2017 Annual Immunization Update
ACIP Recommendations
Cameron Kaiser, MD, MPH
Public Health Officer
County Of Riverside

OBJECTIVES
- By the end of this presentation the participant will be able to:
  - Identify at least 4 vaccine preventable diseases
  - Describe at least 2 changes in the 2017 recommended immunization schedule for 0-18 years of age
  - Identify vaccine recommended during pregnancy
  - Identify 2 symptoms of pertussis disease
  - Identify who should receive an annual influenza vaccine

DISCLOSURES
- Speaker has no financial conflict with manufacturers of any product named in this presentation
- The use of trade names and commercial sources during this presentation is for identification only, and does not imply endorsement by the Riverside University Health System-Public Health, Immunization Program
RECOMMENDED IMMUNIZATION SCHEDULE FOR CHILDREN/ADOLESCENTS AND ADULTS

The Advisory Committee on Immunization Practices (ACIP) is a federal advisory committee which provides advice and guidance to the Centers for Disease Control and Prevention (CDC) on use of vaccines and related agents for the control of vaccine-preventable diseases in the US.

Each year, recommendations for routine use of vaccines in children, adolescents, and adults in the United States are developed by the ACIP. Recommendations for routine use of vaccines in children and adolescents are harmonized with recommendations made by the American Academy of Pediatrics (AAP), and the American College of Obstetrics and Gynecology (ACOG).

Figure 1. Recommended Schedule
- Provides catch-up and minimum intervals between doses
- Use this table (figure 2) in conjunction with the recommended immunization schedule for 0-18 years of age (figure 1), the table for 0-18 years of age based on medical indications (figure 3), and footnotes

Figure 2. Catch-up Schedule
- Provides catch-up and minimum intervals between doses
- Use this table (figure 2) in conjunction with the recommended immunization schedule for 0-18 years of age (figure 1), the table for 0-18 years of age based on medical indications (figure 3), and footnotes
FINAL FOOTNOTES

CHANGES

• Footnote #12 (Tdap) - updated to reflect a preference for vaccination earlier during the 27-36 week gestation for pregnant adolescents
  • This recommendation will maximize passive antibody transfer to the infant
• Footnote #13 (HPV) updated includes new 2-dose schedule recommendation
  • Bivalent HPV vaccine has been removed from the schedule

HEPATITIS B VIRUS

• An extremely infectious disease that affects the liver
• Spread by direct contact with infected blood and other body fluids
• Acute (short-term) illness can lead to:
  ▶ Loss of appetite, tiredness, pain in muscles, joints, stomach, jaundice, diarrhea and vomiting
• Chronic (long-term) infection can lead to:
  ▶ Cirrhosis, liver cancer and death
  ▶ Often asymptomatic

PERINATAL HEPATITIS B PROGRAM

• Administer monovalent HepB vaccine to all newborns within 24 hours of birth
• Infants born to HBsAg positive mothers, administer HepB vaccine AND HBIG within 12 hours of birth
• Testing of these infants is completed 1 to 2 months after HepB series completion. Testing is specifically for HBsAg and antibody to HBsAb (anti-HBs)
  ▶ Test should be quantitative (not qualitative)
• Infants born to mothers of an unknown HBsAg status should receive HepB vaccine within 12 hours of birth regardless of birth weight
• Riverside University Health System - Public Health, Perinatal Hepatitis B Prevention Program
  ▶ Follow-up on referred HBsAg positive mothers to ensure the infants and household contacts receive appropriate preventive treatment
**HEPATITIS B VACCINE**

- **Recommended:**
  - **1st Dose:** within 24 hours of birth
  - **2nd Dose:** 1 or 2 months of age
  - **3rd Dose:** 6-18 months of age

- **Minimum intervals:**
  - Between dose 1 and 2 is four weeks
  - Between dose 2 and 3 is eight weeks
  - and at least sixteen weeks after dose 1
  - Minimum age for final dose (dose 3 or dose 4) is 24 weeks of age

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**ROTAVIRUS**

- **Fecal – oral transmission**
- **Most common cause of severe diarrhea in infants and children**
- **Communicability:** 2 days before onset of symptoms
- **Complications**
  - Severe diarrhea
  - Dehydration
  - Electrolyte imbalance
  - Metabolic acidosis

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**ROTAVIRUS VACCINE**

- **Rotarix (RV5) – 3 dose formula**
  - Administer at 2, 4, and 6 months of age
  - Provided as a lyophilized powder that is reconstituted before administration
  - Administer orally

