General Recommendations on Immunization

Epidemiology and Prevention of Vaccine-Preventable Diseases

National Immunization Program
Centers for Disease Control and Prevention
Revised January 2006

Issues Regarding Timing and Spacing of Vaccines

- Timing of antibody-containing blood products and live vaccines
- Simultaneous and nonsimultaneous administration of different vaccines
- Interval between subsequent doses of the same vaccine

Antibody and Live Vaccines

General Rule
- Inactivated vaccines are generally not affected by circulating antibody to the antigen
- Live attenuated vaccines may be affected by circulating antibody to the antigen

Products Given First

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wait 2 weeks before giving antibody (See Table, Appendix A)</td>
<td></td>
</tr>
</tbody>
</table>

Antibody and Live Vaccines

Antibody for Prevention of RSV

- RSV-IG (RespiGam)
  - Human
  - Contains other antibodies
- Palivizumab (Synagis)
  - Monoclonal
  - Contains only RSV antibody

Simultaneous Administration

- General Rule
There is no contraindication to simultaneous administration of any vaccines.
**Spacing of Vaccine Combinations Not Given Simultaneously**

<table>
<thead>
<tr>
<th>Combination</th>
<th>Minimum Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two live parenteral, or live intranasal influenza vaccine</td>
<td>4 weeks</td>
</tr>
<tr>
<td>All other</td>
<td>None</td>
</tr>
</tbody>
</table>

**Spacing of Live Vaccines Not Given Simultaneously**

- If two live parenteral vaccines, or live intranasal influenza vaccine, are given <4 weeks apart the vaccine given second should be repeated
- Exception is yellow fever vaccine given <4 weeks after measles vaccine

**Intervals Between Doses**

**General Rule**

Increasing the interval between doses of a multidose vaccine does not diminish the effectiveness of the vaccine

Decreasing the interval between doses of a multidose vaccine may interfere with antibody response and protection

**Minimum Intervals and Ages**

Vaccine doses should not be administered at intervals less than the recommended minimum intervals or earlier than the minimum ages

**Violation of Minimum Intervals or Minimum Age**

- ACIP recommends that vaccine doses given up to four days before the minimum interval or age be counted as valid
- Immunization programs and/or school entry requirements may not accept all doses given earlier than the minimum age or interval

**Extended Interval Between Doses**

- Not all permutations of all schedules for all vaccines have been studied
- Available studies of extended intervals have shown no significant difference in final titer
- It is not necessary to restart the series or add doses because of an extended interval between doses
Vaccine Adverse Reactions

- **Adverse reaction**
  - extraneous effect *caused by vaccine*
  - "side effect"

- **Adverse event**
  - *any event following vaccination*
  - could be true adverse reaction
  - could be only coincidental

Vaccine Adverse Reactions

- **Local**
  - pain, swelling, redness at site of injection
  - common with inactivated vaccines
  - usually mild and self-limited

Vaccine Adverse Reactions

- **Systemic**
  - fever, malaise, headache
  - nonspecific
  - may be unrelated to vaccine

Live Attenuated Vaccines

- Must replicate to produce immunity
- Symptoms usually mild
- Occur after an incubation period (usually 7-21 days)

Vaccine Adverse Reactions

- **Allergic**
  - due to vaccine or vaccine component
  - very rare
  - risk minimized by screening

Contraindication

A condition in a recipient that increases the chance of a serious adverse reaction
Precaution
A condition in a recipient that might
• Increase the chance or severity of an adverse reaction, or
• Compromise the ability of the vaccine to produce immunity

Contraindications and Precautions
Permanent contraindications to vaccination:
• Severe allergic reaction to a vaccine component or following a prior dose
• Encephalopathy not due to another identifiable cause occurring within 7 days of vaccination

