Immunizations Across the Lifespan: Updates and Standards for Immunization

April 12, 2011
Southwestern PA Immunization Coalition Conference
Donna L. Weaver, RN, MN
Nurse Educator

Immunization Schedule for Persons Aged 0 Through 6 Years - 2011

Immunization Schedule for Persons Aged 7 Through 18 Years - 2011
Catch-up Immunization Schedules

Pneumococcal Conjugate Vaccine, 13-valent (PCV13)

- Contains the same serotypes of *S. pneumoniae* as PCV7 plus 6 additional serotypes (including 19A)
- Approved by FDA for use among children 6 weeks through 71 months of age
- Same 4-dose schedule as PCV7

MMWR 2010; 59 (No. 6):258-61

ACIP Recommendations for PCV13 Supplemental Dose

- A single supplemental dose of PCV13 is recommended for children who have received a complete age-appropriate series of PCV7
  - healthy children 14 through 59 months
  - children with an underlying medical condition 14 through 71 months (including those who have already received a dose of PPSV)

MMWR 2010; 59 (No. RR-11):1-19
ACIP Recommendations for PCV13 Supplemental Dose

- A single dose of PCV13 may be administered to children 6 through 18 years of age who are at increased risk for invasive pneumococcal disease*
  - functional or anatomic asplenia, including sickle cell disease
  - HIV infection and other immunocompromising conditions
  - cochlear implant
  - CSF leak

*off-label recommendation. MMWR 2010: 59 (No. RR-11):1-19

Influenza Vaccine

- Children 6 months through 8 years should receive 2 doses if they
  - are receiving seasonal influenza vaccine for the first time, or
  - were vaccinated for the first time during the previous influenza season but only received 1 dose, or
  - received no doses of monovalent 2009 H1N1 vaccine

- All other children 6 months through 8 years should receive 1 dose
- Persons 9 years of age and older should receive 1 dose

MMWR 2010:59(RR-8)
Influenza Virus Surveillance, 2010-2011

- Influenza A (H3N2) viruses have predominated circulation nationally during the 2010-11 season
- All influenza types and subtypes have been identified at high level
- The majority of viruses isolated to date have matched those chosen for the 2010-2011 influenza vaccine

Influenza Vaccine

- Influenza vaccine strains selected for 2011-12
  - an A/California/7/2009 (H1N1)-like virus;
  - an A/Perth/16/2009 (H3N2)-like virus
  - a B/Brisbane/60/2008-like virus
Tdap

- Tdap reduces the risk of pertussis by 60% - 80%
- Tdap approved ages
  - 10 through 64 years for Boostrix
  - 11 through 64 years for Adacel
- Tdap not approved by the Food and Drug Administration for children 7 years through 9 years or adults 65 years or older


Tdap Recommendations for Adolescents

- Persons 11 through 18 years of age who have not received Tdap should receive a dose followed by Td booster doses every 10 years
- Adolescents should preferably receive Tdap at the 11 to 12 year-old preventive healthcare visit

MMWR 2011; 60 (No.1):13-5

New Tdap Recommendations for Adolescents*

- Persons 7 through 10 years of age who are not fully immunized against pertussis (including those never vaccinated or with unknown pertussis vaccination status) should receive a single dose of Tdap

*off-label recommendation. MMWR 2011; 60 (No.1):13-5
New Tdap Recommendations for Adolescents

- "Not fully immunized"
  - fewer than 4 doses of DTaP
  - 4 doses of DTaP and last dose was prior to age 4 years

Meningococcal Conjugate Vaccine (MCV4) Issues

- Inadequate response to a single dose of MCV4
  - routine 2-dose primary series

- Waning immunity following 1 dose of MCV4
  - revaccination of some MCV4 recipients

New Tdap Recommendations*

- Tdap can be administered regardless of the interval since the last tetanus and diphtheria containing vaccine

