2018 Annual Immunization Update
ACIP Recommendations

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Riverside

OBJECTIVES

- By the end of this presentation the participant will be able to:
  - Identify the minimum age recommendation for annual influenza vaccination
  - Discuss at least 8 vaccine preventable diseases
  - Describe at least 4 changes in the 2018 Child and Adolescent Immunization Schedule
  - Identify vaccine recommended during pregnancy
  - Discuss zoster vaccine recommendation

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 United States.
- The 2018 child and adolescent immunization schedule summaries ACIP recommendations, including several changes from the 2017 immunizations schedules.
- The immunization schedules have been approved by ACIP, American Academy of Family Physicians, and the American College of Obstetricians and Gynecologists.
- The recommended schedule and the catch-up schedule must be read with footnotes that follow.

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Figure 1. Recommended Schedule
**Figure 2. Catch-up Schedule**

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**Figure 3. Indications Based on Medical Indications**

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Footnotes: Recommended Immunization Schedule for Children and Adolescents Aged 0-18 Years, United States, 2018

- For healthy, non-immunocompromised children and adolescents, the schedule below is recommended.
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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

- The goal of the Perinatal Hepatitis B Prevention Program is to prevent the transmission of perinatal hepatitis B virus by providing:
  - Case management of HBsAg positive pregnant women and their infants
  - Education of medical providers, birth hospitals, and hepatitis B infected pregnant women and their household contacts
  - Coordination with birth hospitals to promote national perinatal hepatitis B prevention recommendations
- Important areas of education and follow-up:
  - Prenatal testing of all pregnant women for hepatitis B infection and reporting positive cases to local health department
  - Testing positive pregnant women for hepatitis B virus deoxyribonucleic acid (HBV DNA)
  - Appropriate prophylaxis of infants born to HBsAg positive women
    - (Hepatitis B vaccine and HBIG)
  - Post-vaccination serologic testing of infants born to HBsAg positive women
PERINATAL HEPATITIS B

- Administer monovalent hepatitis B vaccine to all newborns within 24 hours of birth
- Infants born to HBsAg positive mothers - administer hepatitis B vaccine AND HBIG within 12 hours of birth (separate sites)
- Post vaccination serologic testing is completed 1 to 2 months after HepB series completion (usually at age 9-12 months – testing should NOT be done before 9 months of age)
  - 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 hepatitis B vaccine within 12 hours of birth regardless of birth weight

HEPATITIS B VACCINE

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<th>Date</th>
<th>1st Dose</th>
<th>2nd Dose</th>
<th>3rd Dose</th>
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<td>Birth</td>
<td>within 24 hours of birth</td>
<td>1 or 2 months of age</td>
<td>6-18 months of age</td>
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- Minimum intervals:
  - Between dose 1 and 2 = four weeks
  - Between dose 2 and 3 = 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

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
**ROTAVIRUS VACCINE**

- **Rotarix (RV1)** – 2 dose formula
- Administer at 2 and 4 months of age
- Provided as a lyophilized powder that is reconstituted before administration
- Administer orally

- **Rotateq (RV5)** – 3 dose formula
- Administer at 2, 4, and 6 months of age
- No reconstitution needed
- Administer orally

**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

- 2,925 cases were reported to the California Department of Public Health in 2017
  - 51% increase in overall pertussis cases reported in 2017 compared to 2016
- Infants too young for vaccination are at greatest risk for life-threatening cases
- To protect newborns-pregnant women are recommended to receive Tdap vaccine in their third trimester of every 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
  - A 4th dose may be given as early as age 12 months if at least 6 months has passed since the 3rd dose

**HAEMOPHILUS INFLUENZA, 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 INFLUENZA, TYPE b**

**CLINICAL FEATURES-PRE VACCINE ERA**

- Pneumonia 17%
- Meningitis 4%
- Otitis 13%
- Otitis media 8%
- Parotitis 7%

**HIB VACCINE**

- Minimum age 6 weeks
- Administer a 2 or 3 dose Hib vaccine primary series – depending on vaccine used
  - Primary series with ActHIB, Hiberix or Pentacel: 4-dose series at age 2, 4, 6, and 12-15 months
  - Primary series with PedvaxHib: 3-dose series at ages 2, 4, and 12-15 months
  - Unvaccinated at 15-59 months of age: 1 dose is recommended

