWR on August 26, 2016
- Annual influenza vaccination continues to be recommended for persons without contraindications or precautions 6 months of age and older
- Principal changes:
  - Live attenuated influenza vaccine (LAIV) is not recommended during the 2016-17 season
  - Updated egg allergy recommendations

ACIP Recommendations LAIV

- In light of low effectiveness against influenza A(H1N1)pdm09 in the United States during the 2013-14 and 2015-16 seasons, for the 2016-17 season, ACIP makes the interim recommendation that LAIV4 should not be used in the 2016-17 influenza season
Influenza Vaccination for Persons with Egg Allergy

- Residual egg protein in influenza vaccine is a very rare cause of allergic reaction even in severely allergic people
  - VSD data indicate that anaphylaxis occurs at a rate of about 1 case per million vaccine doses
  - 12 cases of anaphylaxis have been reported after RIV3 (which does not contain egg protein)
- The amount of ovalbumin in a dose of influenza vaccine (<1 µg per 0.5 mL dose) is less than that needed to cause anaphylaxis (estimated about 130 µg)

ACIP Recommendations for Influenza Vaccination of Persons with Egg Allergy

- Persons with a history of egg allergy who have experienced only hives after exposure to egg should receive any licensed age-appropriate influenza vaccine (IIV or RIV3)
ACIP Recommendations for Influenza Vaccination of Persons with Egg Allergy

- Persons who report having had reactions to egg involving symptoms other than hives, such as angioedema, respiratory distress, lightheadedness, or recurrent vomiting or who required epinephrine or another emergency medical intervention, may also receive any age-appropriate influenza vaccine (IIV or RIV3).

- The vaccine should be administered in medical setting (such as a clinic or physician office)

- Vaccine administration should be supervised by a health care provider who is able to recognize and manage severe allergic conditions

ACIP Recommendations for Influenza Vaccination of Persons with Egg Allergy

- A previous severe allergic reaction to influenza vaccine, regardless of the component suspected of being responsible for the reaction, is a contraindication to future receipt of the vaccine

- Providers should consider observing all patients for 15 minutes after vaccination to decrease the risk for injury should they experience syncope
**Tdap Update**

- For persons aged 7 through 10 years who receive a dose of Tdap as part of the catch-up series, an adolescent Tdap vaccine dose may be given at age 11 through 12 years
  - In line with guidance of children for which Tdap is inadvertently administered

https://www.cdc.gov/vaccines/acip/meetings/downloads/slides-2016-10/pertussis-03-liang.pdf

**Tdap in Pregnancy**

- Infants of Tdap vaccinated mothers were born with significantly higher anti-pertussis antibodies compared to infants of unvaccinated mothers

- Within the 27–36 weeks administration “window”
  - Concentration of anti-pertussis antibodies in infant cord blood were higher when mothers were vaccinated earlier
  - Longer exposure to vaccine allows for higher vaccine induced antibody levels produced by mother and transferred to infant

- The tetanus and diphtheria toxoids and acellular pertussis vaccine (Tdap) footnote for vaccination of pregnant adolescents/adults between gestational weeks 27–36 has been updated to reflect a preference for vaccination earlier during this period.

Meningococcal ACWY Recommendations for HIV-infected Persons

- Accumulating evidence indicates that HIV infection increases the risk of invasive meningococcal disease

- At the June 2016 meeting ACIP voted to recommend routine MenACWY vaccination for all HIV-infected persons age 2 months and older

- Number of doses depends on age
  - Persons 2 years and older should receive 2 doses separated by 8 weeks

Use of 2- and 3-Dose Schedules of MenB-FHbp (Trumenba) Meningococcal Serogroup B Vaccine

- Current ACIP Recommendations for Serogroup B Meningococcal (MenB) Vaccines
  - Certain persons aged ≥10 years who are at increased risk for meningococcal disease should receive MenB vaccine (Category A)¹
  - A MenB vaccine series may be administered to adolescents and young adults aged 16–23 years to provide short-term protection against most strains of serogroup B meningococcal disease (Category B)²

¹ MMWR 2015 64(22); 608-612
² MMWR 2015 64(41); 1171-1176
Use of 2- and 3-Dose Schedules of MenB-FHbp (Trumenba) Meningococcal Serogroup B Vaccine

- Changes to the dosage and administration section for MenB-FHbp approved by FDA on April 14, 2016

- Original language:
  - Three doses according to a 0, 2, and 6 month schedule

- Updated language:
  - **Three-dose schedule:** Administer a dose at 0, 1-2, and 6 months
  - **Two-dose schedule:** Administer a dose at 0 and 6 months