- ACIP concluded that while longer intervals between Td and Tdap vaccination could decrease the occurrence of local reactions, the benefits of protection against pertussis outweigh the potential risk for adverse events

*off-label recommendation. MMWR 2011; 60 (No.1):13-5
Persons at Highest Risk of Meningococcal Disease or Suboptimal Vaccine Response

- **Complement deficiency**
  - very high antibody titer required to compensate for complement deficiency
- **Asplenia**
  - evidence of suboptimal response
- **HIV infection**
  - evidence of suboptimal response
- **Single dose primary series may not be sufficient to confer protection for persons with these high-risk conditions**

New MCV4 Recommendations

- **Administer 2 doses of MCV4 at least 8 weeks apart to persons with persistent complement component deficiency and anatomic or functional asplenia, and 1 dose every 5 years thereafter**

*off-label recommendation. MMWR 2011; 60 (No.2): 72-6

New MCV4 Recommendations

- **HIV infection, without another risk factor present, is not a medical indication for meningococcal vaccination**
- **However, some persons with HIV infection should receive MCV4 (adolescents, some international travelers, microbiologists, etc)**
- **Persons with HIV infection who are vaccinated with MCV4 should receive 2 doses at least 8 weeks apart**

MMWR 2011; 60 (No.2): 72-6
New MCV4 Recommendations

- Persons with complement component deficiency, asplenia and HIV who previously received 1 dose should receive a second dose at the earliest opportunity

*off-label recommendation. MMWR 2011; 60 (No.2): 72-6

---

MCV4 Revaccination

- In its 2005 recommendations for MCV, ACIP made no recommendation about revaccination pending the availability of additional data

- Serologic data are now available that show significant decline in antibody 3-5 years after vaccination although few "breakthrough" cases have been reported

MMWR 2009;58(No. 37):1042-3

---

New MCV4 Recommendations*

- New recommendations
  - administer MCV4 at age 11 or 12 years with a booster dose at 16 years of age
  - administer 1 dose at age 13 through 15 years if not previously vaccinated
  - for persons vaccinated at age 13 through 15 years administer a 1-time booster dose is recommended, preferably at or after 16 through 18 years of age

*off-label recommendation. MMWR 2011; 60 (No.2): 72-6
New MCV4
Adolescent Vaccination Recommendations

- The minimum interval between doses is 8 weeks
- A booster dose is not recommended for healthy persons if the first dose is administered at 16-21 years of age
- A booster dose is not recommended for healthy persons persons 22 years or older even if the first dose is administered at 11-15 years of age
- The booster dose should always be MCV4 (not MPSV4)

<table>
<thead>
<tr>
<th>TABLE 1. Summary of meningococcal vaccine recommendations, by risk group – Advisory Committee on Immunization Practices (ACIP), 2010</th>
<th>Primary dose(s)</th>
<th>Booster dose(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Persons aged 11 through 15 years</td>
<td>1 dose, preferably within 1 or 2 years</td>
<td>A booster dose when the first dose is administered at 11 through 15 years</td>
</tr>
<tr>
<td>Individuals in the same age group</td>
<td>2 doses, second dose at least 8 weeks after the first dose</td>
<td>No booster needed if dose is at or after age 16 years</td>
</tr>
<tr>
<td>Persons aged 16 through 19 years and highly vaccinated groups (e.g., military recruits, college students)</td>
<td>2 doses, second dose at least 8 weeks after the first dose</td>
<td>No booster needed if dose is at or after age 16 years</td>
</tr>
<tr>
<td>Persons aged 20 through 55 years (e.g., World War II veterans, military recruits, college students, indigenous populations)</td>
<td>1 dose</td>
<td>A booster dose when the first dose is administered at 16 through 21 years</td>
</tr>
<tr>
<td>Other high-risk persons recommended for revaccination</td>
<td>1 dose</td>
<td>A booster dose when the first dose is administered at 16 through 21 years</td>
</tr>
</tbody>
</table>