- **Rotateq (RV1) – 2 dose formula**
  - Administer at 2 and 4 months of age
  - No reconstitution needed
  - Administer orally

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[Image of a doctor examining a dehydrated child]

*Courtesy of World Health Organization, photo credit Dr. D. Mahalanabis*
**DIPHTHERIA**
- Bacteria that lives in the mouth, throat and nose of an infected person
- Transmission person to person through coughing or sneezing
- Most common sites are the pharynx and the tonsils
- Early symptoms include malaise, sore throat, anorexia, and low-grade fever
- Membrane covering the tonsils and soft palate may cause respiratory obstruction

**TETANUS**
- Caused by spore-forming bacteria which are found in soil, and animal feces
- The most common form of tetanus is generalized
- Descending symptoms of trismus (lockjaw), stiff neck, difficulty swallowing, muscle rigidity and spasms

**Pertussis**
- Highly contagious respiratory infection caused by *Bordetella pertussis*
- Disease spread through air by infectious droplets through coughing and sneezing
- Inflammation occurs which interferes with clearance of pulmonary secretions
Pertussis Clinical Features

Three stages

- **Catarrhal stage** – 1-2 weeks
  - runny nose, sneezing, low-grade fever, and a mild cough (similar to the common cold)
- **Paroxysmal cough stage** – 1-6 weeks
  - rapid coughs with a high-pitched whoop at the end of the cough paroxysm
- **Convalescence** – weeks to months
  - recovery is gradual

Pertussis in California

- 1,540 cases were reported to the California Department of Public Health in 2016
- Preliminary numbers and expected to increase
- Young infants are at greatest risk of hospitalization and death from pertussis, therefore pregnant women are encouraged to receive Tdap vaccine at EACH pregnancy
- Pertussis antibodies are transferred from vaccinated mothers to their infants and will help protect them until they are old enough to be vaccinated
- The primary DTaP vaccine series is essential for reducing severe disease in young infants and should not be delayed
  - The first dose can be given as early as 6 weeks
DTAP VACCINE

- Approved for children 6 weeks through 6 years
- Administer a 5-dose series of DTaP vaccine:
  - Recommended at age 2, 4, 6, 15-18 months, and 4-6 years
  - DTaP #4 may be given as early as age 12 months if at least 6 months has passed since DTaP #3
  - Inadvertent early administration of DTaP #4: If the 4th dose of DTaP was administered at least 4 months after the 3rd dose and the child was 12 months of age or older, it does not need to be repeated

HAEMOPHILUS INFuenZA, TYPE b

- Bacterial infection, particularly among infants and children under age 5 years
- Enters the nasopharynx
- Invades bloodstream and causes infection at distant sites
- Spread person to person through the air by coughing, sneezing, and breathing

HAEMOPHILUS INFuenZA, TYPE b
CLINICAL FEATURES-PRE VACCINE ERA

- Epiglottis
- Pneumonia
- Meningitis
- Arthritis
- Carotids
- Meningitis
- Septicemia per vaccine era
HIB VACCINE

- Administer a 2 or 3 dose Hib vaccine primary series – depending on vaccine used
  
  Primary series with ActHIB, MenBibrix, Hiberc, or Pentozol = 3 doses administered at age 2, 4, and 6 months
  
  Primary series with PedvaxHib = 2 doses administered at ages 2 and 4 months; a dose at age 6 months is not indicated
  
  One booster dose (dose 3 or 4, depending on vaccine used in primary series) of any Hib vaccine should be administered at age 12-15 months

PNEUMOCOCCAL DISEASE

- Streptococcus pneumoniae - acute bacterial infection
  
  Spread by coughing and sneezing
  
  Clinical features
    - pneumonia, bacteremia, and meningitis
  
  Symptoms
    - fever, chills, chest pain, coughing, and dyspnea
  
  Complications
    - meningitis, sepsis, brain damage, ear and sinus infections

PNEUMOCOCCAL CONJUGATE VACCINE (PCV13)

- 4 dose series PCV 13 ages 2, 4, 6, and 12-15 months
  
  Administer 1 dose of PCV13 to all healthy children 24-59 months not completely vaccinated for their age
  
  All recommended PCV13 doses should be administered prior to PPSV23 vaccination if possible
  
  See footnotes for vaccination of persons with high-risk conditions
Slide 28

POLIO
- First outbreak described in the U.S. in 1843
- More than 21,000 paralytic cases reported in the U.S. in 1952
- Global eradication possibly within this decade