The choice and dosing schedule may depend on the risk of exposure and the patient’s susceptibility to meningococcal serogroup B disease


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Use of 2- and 3-Dose Schedules of MenB-FHbp (Trumenba) Meningococcal Serogroup B Vaccine

- For persons at increased risk for meningococcal disease and for use during serogroup B outbreaks, 3 doses of MenB-FHbp should be administered at 0, 1-2, 6 months

- When given to healthy adolescents who are not at increased risk for meningococcal disease, 2 doses of MenB-FHbp should be administered at 0 and 6 months
HPV 2-dose Schedule

- For persons initiating vaccination before age 15, the recommended immunization schedule is 2 doses of HPV vaccine at 0, 6-12 months.

- For persons initiating vaccination at age 15 years or older, the recommended immunization schedule is 3 doses of HPV vaccine at 0, 1–2, 6 months.

- Immunocompromised persons*, including those with human immunodeficiency virus (HIV) infection, should receive a 3-dose series at 0, 1–2, and 6 months, regardless of age at vaccine initiation.

*See MMWR December 16, 2016;65(49):1405-1408, available at https://www.cdc.gov/mmwr/volumes/65/wr/pdfs/mm6549a5.pdf

Polio

- MMWRs published 1/13/17 and 2/17/17 provide additional guidance regarding assessment of poliovirus vaccination status and vaccination of children who have received poliovirus vaccine outside the U.S.

- If both OPV and IPV were administered as part of a series, the total number of doses needed to complete the series is the same as that recommended for the U.S. IPV schedule. A minimum interval of 4 weeks should separate doses in the series, with the final dose administered on or after the fourth birthday and at least 6 months after the previous dose.

- If only OPV was administered, and all doses were given before age 4 years, 1 dose of IPV should be given at 4 years or older and at least 6 months after the last OPV dose.

- Only trivalent OPV (tOPV) counts toward the U.S. vaccination requirements.
Vaccine Updates

HPV Vaccines

- 2vHPV and 4vHPV vaccines are no longer being distributed in the United States.
- All available doses of 2vHPV expired at the end of 2016
- All available doses of 4vHPV will expire in May 2017
**Hiberix**

- Hiberix was first licensed in the US in August 2009 for use as a booster dose
- Hiberix is now FDA approved for a 3-dose infant primary vaccination series
  - Safety and immunogenicity of Hiberix in infants is similar to ActHIB and Pentacel

![Morbidity and Mortality Weekly Report]

**Food and Drug Administration Approval for Use of Hiberix as a 3-Dose Primary Haemophilus influenzae Type b (Hib) Vaccination Series**

https://www.cdc.gov/mmwr/volumes/65/wr/pdfs/mm6516a3.pdf

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**MenHibrix**

- The vaccine manufacturer notified providers that it has decided to discontinue MenHibrix manufacturing
- All doses of MenHibrix will expire by mid September 2017
Td Supply Shortage

- If Td is unavailable, Tdap should be used in place of Td when indicated for wound management.
- For routine vaccination and booster doses:
  - If a person has never received a dose of Tdap, Tdap should be administered.
  - If a person has previously received a dose of Tdap, using Tdap in place of Td is at the discretion of the provider, but would be a reasonable alternative.

Update on Menomune (MPSV4)

- Sanofi Pasteur is discontinuing production and supply of Menomune in the United States
- Last remaining lots will expire June-September 2017
Updated Guidance for Use of Meningococcal Vaccines in Persons Aged ≥56 Years

- Meningococcal vaccines that are licensed for use in person aged ≥56 year are not currently available in the United States
- Persons aged ≥56 years who are recommended meningococcal vaccination because they are at increased risk for meningococcal disease should receive MenACWY conjugate vaccine
  - This includes, meningococcal vaccine-naïve persons aged ≥56 years who anticipate requiring only a single dose of meningococcal vaccine (e.g. travelers and persons at risk as a risk of a community outbreak)
  - And persons who were vaccinated previously with MenACWY conjugate vaccine and are recommended for revaccination or for whom multiple doses are anticipated (e.g., person with asplenia, HIV, and microbiologists)
Recommended Immunization Schedule for Children and Adolescents Aged 18 Years or Younger, UNITED STATES, 2017

This schedule includes recommendations in effect as of January 1, 2017. Any dose not administered at the recommended age should be administered at a subsequent visit, when indicated and feasible. The use of a combination vaccine generally is preferred over separate injections of its equivalent component vaccines. Vaccination providers should consult the relevant Advisory Committee on Immunization Practices (ACIP) statement for detailed recommendations, available online at www.cdc.gov/vaccines/hcp/acip-recs/index.html. Clinically significant adverse events that follow vaccination should be reported to the Vaccine Adverse Event Reporting System (VAERS) online (www.vaers.hhs.gov) or by telephone (800-822-7967). Suspected cases of vaccine-preventable diseases should be reported to the state or local health department. Additional information, including precautions and contraindications for vaccination, is available from CDC online (www.cdc.gov/vaccines/hcp/admin/contraindications.html) or by telephone (800-CDC-INFO [800-232-4636]).