MMWR 2011; 60 (No.2): 72-6

MCV Revaccination Recommendations*

- Other high-risk persons recommended for revaccination
  - microbiologists with prolonged exposure to Neisseria meningitidis
  - frequent travelers to or persons living in areas with high rates of meningococcal disease
- Revaccinate every 5 years as long as the person remains at increased risk
  - MCV for persons 2 through 55 years of age
  - MPSV for persons 56 years and older

*off-label recommendation. MMWR 2009;58(No. 37):1042-3
Interchangeability of MCV4 Brands

- No data are available on the interchangeability of MCV4 brands
- Whenever feasible, the same brand of vaccine should be used for all doses of the vaccination series
- If vaccination providers do not know or have available the brand of vaccine previously administered, either vaccine can be used to continue or complete the series

MMWR 2011; 60 (No.2): 72-6

Menveo MCV Vaccine

- Approved for persons 2 through 55 years of age
- Lyophilized serogroup A vaccine reconstituted with liquid containing serogroups C, Y, and W135
- May be used for any person 2 through 55 years of age for whom MCV4 is indicated including revaccination

MMWR 2010;59(No.9):273

Menveo Vaccine Administration Errors

- Liquid C-Y-W135 component administered without using it to reconstitute the lyophilized A component
- Revaccination may not be needed
  - serogroup A disease is rare in the U.S. so revaccination not needed if the person does not plan to travel outside the U.S.
  - revaccinate (no minimum interval) if international travel anticipated especially to Africa
Adults Need Immunizations Too!

- 45,000 adults will die of vaccine preventable diseases this year
- Immunization status needs to be assessed throughout a person’s life
- Many childhood diseases can be more serious health threats for adults

Vaccination Coverage Among U.S. Adults 2009 National Health Interview Survey

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>% Vaccinated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Influenza</td>
<td></td>
</tr>
<tr>
<td>19-49 years, high risk (1,067)</td>
<td>33.4</td>
</tr>
<tr>
<td>50-64 years (1,119)</td>
<td>60.1</td>
</tr>
<tr>
<td>≥65 years (3,444)</td>
<td>65.6</td>
</tr>
<tr>
<td>Healthcare Workers (1,207)</td>
<td>52.9</td>
</tr>
<tr>
<td>Pneumococcal vaccine</td>
<td></td>
</tr>
<tr>
<td>19-64 years, high risk (8,070)</td>
<td>17.5</td>
</tr>
<tr>
<td>≥65 years (5,275)</td>
<td>60.6</td>
</tr>
<tr>
<td>Tetanus Toxoid in past 10 years</td>
<td></td>
</tr>
<tr>
<td>19-49 (14,378)</td>
<td>63.1</td>
</tr>
<tr>
<td>50-64 (8,540)</td>
<td>62.8</td>
</tr>
<tr>
<td>≥65 (5,132)</td>
<td>52.8</td>
</tr>
<tr>
<td>Proportion of Tetanus Toxoid that was given as Tdap</td>
<td>50.8</td>
</tr>
</tbody>
</table>

www.cdc.gov/vaccines/stats-surv/nhis/2009-nhis.htm
Changes in the 2011 Adult Schedule

- Universal influenza vaccination
- Re-ordered list of vaccines to keep all universally-recommended vaccines together
- Restarting vaccination series
- Revaccination with PPSV23
- Meningococcal conjugate 2-dose series
- Permissive use of Tdap vaccine in adults ≥65 years and removal of minimal interval
Rationale: Recommendation to Vaccinate All Persons 6 Months of Age or Older

- Morbidity and mortality occurs in all age groups, including among adults 19-49 years of age
- Some persons who have influenza complications
  - have no previously identified risk factors
  - have risk factors but are unaware that they should be vaccinated, or
  - might be at risk due to newly identified risk factors
- Simplicity

MMWR 2010;59(RR-8)

