Vaccine Safety: Understanding Vaccine Contraindications and Precautions

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Karen Lewis, MD; AIPO Medical Director
Definitions

• Contraindication
  – Increased likelihood of serious reaction

• Precaution
  – Might have increase in chance of severity of adverse reaction
  – Might compromise the ability of vaccine to produce immunity
Contraindication
Increased likelihood of serious reaction

- Anaphylaxis to vaccine component or previous dose (all vaccines)
- Live virus in immune compromised
- History of intussusception
- Unexplained encephalopathy within seven days of DTaP/Tdap
- Pregnancy (live)
- Antivirals (LAIV, varicella)
- < 6 weeks of age (Hib)
Precautions

• May have increased chance of severity of adverse reaction
• May hurt ability of vaccine to produce immunity
Always with Every Vaccine

Contraindication
• Severe allergic reaction (anaphylaxis) after a previous vaccine dose or to a vaccine component

Precaution
• Moderate or serve acute illness with or without fever
Pregnancy

- Contraindicated
  - Live vaccines

- Precautions
  - Most other vaccines

- Indicated
  - Influenza vaccine
  - Tdap
Immune System

Variety of Immune Cells

Anatomy and Immunity

Clip art
Treatments that Can Affect Immune Response to Vaccines

- IV and IM immune globulins
- Azathioprine, 6-MP, methotrexate
- Corticosteroids
- Immune modulators
- Anti-rejection medicines
- Radiation
- Chemotherapy
- Hematopoietic stem cell transplantation
Measles-Mumps-Rubella Vaccine

- **Contraindication**
  - Known severe immunodeficiency
  - Pregnancy

- **Precautions**
  - Recent receipt of antibodies (IM, IV, blood)
  - History of low platelets or TTP
  - Need for TB skin test
Varicella Vaccine

• Contraindications
  – Known severe immunodeficiency
  – Pregnancy

• Precautions
  – Recent receipt of antibodies (IM, IV, blood)
  – Specific antiviral for 24 hours before vaccine; hold antivirals for 14 days after vaccine
Zoster Vaccine

- Contraindicated
  - Severe immunodeficiency
  - Pregnancy
- Precaution
  - Recent antibody receipt
  - Recent antivirals

OK even if:
- No history of chicken pox
- History of shingles
- HIV if CD4 count $> 200$
- Low dose 6-MP, azathioprine, methotrexate, corticosteroids
Rotavirus Vaccine

- Rotavirus by EM

- Contraindication: SCID, or anaphylaxis to latex*

- Precautions:
  - Altered immunity
  - History of intussusception
  - Chronic intestinal disease
  - ± Spina bifida or bladder extrophy

- Evaluate infants if persistent diarrhea after rotavirus vaccine

*Rotarix

CDC. MMWR, February 6, 2009, (RR-2)
Diphtheria-Tetanus-Pertussis Vaccines

• Contraindication
  – Unexplained encephalopathy within seven days of DTaP/Tdap

• Precautions
  – GBS within 6 weeks of tetanus vaccine
  – Arthus reaction after vaccine (T & D)
  – Progressive neurologic disorder (pertussis)
  – $\geq 105^\circ F (\geq 40.5^\circ C)$ within 48 hours*
  – Shock-like state within 48 hours*
  – Persistent crying $\geq 3$ hours within 48 hours*
  – Seizure within 3 days*

*After DTaP only
Arthus Reaction

- Exaggerated local response to tetanus or diphtheria vaccines
- Extensive, painful swelling
- More common in adults
- High existing antibody levels
- Avoid revaccination for 10 years
Influenza Vaccines (IIV)

• Contraindication
  – Anaphylaxis to vaccine or component

• Precautions
  – Guillain-Barré Syndrome within six weeks
  – Egg allergy other than just hives?
## Egg Allergies and Influenza Vaccine

<table>
<thead>
<tr>
<th>Reaction to eggs?</th>
<th>Wait after</th>
<th>Where give</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hives</td>
<td>15 minutes</td>
<td>Anywhere</td>
</tr>
<tr>
<td>Anaphylaxis</td>
<td>15 minutes</td>
<td>Only in locations where HCP trained in response to anaphylaxis</td>
</tr>
<tr>
<td>Angioedema</td>
<td></td>
<td></td>
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<tr>
<td>Epinephrine need</td>
<td></td>
<td></td>
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<tr>
<td>Respiratory distress</td>
<td></td>
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<tr>
<td>Lightheadedness</td>
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<tr>
<td>Persistent vomiting</td>
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</tbody>
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MMWR, August 26, 2016 (RR-05)
Small Risk of Guillain-Barré Syndrome within 6 Weeks of Vaccination