The Recommended Immunization Schedule for Children and Adolescents Aged 18 Years or Younger are approved by the Advisory Committee on Immunization Practices (www.cdc.gov/vaccines/acip)
American Academy of Pediatrics (www.aap.org)
American Academy of Family Physicians (www.aafp.org)
American College of Obstetricians and Gynecologists (www.acog.org)

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

NOTE: The above recommendations must be read along with the footnotes of this schedule.
### Figure 1. Recommended Immunization Schedule for Children and Adolescents Aged 18 Years or Younger — United States, 2017

**NOTE:** The above recommendations must be read along with the footnotes of this schedule.

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>Birth</th>
<th>1 mo</th>
<th>12 mo</th>
<th>4 years</th>
<th>5 years</th>
<th>11 years</th>
<th>16 years</th>
<th>18 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Haemophilus B (Hib)</td>
<td>2 doses</td>
<td>2 doses</td>
<td>4 doses</td>
<td>4 doses</td>
<td>2 doses</td>
<td>3 doses</td>
<td>4 doses</td>
<td>5 doses</td>
</tr>
<tr>
<td>Rotavirus (RV) (live)</td>
<td>2 doses</td>
<td>2 doses</td>
<td>2 doses</td>
<td>2 doses</td>
<td>2 doses</td>
<td>1 dose</td>
<td>2 doses</td>
<td>3 doses</td>
</tr>
<tr>
<td>Diphtheria, tetanus, and acellular pertussis (DTaP)</td>
<td>3 doses</td>
<td>3 doses</td>
<td>3 doses</td>
<td>3 doses</td>
<td>3 doses</td>
<td>3 doses</td>
<td>3 doses</td>
<td>3 doses</td>
</tr>
<tr>
<td>Hemophiliac virus type A (Hep A)</td>
<td>2 doses</td>
<td>2 doses</td>
<td>2 doses</td>
<td>2 doses</td>
<td>2 doses</td>
<td>2 doses</td>
<td>2 doses</td>
<td>2 doses</td>
</tr>
<tr>
<td>Universal IPV (IPV)</td>
<td>3 doses</td>
<td>3 doses</td>
<td>3 doses</td>
<td>3 doses</td>
<td>3 doses</td>
<td>3 doses</td>
<td>3 doses</td>
<td>3 doses</td>
</tr>
<tr>
<td>Inactivated poliovirus (IPV)</td>
<td>3 doses</td>
<td>3 doses</td>
<td>3 doses</td>
<td>3 doses</td>
<td>3 doses</td>
<td>3 doses</td>
<td>3 doses</td>
<td>3 doses</td>
</tr>
<tr>
<td>Mumps, measles, and rubella (MMR)</td>
<td>2 doses</td>
<td>2 doses</td>
<td>2 doses</td>
<td>2 doses</td>
<td>2 doses</td>
<td>2 doses</td>
<td>2 doses</td>
<td>2 doses</td>
</tr>
<tr>
<td>Varicella (VZV)</td>
<td>2 doses</td>
<td>1 dose</td>
<td>1 dose</td>
<td>1 dose</td>
<td>1 dose</td>
<td>1 dose</td>
<td>1 dose</td>
<td>1 dose</td>
</tr>
<tr>
<td>Hepatitis B (Hep B)</td>
<td>2 doses</td>
<td>2 doses</td>
<td>2 doses</td>
<td>2 doses</td>
<td>2 doses</td>
<td>2 doses</td>
<td>2 doses</td>
<td>2 doses</td>
</tr>
<tr>
<td>Meningococcal C (MenC)</td>
<td>2 doses</td>
<td>2 doses</td>
<td>2 doses</td>
<td>2 doses</td>
<td>2 doses</td>
<td>2 doses</td>
<td>2 doses</td>
<td>2 doses</td>
</tr>
<tr>
<td>Hepatitis A (Hep A)</td>
<td>2 doses</td>
<td>2 doses</td>
<td>2 doses</td>
<td>2 doses</td>
<td>2 doses</td>
<td>2 doses</td>
<td>2 doses</td>
<td>2 doses</td>
</tr>
<tr>
<td>Tetanus, diphtheria, and acellular pertussis (Tdap)</td>
<td>1 dose</td>
<td>1 dose</td>
<td>1 dose</td>
<td>1 dose</td>
<td>1 dose</td>
<td>1 dose</td>
<td>1 dose</td>
<td>1 dose</td>
</tr>
<tr>
<td>Hepatitis A (Hep A)</td>
<td>2 doses</td>
<td>2 doses</td>
<td>2 doses</td>
<td>2 doses</td>
<td>2 doses</td>
<td>2 doses</td>
<td>2 doses</td>
<td>2 doses</td>
</tr>
<tr>
<td>Pneumococcal polysaccharide vaccine (PPV23)</td>
<td>1 dose</td>
<td>1 dose</td>
<td>1 dose</td>
<td>1 dose</td>
<td>1 dose</td>
<td>1 dose</td>
<td>1 dose</td>
<td>1 dose</td>
</tr>
</tbody>
</table>