2011 Adult Schedule

Changes in the 2011 Adult Schedule

- Universal influenza vaccination
- Re-ordered list of vaccines to keep all universally-recommended vaccines together
- Restarting vaccination series
- Revaccination with PPSV
- Meningococcal conjugate 2-dose series
- Permissive use of Tdap vaccine in adults ≥65 years and removal of minimal interval
Changes in the 2011 Schedule

- Universal influenza vaccination
- Re-ordered list of vaccines to keep all universally-recommended vaccines together
- Restarting vaccination series
- Revaccination with PPSV
- Meningococcal conjugate 2-dose series
- Permissive use of Tdap vaccine in adults >65 years and removal of minimal interval
Changes in the 2011 Adult Schedule

- Restarting vaccination series statement
- Added to box below Fig 2
  - For all vaccines being recommended on the adult immunization schedule: a vaccine series does not need to be restarted, regardless of the time that has elapsed between doses
- Has been more of issue with HPV vaccine but really applies all vaccines

Pneumococcal Polysaccharide Vaccine Revaccination

- Clarifies that revaccination applies to persons up to 64 years who are at highest risk of serious pneumococcal disease
- Single revaccination dose at least 5 years after the first dose
- NO more than 2 lifetime doses
  - Even if both are administered prior to 65 years of age
- Revaccination of persons 65 years or older is not recommended

Pneumococcal Polysaccharide Vaccine Candidates for Revaccination

- Persons 2 through 64 years with:
  - functional or anatomic asplenia
  - immunosuppression
  - transplant
  - chronic renal failure
  - nephrotic syndrome
- Persons vaccinated at younger than 65 years of age

MMWR 1997;46(RR-8):1-24
Review of Pneumococcal Polysaccharide Vaccine Recommendations

- Routine pneumococcal polysaccharide vaccination is recommended for adults 19 through 64 years of age:
  - with asthma
  - who smoke cigarette
- Data are insufficient to recommend vaccination for persons younger than 19 years with asthma or who smoke

PPSV Clinical Resource

Immunization Action Coalition

New Meningococcal Recommendations

- 2-dose series of meningococcal conjugate vaccine is recommended for adults with anatomic or functional asplenia or persistent complement component deficiencies
  - Revaccination still recommended every 5 years for those who remain at increased risk *
- Single dose of meningococcal vaccine still recommended for those with other indications

MMWR 2011;60(03):72-76 * Does not apply to adults with HIV
How does MCV adolescent booster dose affect Adult Schedule?

- Adolescents who receive first dose of meningococcal vaccine at or after age 16 years do not need a booster dose
- Routine vaccination after age 21 years not recommended
- What about adolescents 19-21 yrs who have received no prior meningococcal vaccine?
  - NO, not routinely, but YES if college or university student

New Tdap Recommendations

- Permissive use of Tdap vaccine in adults aged 65 years and older
- Tdap vaccine can be administered regardless of how much time elapsed since most recent Td containing vaccine

Permissive Use of Tdap Vaccine in Persons 65 Years and Older

- Adults ≥65 years who have close contact with infant should receive Tdap
- Other adults ≥65 years may receive Tdap
- Based on data* showing comparable safety profile in >65 vs <65 year olds and evidence of immunogenicity

*unpublished data from vaccine trials
Recommendations Regarding Tdap in Adults 19 Through 65 Years

- Footnote reworded to emphasize giving Tdap as soon as feasible to:
  - Postpartum women
  - Close contacts of infants <12 months (e.g., grandparents, child-care providers)
  - Healthcare personnel with direct patient contact

Tdap and Healthcare Personnel (HCP)

- NEW- 2/23/2011
  Unvaccinated HCP, regardless of age*, should receive a single dose of Tdap as soon as feasible regardless of the time since last Td dose

*off-label recommendation. Approved by ACIP on Feb. 23, 2011)

Tdap and Healthcare Personnel (HCP)

- Hospitals and ambulatory-care facilities should provide Tdap for HCP and use approaches that maximize vaccination rates (e.g., education about benefits of vaccination, convenient access, & at no charge)