Contraindications and Precautions

<table>
<thead>
<tr>
<th>Condition</th>
<th>Live</th>
<th>Inactivated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allergy to component</td>
<td>C</td>
<td>C</td>
</tr>
<tr>
<td>Encephalopathy</td>
<td>---</td>
<td>C</td>
</tr>
<tr>
<td>Pregnancy</td>
<td>C</td>
<td>V</td>
</tr>
<tr>
<td>Immunosuppression</td>
<td>C</td>
<td>V</td>
</tr>
<tr>
<td>Severe illness</td>
<td>P</td>
<td>P</td>
</tr>
<tr>
<td>Recent blood product</td>
<td>P*</td>
<td>V</td>
</tr>
</tbody>
</table>

C=contraindication  P=precaution  V=vaccinate if indicated
*MMR and varicella only

Immunosuppression
Disease
• Congenital immunodeficiency
• Leukemia or lymphoma
• Generalized malignancy

Immunosuppression
Drugs and Therapy
• Alkylating agents
• Antimetabolites
• Radiation

Immunosuppression
Corticosteroids
• 20 mg or higher per day
• 2 mg/kg or higher per day, for 14 days or longer
• NOT aerosols, topical, alternate-day, short (<14 days), high-dose courses
Recommendations for Routine Immunization of HIV-Infected Children

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>Asymptomatic</th>
<th>Symptomatic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Varicella</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>MMR</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>LAIV</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>All others</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Yes = vaccinate  No = do not vaccinate

Vaccination of Hematopoietic Stem Cell Transplant Recipients

• Includes recipients of bone marrow, peripheral cell, and umbilical cord blood transplants
• Autologous or allogeneic
• HSCT recipients should be revaccinated

Vaccination of Hematopoietic Stem Cell Transplant Recipients

• Inactivated influenza vaccine at >6 months following transplant and annual thereafter
• Inactivated vaccines (DTaP, Td, Hib, IPV, hepatitis B, PPV) at 12 months
• MMR at 24 months if immunocompetent
• Varicella, meningococcal, PCV7 and Tdap vaccines not recommended (insufficient data)

Vaccination of Household Contacts of Immunosuppressed Persons

• Healthy household contacts of immunosuppressed persons SHOULD receive MMR and varicella vaccines and annual influenza vaccination

Invalid Contraindications to Vaccination

• Minor illness
• Antimicrobial therapy
• Disease exposure or convalescence
• Pregnancy or immunosuppression in the household
• Breastfeeding
• Premature birth
• Non-vaccine-related allergies
• Nonanaphalactic allergy to vaccine component
• Family history (unrelated to immunosuppression)
• Need for TB skin testing

Invalid Contraindications Minor Illness

• Low grade fever
• Upper respiratory infection
• Otitis media
• Mild diarrhea

—Only one small study has suggested decreased efficacy of measles vaccine in children with URI
—Findings not replicated by multiple prior and subsequent studies
—No evidence of increased adverse reaction
Screening Questions

• Is the child sick today?
• Allergy to food, medication or vaccine?
• Serious reaction to a vaccine in the past?
• Has the child had a seizure or a brain problem?

Vaccination During Acute Illness

• No evidence that acute illness reduces vaccine efficacy or increases vaccine adverse reactions
• Vaccines should be delayed until the illness has improved
• Mild illness, such as otitis media or an upper respiratory infection, is NOT a contraindication to vaccination

Screening Questions

• Does the child have cancer, leukemia, AIDS, or any other immune system problem?
• Has the child taken cortisone, prednisone, other steroids, or anticancer drugs, or had x-ray treatments in the past 3 months?
• Has the child received a transfusion of blood or blood products, or been given a medicine called immune or gamma globulin in the past year?

Screening Questions

• Is the child or teen pregnant, or is there a chance she could become pregnant during the next month?
• Has the child received any vaccinations in the past 4 weeks?

Screening Questions

• Standardized screening questionnaires are available from many state immunization programs, and from the Immunization Action Coalition website at <http://www.immunize.org>

National Immunization Program

Contact Information

• Telephone 800.CDC.INFO
• Email nipinfo@cdc.gov
• Website www.cdc.gov/nip