**NOTE:** The above recommendations must be read along with the footnotes of this schedule.
Figure 1. Recommended immunization schedule for children and adolescents aged 18 years or younger—United States, 2017.

NOTE: The above recommendations must be read along with the footnotes of this schedule.

Figure 2. Catch-up immunization schedule for persons aged 4 months through 10 years who start late or who are more than 1 month behind—United States, 2017.

NOTE: The above recommendations must be read along with the footnotes of this schedule.
Introduction of High-risk Figure

- Demonstrates most children with medical conditions can (and should) be vaccinated according to the routine immunization schedule

- Indicates when a medical condition is a precaution or contraindication

- Indicates when additional doses of vaccines may be necessary secondary to the child's/adolescent's medical condition
### Recommended Immunization Schedule for Adults Aged 19 Years or Older, United States, 2017

In February 2017, the Recommended Immunization Schedule for Adults Aged 19 Years or Older, United States, 2017 was revised by the Advisory Committee on Immunization Practices (ACIP) and approved by the Centers for Disease Control and Prevention (CDC). The 2017 adult immunization schedule was developed and approved by the following professional medical organizations:

- American Academy of Pediatrics (www.aap.org)
- American College of Preventive Medicine (www.acpmed.org)
- Infectious Diseases Society of America (www.idsociety.org)
- American Academy of Family Physicians (www.aafp.org)
- American College of Physicians (www.acponline.org)

The schedule is published with courtesy of the Centers for Disease Control and Prevention.

### Table: Recommended Immunization Schedule for Adults Aged 19 Years or Older, United States, 2017

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>19-29 years</th>
<th>≥ 30 years</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Influenza</strong>&lt;sup&gt;1&lt;/sup&gt;</td>
<td>1 dose annually</td>
<td>1 dose annually</td>
</tr>
<tr>
<td>Td/TTd&lt;sup&gt;4&lt;/sup&gt;</td>
<td>Substitute Td for Td alone, tat every 10 years</td>
<td>Substitute Td for Td alone, at every 10 years</td>
</tr>
<tr>
<td>MMR&lt;sup&gt;2&lt;/sup&gt;</td>
<td>1 or 2 doses depending on indication</td>
<td>1 dose</td>
</tr>
<tr>
<td>var&lt;sup&gt;5&lt;/sup&gt;</td>
<td>2 doses</td>
<td>2 doses</td>
</tr>
<tr>
<td>HIV&lt;sup&gt;2&lt;/sup&gt;</td>
<td>1 dose</td>
<td>1 dose</td>
</tr>
<tr>
<td>HPV - Female&lt;sup&gt;4&lt;/sup&gt;</td>
<td>3 doses</td>
<td>3 doses</td>
</tr>
<tr>
<td>IPV - Male&lt;sup&gt;4&lt;/sup&gt;</td>
<td>3 doses</td>
<td>3 doses</td>
</tr>
<tr>
<td>PCV13&lt;sup&gt;1&lt;/sup&gt;</td>
<td>3 doses</td>
<td>3 doses</td>
</tr>
<tr>
<td>PPV23&lt;sup&gt;1&lt;/sup&gt;</td>
<td>1 or 2 doses depending on indication</td>
<td>1 dose</td>
</tr>
<tr>
<td>HaPPV&lt;sup&gt;1&lt;/sup&gt;</td>
<td>2 or 3 doses depending on vaccine</td>
<td>2 or 3 doses depending on vaccine</td>
</tr>
<tr>
<td>IPV - Male&lt;sup&gt;4&lt;/sup&gt;</td>
<td>3 doses</td>
<td>3 doses</td>
</tr>
<tr>
<td>MenACWY or Meningococcal&lt;sup&gt;1&lt;/sup&gt;</td>
<td>1 or more doses depending on indication</td>
<td>1 or more doses depending on indication</td>
</tr>
<tr>
<td>RV&lt;sup&gt;6&lt;/sup&gt;</td>
<td>2 doses</td>
<td>2 doses</td>
</tr>
<tr>
<td>HaPPV&lt;sup&gt;1&lt;/sup&gt;</td>
<td>2 or 3 doses depending on vaccine</td>
<td>2 or 3 doses depending on vaccine</td>
</tr>
<tr>
<td>HB&lt;sup&gt;2&lt;/sup&gt;</td>
<td>1 dose</td>
<td>1 dose</td>
</tr>
</tbody>
</table>