- Influenza vaccine
- Tetanus vaccine
- Some vaccines conjugated to tetanus toxoid:
  - Hiberix
  - ActHIB
  - Pentacel
  - Prevnar13
  - Menactra
  - Menveo
Live-Attenuated Influenza Vaccine

- Temperature dependent mutant
- Mimics influenza infection
- Only one instance of person-to-person transmission
- Previously used for healthy 2-49 year olds

CDC. MMWR. August 26, 2016, (RR-5)
Other Vaccine Details

- Hib vaccine
  - < 6 weeks of age is a contraindication
- Hepatitis B
  - Infant < 2 kg is a precaution
- HPV vaccine
  - Pregnancy is a precaution
- Recombinant influenza
  - OK if severe egg allergy
Vaccines that Contain Yeast

- Engerix-B (HepB)
- Recombivax HB (HepB)
- Twinrix (HepA & HepB)
- Pediarix (DTaP-HepB-IPV)
- Gardasil 9 (HPV9)
- Prevnar13 (PCV13)
- Menveo (MCV4)

CDC. 2015 Pink Book. Appendix B.
Invalid Contraindications #1

- Mild illness
- Low grade fever
- URI
- Cold
- Otitis media
- Mild diarrhea
Invalid Contraindications #2

- Antibiotics
  - Except oral typhoid
- Antivirals
  - Except LAIV, Varicella
- Disease exposure
- Convalescence
Invalid Contraindications #3

- Pregnant or immunosuppressed person in household
  - Except vaccinia (smallpox)
  - ± LAIV
  - ± Varicella
- Family history of adverse events
Invalid Contraindications #4

- Breastfeeding
  - Except vaccinia (smallpox)
  - Avoid yellow fever vaccine
- Preterm Birth ≥ 2 kg
  - OK to vaccinate
  - Very low birth weight
    - OK by one month
    - Hepatitis B vaccine issues
Invalid Contraindications #5

- Multiple vaccines
  - Exemptions
    - PCV13 & Menactra in asplenics
    - Vaccinia (smallpox) and varicella
- TB skin test (TST) and vaccines
  - OK same or separate days
  - But...TST could be smaller within 4 weeks of MMR
Invalid Contraindications #6

- Non-specific allergies
- Duck or feather allergy
- Penicillin allergy
- Relatives with allergies
- Receiving allergy shots
- Non-anaphylactic or not severe allergy to vaccine component
Balance Risks

Disease Complications
- Meningitis
- Pneumonia
- Cellulitis
- Gangrene
- Paralysis
- Liver cancer
- Cervical cancer
- Throat cancer
- Dehydration
- Death

Reaction to Vaccine
- Local reaction at site
- Fever, febrile seizure
- Rash
- Low platelet count
- Intussusception
- Guillain-Barré Syndrome
- Disease from live virus vaccine
- Anaphylaxis
Questions?
Review Objectives

• Explain the difference between a vaccine contraindication and a precaution.
• Describe one vaccine contraindication that applies to all vaccines.
• Name at least one vaccine that is contraindicated in pregnancy.
CASE STUDY

- A 15-year-old pregnant adolescent has not received any doses of Tdap, MCV4, and HPV. Which of these vaccines can she receive during pregnancy?
CASE STUDY

• A 1-month-old full term female received HBIG and hepatitis B vaccine at birth because her mother is chronically infected with hepatitis B.
• She is seen today to get her second dose of hepatitis B vaccine. What other vaccines should she receive?
A pregnant woman brings in her 4-year-old son for routine vaccinations. He has been up-to-date according to CDC recommendations, so he is due for an MMR, a varicella vaccine, his 5\textsuperscript{th} DTaP and his 4\textsuperscript{th} inactivated polio vaccine.

What vaccines can he get in light of his mother being pregnant?
CASE STUDY

• A 30-year-old healthy woman is breastfeeding. Are there any vaccines that she should not receive if they were otherwise indicated?
CASE STUDY

• A 5-year-old girl was diagnosed four months ago as having Kawasaki disease. She received 2 grams/kg of IV immune globulin. She comes to your office today for her 4-6 year old vaccines: DTaP, IPV, MMR, and Varicella.

• Which vaccines can she receive?
• Can she receive an influenza vaccine?
THANK YOU

Karen Lewis, MD | AIPO Medical Director
Karen.lewis@azdhs.gov | 602-364-3856

azhealth.gov

@azdhs

facebook.com/azdhs