**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)

- Minimum age 6 weeks
- 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
- See footnotes for vaccination of persons with high-risk conditions

### 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

### Polio

- First described in England in 1789
- First U.S. outbreak in 1843
- More than 21,000 paralytic cases reported in the U.S. in 1952
- Vaccine introduced in 1955
- Polio eradication is ongoing worldwide through vaccination
POLIO (IPV) VACCINE

- First dose may be given as early as 6 weeks of age
- Minimum age 6 weeks
- 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 – administer 1 more dose at age 4 - 6 years and at least 6 months after previous dose
- See footnotes for more detailed information

INFLUENZA VIRUS

- Highly infectious viral illness
- Spread through coughing and sneezing
- Can cause mild to severe illness including fever, myalgia, cough, sore throat, runny nose and headache
2017-2018
INFLUENZA VACCINE COMPOSITION

- Trivalent formulation contains:
  - A/Michigan/45/2015 (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
  - Deaths: 36 (Age 0-64)
  - Outbreaks: 36
  - Laboratory: 21.1% positive
  - Outpatient ILI: Above expected levels
  - Hospitalizations: Above expected levels

(A SNAPSHOT)
INFLUENZA VACCINE

- Administer annually to all persons 6 months and older
- Children 6 months-8 years who did not receive at least 2 doses of influenza vaccine before July 1, 2017 should receive 2 doses separated by at least 4 weeks
- All persons 9 years of age and older administer 1 dose
- For the 2017-2018 season, use of live attenuated influenza vaccine (LAIV) is NOT recommended
Which flu vaccine do I give to babies and children under 3 in California?
Which flu vaccine do I give to pregnant women?

**MEASLES**

- 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

White spots inside the mouth are common with measles (Koplik's spots)

Courtesy of Centers for Disease Control and Prevention
MUMPS

- 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

RUBELLA

- 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)

MMR VACCINE

- Minimum age 12 months
- Administer 2-dose series age 12-15 months and 4-6 years
- 2nd dose may be administered as early as 4 weeks after the 1st dose
- Unvaccinated children and adolescents - 2 doses at least 4 weeks apart
- International travel for infants 6-11 months: 1 dose before departure
  - Revaccinate with 2 doses at 12-15 months
  - 2nd dose as early as 4 weeks later

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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

VARICELLA VACCINE

- Minimum age: 12 months
- Administer in a 2-dose series:
  - First dose 12-15 months of age
  - Second dose 4-6 years of age
- Ensure all persons 7-18 years of age without evidence of immunity receive 2 doses of varicella vaccine
  - Ages 7-12: routine interval 3 months (minimum interval: 4 weeks)
  - Ages 13 and older: minimum interval 4 weeks

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

- Minimum age: 12 months
- 2-dose series, separated by 6-18 months, between the 1st and 2nd birthdays
- Anyone 2 years of age or older may receive the Hepatitis A vaccine if desired
  - Minimum interval between doses 6 months

ADOLESCENT VACCINES

MENINGOCOCCAL DISEASE

- Severe acute bacterial infection caused by *Neisseria meningitidis*
- 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 (A,C,W,Y)**

<table>
<thead>
<tr>
<th>Name</th>
<th>0 months</th>
<th>1 month</th>
<th>2 months</th>
<th>3 months</th>
<th>6 months</th>
<th>12 months</th>
<th>18 months</th>
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<tr>
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</table>

- Minimum age: 2 months [Menveo], 9 months [Menactra]
- 2 dose series: 11-12 years and 16 years
- Age 13-15 years: 1 dose now and booster at age 16-18 years
- Age 16-18 years: 1 dose

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**Tetanus, diphtheria, acellular pertussis Vaccine (Tdap)**

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<tr>
<th>Name</th>
<th>0 months</th>
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<th>2 months</th>
<th>3 months</th>
<th>6 months</th>
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<th>17 years</th>
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<tbody>
<tr>
<td>Menveo</td>
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- Adolescents 11-12 years of age: 1 dose
- Pregnant adolescents: 1 dose of Tdap during each pregnancy (preferably during the early part of 27 - 36 weeks gestation)
- Tdap may be administered regardless of the interval since the last tetanus and diphtheria toxoid-containing vaccine
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