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*Recommended for adults who meet the age requirements, lack documentation of previous vaccination, or have evidence of past infection.

<sup>1</sup> Vaccines are listed in the order of preference.

<sup>2</sup> Enhanced surveillance is recommended for health care workers who have direct patient contact.

<sup>3</sup> Vaccines recommended for children born on or after January 1, 2013.

<sup>4</sup> Recipients of HZV vaccine should receive a second dose of HZV vaccine 6 months to 2 years after the first dose.

<sup>5</sup> Recipients of MenACWY vaccine should receive a second dose of MenACWY vaccine 6 months to 2 years after the first dose.

<sup>6</sup> HaPPV provides protection against Streptococcus pneumoniae, Haemophilus influenzae type b, and Neisseria meningitidis (A, C, Y, W-135) and is recommended for adults 19 years of age or older whose immune status has not been assessed within the past 10 years. HaPPV is also recommended for adults who have a history of meningococcal disease or who are at increased risk of meningococcal disease.

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Figures 1 and 2 should be read with the footnotes that contain important general information and considerations for special populations.
7. Pneumococcal vaccination

General information
- Adults who are older than 65 years of age should receive a pneumococcal vaccine. This vaccine is also recommended for people who have chronic medical conditions such as diabetes, HIV infection, chronic lung disease, and kidney disease.
- The vaccine is recommended for people who are at high risk of developing pneumococcal pneumonia, such as those who have had a prior episode of pneumococcal pneumonia or who have had a prior episode of severe pneumonia.
- The vaccine is recommended for people who have had a prior episode of meningococcal meningitis or who have had a prior episode of severe meningococcal meningitis.
- The vaccine is recommended for people who have had a prior episode of bacterial meningitis or who have had a prior episode of severe bacterial meningitis.

Specific indications
- Adults who are older than 65 years of age should receive a pneumococcal vaccine. This vaccine is also recommended for people who have chronic medical conditions such as diabetes, HIV infection, chronic lung disease, and kidney disease.
- The vaccine is recommended for people who are at high risk of developing pneumococcal pneumonia, such as those who have had a prior episode of pneumococcal pneumonia or who have had a prior episode of severe pneumonia.
- The vaccine is recommended for people who have had a prior episode of meningococcal meningitis or who have had a prior episode of severe meningococcal meningitis.
- The vaccine is recommended for people who have had a prior episode of bacterial meningitis or who have had a prior episode of severe bacterial meningitis.

8. Hepatitis A vaccination

General information
- Adults who are older than 65 years of age who have had hepatitis A vaccine or who have had hepatitis A infection should receive a hepatitis A vaccine. This vaccine is also recommended for people who have had a prior episode of hepatitis A or who have had a prior episode of severe hepatitis A.
- The vaccine is recommended for people who have had a prior episode of hepatitis B or who have had a prior episode of severe hepatitis B.
- The vaccine is recommended for people who have had a prior episode of hepatitis C or who have had a prior episode of severe hepatitis C.
- The vaccine is recommended for people who have had a prior episode of hepatitis D or who have had a prior episode of severe hepatitis D.

Specific indications
- Adults who are older than 65 years of age who have had hepatitis A vaccine or who have had hepatitis A infection should receive a hepatitis A vaccine. This vaccine is also recommended for people who have had a prior episode of hepatitis A or who have had a prior episode of severe hepatitis A.
- The vaccine is recommended for people who have had a prior episode of hepatitis B or who have had a prior episode of severe hepatitis B.
- The vaccine is recommended for people who have had a prior episode of hepatitis C or who have had a prior episode of severe hepatitis C.
- The vaccine is recommended for people who have had a prior episode of hepatitis D or who have had a prior episode of severe hepatitis D.