Slide 29

Polio
- Virus enters through mouth
- Replication in pharynx and GI tract
- Symptoms vary
- Hematologic spread to lymphatics and central nervous system
- Viral spread along nerve fibers
- Destruction of motor neurons

Slide 30

Aerial view of crowd awaiting polio immunization, San Antonio, 1962
Courtesy of Centers for Disease Control and Prevention
**Slide 31:**

**Poliomyelitis-United States, 1950-2010**

![Graph showing polio cases in the United States from 1950 to 2010.](image)

**Slide 32:**

**POLIO (IPV) VACCINE**

- First dose may be given as early as 6 weeks of age
- Administer 4 dose series at 2, 4, 6-18 months, and 4-6 years
- Final dose should be administered on or after the 4th birthday and at least 6 months after the previous dose
- If 4 or more doses administered before age 4 years – an additional dose should be administered at age 4-6 years and at least 6 months after previous dose
- See footnotes for more detailed information

**Slide 33:**

**INFLUENZA VIRUS**

- Highly infectious viral illness
- Spread through coughing and sneezing
- Causes fever, myalgia, cough, sore throat, runny nose and headache

![Photo of influenza germs spreading in the air.](image)
INFLUENZA VACCINE COMPOSITION

- Trivalent formulation contains:
  - A/California/7/2009 (H1N1) - like virus
  - A/Hong Kong/4801/2014 (H3N2) - like virus
  - B/Brisbane/60/2008 - like virus (Victoria lineage)

- Quadrivalent formulation contains the aforementioned antigens and:
  - B/Phuket/3073/2013 - like virus (Yamagata lineage)
California Influenza Data

- California Department of Public Health (CDPH) reports:
- Influenza activity in California remains elevated statewide.
- Outpatient influenza-like illness (ILI):
  - 3.2% of patient visits during Week 5 were ILI, which is above expected levels for this time of year.
- 9 laboratory-confirmed influenza-associated deaths among patients 0-64 years of age during Week 5.
INFLUENZA VACCINE

- Administer annually to all persons 6 months and older
- For the 2016-2017 season, use of live attenuated influenza vaccine (LAIV) is NOT recommended
- Children 6 months-8 years receiving influenza vaccine for the first time administer 2 doses (separated by at least 4 weeks)
- All persons 9 years of age and older administer 1 dose
- Formulations not grown in chicken eggs:
  - Flucelvax® (cell-based)
  - Flublok® (recombinant hemagglutinin influenza vaccine)

INFLUENZA VACCINE CONFUSION

Which flu vaccine do I give to babies and children under 3 in California?
Which flu vaccine do I give to pregnant women?
Which vaccine do I give to babies?
Which vaccine do I give to someone who is pregnant?
Who needs flu mist?
A clinical case is characterized by:
- A generalized rash lasting 3 or more days
- Temperature of 101°F or higher
- Cough, coryza, and/or conjunctivitis
- Koplik spots – bluish white spots on the buccal mucosa
- 1-2 days before the measles rash appears and up to 1-2 days after

MEASLES

![Image of Koplik spots](https://example.com/koplik-spots)

Courtesy of Centers for Disease Control and Prevention

Virus, spread by respiratory droplets, causes infection of salivary glands which become swollen
- Causes fever, headache, and painful swelling of the testicles and joints
- Can lead to deafness, and meningitis

MUMPS

![Image of mumps](https://example.com/mumps)

Courtesy of Centers for Disease Control and Prevention

Respiratory transmission of virus
- Virus is spread by coughing and sneezing
- Rash occurs 14-17 days after exposure and last about 3 days
- Complications include arthralgia or arthritis in adult female – rare in children, encephalitis, orchitis, neuritis and congenital rubella syndrome (CRS)

RUBELLA

![Image of rubella rash](https://example.com/rubella-rash)

Courtesy of Centers for Disease Control and Prevention
**MMR VACCINE**

- Administer 2-dose series age 12-15 months and 4-6 years
  - 2nd dose may be administered before 4 years of age provided at least 4 weeks has passed since 1st dose
  - Administer 1 dose to infants 6-11 months of age before international travel
  - These children will need revaccination with 2 doses of MMR vaccine - 1st dose at age 12-15 months and 2nd dose at least 4 weeks later
  - Ensure all school-aged children and adolescents have had 2 doses of MMR vaccine with a minimum interval of 4 weeks between doses