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HUMAN PAPILLOMAVIRUS (HPV) VACCINE

- Routine vaccination for all adolescents at 11-12 years of age through 18 if not previously vaccinated
  - Series can be started as early as 9 years
- History of sexual abuse or assault: begin series at age 9 years
- See footnotes for more special situations instructions

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MENINGOCOCCAL B VACCINE

- MenB vaccines may be given at clinical discretion to adolescents 16-23 years
  (preferred age 16-18 years) who are not at increased risk
  - Bexsero: 2 doses at least 1 month apart
  - Trumenba: 2 doses at least 6 months apart
    - If the 2nd dose is given earlier than 6 months, give a 3rd dose at least 4 months after the 2nd
  - Bexsero and Trumenba are not interchangeable
- See footnotes for special populations and situations
PNEUMOCOCCAL POLYSACCHARIDE VACCINE (PPSV23)

- Administer PCV 13 doses before PPSV23 if possible
- (See footnote 5 for detailed information on PPSV23 and PCV13 vaccination of persons with high-risk conditions)
Figure 2: Recommendations by Medical Conditions

<table>
<thead>
<tr>
<th>Condition</th>
<th>Recommendations</th>
</tr>
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<tbody>
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<tr>
<td>Diabetes</td>
<td>1st Line Second Line Third Line</td>
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<tr>
<td>Heart Disease</td>
<td>1st Line Second Line Third Line</td>
</tr>
<tr>
<td>Asthma</td>
<td>1st Line Second Line Third Line</td>
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</tbody>
</table>

Footnotes

Table. Contraindications and Precautions
**Zoster Vaccine**

- On October 20, 2017 a new Zoster vaccine was approved by FDA
- Shingrix-GSK, Recombinant Zoster Vaccine (RZV)
- RZV is recommended:
  - Among immunocompetent adults age 50 years and older for the prevention of herpes zoster and related complications
  - Among adults aged 50 years or older who previously received the zoster vaccine live (ZVL) Zostavax and either RZV or ZVL for adults aged 60 years or older (RZV is preferred)

**Zoster Vaccine**

- Administer 2 doses RZV (0.5 ml each) 2-6 months apart
  - Adults 50 years or older regardless of past episode of herpes zoster or receipt of ZVL
  - Adults who previous received ZVL at least 2 months after ZVL
  - Adults 60 years or older, administer either RZV or ZVL (RZV is preferred)
- Shingrix is stored in the refrigerator: 2-6°C (36-46°F)

**MMR**

- Administer 1 dose of MMR to adults with no evidence of immunity measles, mumps, or rubella
- Evidence of immunity:
  - Born before 1957 (except for health care personnel)
  - Documentation of receipt of MMR
  - Laboratory evidence of immunity or disease
- New rec: 3rd dose of MMR for persons previously vaccinated with 2 doses identified as at risk population during an outbreak
New Hepatitis B Vaccine (coming soon)

- November 2017 FDA approved a new recombinant hepatitis b vaccine
- Heplisav-B (Dynavax)
- 18 years of age and older
- 2 dose series –separated by 1 month - 0.5 ml IM
- Store in refrigerator
  - 2-8°C (36-46°F)
- Recommendations not yet published

VACCINE MANAGEMENT

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

RESOURCES

Riverside University Health Systems-Public Health, Immunization Program
  - www.rivcoph.org
  - www.rivcoimm.org
  - 888-246-1215
  - 951-358-7125
San Bernardino County Department of Public Health, Immunization Program
  - www.sbcounty.gov/dph
  - 800-782-4264
California Immunization Branch
  - Vaccine for Children Program (VFC)
    - www.eziz.org
Immunization Action Coalition
  - www.immunize.org
Centers for Disease Control and Prevention
  - www.cdc.gov/vaccines/
    - www.shotsforschool.org
THANK YOU

Q&A

Questions
Answers

Riverside University HEALTH SYSTEM
Public Health