9. Hepatitis B vaccination

General information
- Adults who are older than 65 years of age who have had hepatitis B vaccine or who have had hepatitis B infection should receive a hepatitis B vaccine. This vaccine is also recommended for people who have had a prior episode of hepatitis B or who have had a prior episode of severe hepatitis B.
- The vaccine is recommended for people who have had a prior episode of hepatitis A or who have had a prior episode of severe hepatitis A.
- The vaccine is recommended for people who have had a prior episode of hepatitis C or who have had a prior episode of severe hepatitis C.
- The vaccine is recommended for people who have had a prior episode of hepatitis D or who have had a prior episode of severe hepatitis D.

Specific indications
- Adults who are older than 65 years of age who have had hepatitis B vaccine or who have had hepatitis B infection should receive a hepatitis B vaccine. This vaccine is also recommended for people who have had a prior episode of hepatitis B or who have had a prior episode of severe hepatitis B.
- The vaccine is recommended for people who have had a prior episode of hepatitis A or who have had a prior episode of severe hepatitis A.
- The vaccine is recommended for people who have had a prior episode of hepatitis C or who have had a prior episode of severe hepatitis C.
- The vaccine is recommended for people who have had a prior episode of hepatitis D or who have had a prior episode of severe hepatitis D.

10. Influenza vaccination

General information
- Adults who are older than 65 years of age who have had influenza vaccine or who have had influenza infection should receive an influenza vaccine. This vaccine is also recommended for people who have had a prior episode of influenza or who have had a prior episode of severe influenza.
- The vaccine is recommended for people who have had a prior episode of pneumococcal pneumonia or who have had a prior episode of severe pneumococcal pneumonia.
- The vaccine is recommended for people who have had a prior episode of meningococcal meningitis or who have had a prior episode of severe meningococcal meningitis.
- The vaccine is recommended for people who have had a prior episode of bacterial meningitis or who have had a prior episode of severe bacterial meningitis.

Specific indications
- Adults who are older than 65 years of age who have had influenza vaccine or who have had influenza infection should receive an influenza vaccine. This vaccine is also recommended for people who have had a prior episode of influenza or who have had a prior episode of severe influenza.
- The vaccine is recommended for people who have had a prior episode of pneumococcal pneumonia or who have had a prior episode of severe pneumococcal pneumonia.
- The vaccine is recommended for people who have had a prior episode of meningococcal meningitis or who have had a prior episode of severe meningococcal meningitis.
- The vaccine is recommended for people who have had a prior episode of bacterial meningitis or who have had a prior episode of severe bacterial meningitis.

Table: Contraindications and precautions for vaccines recommended for adults aged 18 years or older

<table>
<thead>
<tr>
<th>Contraindications and precautions for vaccines recommended for adults aged 18 years or older</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Contraindications</strong></td>
</tr>
<tr>
<td>1. History of seizures, severe allergic reaction to a vaccine</td>
</tr>
<tr>
<td>2. History of anaphylactic shock</td>
</tr>
<tr>
<td>3. History of severe allergic reaction to a vaccine component</td>
</tr>
<tr>
<td>4. History of severe reaction to a prior dose of the vaccine</td>
</tr>
<tr>
<td>5. History of severe reaction to a prior dose of a similar vaccine</td>
</tr>
<tr>
<td><strong>Precautions</strong></td>
</tr>
<tr>
<td>1. History of severe allergic reaction to a vaccine component</td>
</tr>
<tr>
<td>2. History of severe reaction to a prior dose of the vaccine</td>
</tr>
<tr>
<td>3. History of severe reaction to a prior dose of a similar vaccine</td>
</tr>
</tbody>
</table>

11. Adverse effects of vaccines

**Common adverse effects:**
- Local:
  - Injection site:
    - Pain
    - Swelling
    - Redness
    - Itching
  - Not usually serious
- Systemic:
  - Fever
  - Headache
  - Fatigue
  - Muscle pain
  - Localized lymph node enlargement

**Uncommon adverse effects:**
- Local:
  - Infection at the injection site
- Systemic:
  - Anaphylaxis
  - Severe allergic reaction

**Infrequently reported adverse effects:**
- Local:
  - Numbness and tingling
- Systemic:
  - Gastrointestinal disturbances
  - Nervous system disturbances

**Serious adverse effects:**
- Anaphylaxis
- Severe allergic reaction
- Seizure
- Aseptic meningitis
- Arthralgia
- Aseptic arthritis