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**VARICELLA (CHICKENPOX)**

- Caused by the varicella zoster virus
- Spread person to person through air, or contact with fluid from blisters
- Usually mild, but can be serious, especially in young infants and adults
- Complications include bacterial infection of skin lesions, pneumonia, and central nervous system manifestations

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**VARICELLA VACCINE**

- Administer in a 2-dose series:
  - First dose 12-15 months of age
  - Second dose 4-6 years of age
  - Ensure all children/adolescents 7-18 years of age without evidence of immunity receive 2 doses of varicella vaccine
**HEPATITIS A**

- Virus enters mouth, through personal contact or by ingestion of contaminated food or water
- Viral replication in the liver
- Virus present in blood and feces 10-12 days after infection
- Virus excreted in feces
- Two dose vaccination provides nearly 100% protection

**HEPATITIS A VACCINE**

- 2-dose series at age 12-23 months
- Separate the 2 doses by 6-18 months
- Any person age 2 years and older who have not already received the Hepatitis A vaccine series should receive 2 doses, separated by 6 – 18 months

**ADOLESCENT VACCINES**
MENINGOCOCCAL DISEASE
- Severe acute bacterial infection caused by Neisseria meningitidis
- N. meningitidis colonizes mucosal surfaces of the nasopharynx
- Spread by direct contact with large-droplet respiratory tract secretions - coughing, sneezing, and kissing
- Meningitis and sepsis - two most invasive diseases caused by serogroups A, B, C, W, and Y
- Symptoms: sudden onset of fever, headache, stiff neck often accompanied by nausea, vomiting, photophobia (eye sensitivity to light) and mental status changes
- Causes meningitis predominantly; also sepsis (blood infection) and pneumonia

MENINGOCOCCAL CONJUGATE VACCINE (MCV4)
- Administer a single dose of Menactra or Menveo vaccine at age 11-12 years of age with a booster at age 16 years
- Administer Menactra or Menveo vaccine at age 13-18 if not previously vaccinated

Tetanus, diphtheria, acellular pertussis Vaccine (Tdap)
- Administer 1 dose to all adolescents 11-12 years of age
- Administer one dose of Tdap to pregnant adolescents during each pregnancy (preferably during the early part of 27-36 weeks gestation)
- Persons 7–10 years of age who are not fully immunized with DTaP vaccine series, should receive a dose of Tdap
HUMAN PAPILLOMAVIRUS (HPV)
- Viral infection
- Transmission
  - Direct contact, usually sexual
  - Can be mother to newborn at time of birth
- Two most common types of cervical cancer caused by HPV
  - Squamous cell carcinoma
  - Adenocarcinoma
- HPV is believed to be responsible for 90% of anal cancers, 71% vulvar vaginal, or penile cancers, and 72% of oropharyngeal cancers

HUMAN PAPILLOMAVIRUS (HPV) VACCINE
- Administer a 2-dose series 0, 6-12 months to all adolescents 11-12 years of age
- Series can be started as early as 9 years
- Administer beginning at 9 years of age to children with history of sexual abuse or assault
MENINGOCOCCAL B VACCINE

- High risk conditions:
  - 2-dose series of Bexsero
  - 3-dose series of Trumenba
- The two MenB vaccines are not interchangeable
- The same vaccine product must be used for all doses

PNEUMOCOCCAL POLYSACCHARIDE VACCINE (PPSV23)

- All recommended PCV 13 doses should be administered prior to PPSV23 vaccination if possible
- (See footnote 5 for detailed information on PPSV23 and PCV13 vaccination of persons with high-risk conditions)
Slide 67

Table: Contraindications and Precautions

Slide 68

VACCINE MANAGEMENT

- Vaccines and vaccine management should be a part of all office staff meetings
- Variety of vaccines and preparations
- Competency in all aspects of immunizations should be documented for all staff
- Hands-on Immunization Technique courses provided by Riverside and San Bernardino Counties

Slide 69

RESOURCES

- Riverside University Health Systems-Public Health, Immunization Program
  - www.rivcoph.org
  - www.rivcophmm.org
  - 888-385-2215
  - 951-386-7125
- San Bernardino County Department of Public Health, Immunization Program
  - www.sbcounty.gov/dph
  - 800-782-4264
- California Immunization Branch-VFC
  - www.eziz.org
  - www.cdc.gov/vaccines/
  - www.shotsforschool.org