**Rare adverse effects:**
- Severe reaction to vaccine component
- Reaction to a vaccine dose

Other adverse effects:
- Injection site reactions
- Local inflammation
- Systemic reactions

**Precautions for vaccine administration:**
- Administer vaccine to the anterolateral aspect of the upper arm
- Use a single-use syringe for each dose
- Use a single-use needle for each dose
- Do not administer vaccine if the vial is clouded or the contents are discolored
- Do not administer vaccine if the vial is damaged or if the vial is not properly refrigerated

**Adverse effects of vaccines:**
- Local:
  - Injection site:
    - Pain
    - Swelling
    - Redness
    - Itching
  - Not usually serious
- Systemic:
  - Fever
  - Headache
  - Fatigue
  - Muscle pain
  - Localized lymph node enlargement

**Uncommon adverse effects:**
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  - Infection at the injection site
- Systemic:
  - Anaphylaxis
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21
### Estimated Vaccine Coverage Among Children Aged 19-35 Months, NIS 2015

<table>
<thead>
<tr>
<th>State/Area</th>
<th>Vaccine Series* 4:3:1:3:3:1:4</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>72.2%</td>
<td></td>
</tr>
<tr>
<td>New York</td>
<td>71.9%</td>
<td></td>
</tr>
</tbody>
</table>

*Includes >4 doses DTaP/DT/DTP, > 3 doses polio, > 1 dose MMR, full series Hib, > 3 doses Hep B, dose > 1 varicella, and > 4 doses PCV.

MMWR 2015; 64(33): 889-896
Estimated percentage of children enrolled in kindergarten with an exemption from one or more vaccines, United States, 2015–16 school year

<table>
<thead>
<tr>
<th>New York</th>
<th>Exemption Type</th>
<th>N</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(All kindergartners = 232,521)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medical</td>
<td></td>
<td>323</td>
<td>0.1</td>
</tr>
<tr>
<td>Nonmedical</td>
<td></td>
<td>1,729</td>
<td>0.7</td>
</tr>
<tr>
<td>Any</td>
<td></td>
<td>2,052</td>
<td>0.9</td>
</tr>
</tbody>
</table>

Estimated Vaccination Coverage among Adolescents Aged 13-17 Years, NIS-Teen, United States, 2006-2015

* APD = Adequate provider data; ** ≥2 doses MenACWY among adolescents aged 17 years

MMWR 65(33);850-858
Estimated Vaccination Coverage among Adolescents Aged 13-17 Years, NIS-Teen, United States, 2015

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>United States</th>
<th>New York</th>
</tr>
</thead>
<tbody>
<tr>
<td>≥1 Tdap</td>
<td>86.4%</td>
<td>89%</td>
</tr>
<tr>
<td>≥1 HPV (F)</td>
<td>62.8%</td>
<td>62.3%</td>
</tr>
<tr>
<td>≥3 HPV (F)</td>
<td>41.9%</td>
<td>47.3%</td>
</tr>
<tr>
<td>≥1 HPV (M)</td>
<td>49.8%</td>
<td>60.3%</td>
</tr>
<tr>
<td>≥3 HPV (M)</td>
<td>28.1%</td>
<td>38.1%</td>
</tr>
<tr>
<td>≥1 MenACWY</td>
<td>81.3%</td>
<td>86.2%</td>
</tr>
<tr>
<td>≥2 MenACWY*</td>
<td>33.3%</td>
<td>--</td>
</tr>
</tbody>
</table>

*≥2 doses of MenACWY or meningococcal-unknown type vaccine among adolescents 17 years. Does not include adolescents who received their first dose of MenACWY vaccine at ≥16 years.

https://www.cdc.gov/mmwr/volumes/65/wr/mm6533a4.htm

Vaccination Coverage Among Adults in the United States, National Health Interview Survey, 2015

https://www.cdc.gov/vaccines/imz-managers/coverage/adultvaxview/coverage-estimates/2015.html
Vaccination Coverage Among Adults in the United States, National Health Interview Survey, 2015

- Among adults 65 years and older:
  - Over one-third did not report pneumococcal or Td vaccination.
  - More than four out of every five did not report Tdap vaccination.
  - Nearly two-thirds did not report having had a shingles vaccination.

- Among adults younger than 65 years with indications for pneumococcal vaccination, approximately 3 out of every 4 did not report ever having been vaccinated.

https://www.cdc.gov/vaccines/imz-managers/coverage/adultvaxview/coverage-estimates/2015.html

Seasonal Influenza update
Weekly US Map: Influenza Summary Update

Influenza vaccine coverage — General Population

*The 2016–17 end-of-season estimates will not be available until September 2017.
Influenza vaccine coverage — Health Care Personnel

Flu vaccination coverage among health care personnel vaccinated by November and by April for 2010-11 through 2015-16 flu seasons, and by November for 2016-17 flu season, Internet panel survey, United States

https://www.cdc.gov/flu/fluvaxview/hcp‐ips‐nov2016.htm

Influenza vaccine coverage — Pregnant Women

Figure 1. Flu vaccination coverage before and during pregnancy among pregnant women by early November and mid April for 2010-11 through 2015-17 flu seasons, Internet panel survey, United States

https://www.cdc.gov/flu/fluvaxview/pregnant‐women‐nov2016.htm
Interim Estimates of 2016–17 Seasonal Influenza Vaccine Effectiveness — United States, February 2017

- Report uses data, as of February 4, 2017

<table>
<thead>
<tr>
<th>Influenza type</th>
<th>Overall Adjusted Vaccine Effectiveness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Influenza A and B</td>
<td>48%</td>
</tr>
<tr>
<td>Influenza A</td>
<td>43%</td>
</tr>
<tr>
<td>Influenza B</td>
<td>73%</td>
</tr>
</tbody>
</table>

MMWR 66(6); 167-171
https://www.cdc.gov/mmwr/volumes/66/wr/mm6606a3.htm?s_cid=mm6606a3_w

Recommended composition of influenza virus vaccines for use in the 2017-2018 northern hemisphere influenza season

- It is recommended that trivalent vaccines for use in the 2017-2018 northern hemisphere influenza season contain the following:
  - A/Michigan/45/2015 (H1N1)pdm09-like virus [NEW]
  - A/Hong Kong/4801/2014 (H3N2)-like virus
  - B/Brisbane/60/2008-like virus

- It is recommended that quadrivalent vaccines containing two influenza B viruses contain the above three viruses and:
  - B/Phuket/3073/2013

ACIP Recommendations for 2017-18 Influenza Season

- ACIP has not yet voted on recommendations for the 2017-18 Influenza Season
  - No new recommendations regarding LAIV at this time

Impact of Vaccination
Childhood Immunization Provides Big Savings

- CDC estimates vaccination of children born between 1994 and 2016 will prevent:
  - 381 million illnesses
  - 24.5 million hospitalizations
  - 855,000 early deaths

- Cost savings
  - $360 billion in direct costs
  - $1.65 trillion in total societal costs
CDC Resources for Staff Education

- Competency-based education for staff is critical
- Multiple education products available free through the CDC website:
  - Immunization courses (webcasts and online self-study)
  - Netconferences
  - You Call the Shots self-study modules
- Continuing education credits available

https://www.cdc.gov/vaccines/ed/index.html

You Call the Shots
(Several Modules Added or Updated)

https://www.cdc.gov/vaccines/ed/youcalltheshots.html
Now Available

- Supplemental information regarding:
  - Human Papillomavirus
  - Meningococcal Disease
  - Pneumococcal Disease

https://www.cdc.gov/vaccines/pubs/pinkbook/supplement.html
https://www.cdc.gov/vaccines/pubs/pinkbook/index.html

Now Available
General Best Practice Guidelines on Immunization

- Replaces the “General Recommendations on Immunization”
  - Timing and Spacing of Immunobiologics
  - Contraindications and precautions
  - Preventing and Managing Adverse Reactions
  - Vaccine Administration
  - Storage and Handling of Immunobiologics
  - Altered Immunocompetence
  - Special Situations
  - Vaccination Records
  - Vaccination Programs
  - Vaccine Information Sources

https://www.cdc.gov/vaccines/hcp/acip-recs/general-recs/index.html
CDC Vaccine and Immunization Resources

Questions? Email CDC

- Providers
  nipinfo@cdc.gov
- Parents and patients
  www.cdc.gov/cdcinfo

Website
www.cdc.gov/vaccines

Twitter
@DrNancyM_CDC

Influenza
www.cdc.gov/flu

Vaccine Safety
www.cdc.gov/vaccinesafety

Additional Resources

- State Immunization Program
  - https://www.health.ny.gov/prevention/immunization/
  - And local public health immunization programs, too!
- Immunization Action Coalition
  www.immunize.org
- Vaccine Education Center
  www.chop.edu
- American Academy of Pediatrics (AAP)
  www.aap.org/immunize
- National Foundation for Infectious Diseases (NFID)
  www.nfid.org