- Tdap is not currently licensed for multiple administrations. Vaccinated HCP should receive routine booster immunization against tetanus and diphtheria according to previously published guidelines
Clarifications to footnotes in Adult Schedule

- HPV footnote (#4) revised to indicate that either quadrivalent or bivalent vaccine is recommended for females
- MMR footnote (#6) revised by consolidating common language that previously had been part of each of three vaccine component sections
- Hib footnote (#12) shortened to clarify high risk indications and now consistent with child schedule wording

Rights of Medication Administration

- Right patient
- Right vaccine or diluent
- Right time
  (includes administering at correct age, appropriate interval, and before vaccine/diluent expiration)
- Right dosage
- Right route, needle length and technique
- Right site
- Right documentation

Right Patient

- What is the patient’s name? Has the patient received any immunizations under another name?
- What is the patient’s date of birth?
- Has the patient received any vaccines or shots at another clinic or healthcare facility recently?
- Do you have a copy of the patient’s immunization record?
### Right Vaccine - check the label at least 3 times

- DT, DTP, Td, Tdap, TT
- DTP-HepB-IPV, DTaP-IPV, DTaP-IPV/Hib
- Hib, Hib-HepB
- HepA, HepB, HepA-HepB
- HPV2, HPV4
- IPV
- LAIV, TIV
- MCV4, MPSV4
- MMR, MMRV
- PCV13, PPSV23
- RV1, RV5
- VAR, ZOS

### Right Vaccine – Common Mix-ups

<table>
<thead>
<tr>
<th>DT</th>
<th>Td (dT)</th>
<th>TST</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 wks thru 6 yrs</td>
<td>7 yrs and older</td>
<td>Not a vaccine</td>
</tr>
<tr>
<td>Schedule</td>
<td>Schedule</td>
<td>Schedule</td>
</tr>
<tr>
<td>Completion of 5 dose</td>
<td>2 doses + Tdap dose for primary series</td>
<td>As necessary to screen for tuberculosis</td>
</tr>
<tr>
<td>Diphtheria toxoid</td>
<td>Diphtheria toxoid (~1/3 amount in DT)</td>
<td>Contents</td>
</tr>
<tr>
<td>Tetanus toxoid</td>
<td>Tetanus toxoid (same amount as in DT)</td>
<td>Purified protein</td>
</tr>
<tr>
<td>Intramuscular (IM)</td>
<td>Intramuscular (IM)</td>
<td>Intradermal (ID)</td>
</tr>
</tbody>
</table>

### Right Vaccine – Common Mix-ups

<table>
<thead>
<tr>
<th>DTaP</th>
<th>Tdap</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 wks thru 6 yrs</td>
<td>10 yrs thru 64 yrs</td>
</tr>
<tr>
<td>Schedule</td>
<td>Schedule</td>
</tr>
<tr>
<td>5 doses</td>
<td>1 dose</td>
</tr>
<tr>
<td>Diphtheria toxoid</td>
<td>Diphtheria toxoid (~1/3 amount in DTaP)</td>
</tr>
<tr>
<td>Tetanus toxoid</td>
<td>Tetanus toxoid (same amount as in DTaP)</td>
</tr>
<tr>
<td>Pertussis antigens</td>
<td>Pertussis antigens (less than amount in DTaP)</td>
</tr>
<tr>
<td>Intramuscular (IM)</td>
<td>Intramuscular (IM)</td>
</tr>
</tbody>
</table>

Right Vaccine – Common Mix-ups

- **Hib booster vaccine ONLY**
  - Hib (Hiberix)

- **Must be at least 12 months of age* and**

- **Must have received at least one prior Hib dose**

- **Must be administered at least 2 months (8 weeks) after last primary Hib dose**

  *off-label

---

Right Vaccine – Common Mix-ups

- **HPV2 (Cervarix)**
  - 9 yrs thru 26 yrs*
  - Schedule 3 doses
  - Contents HPV types 16 & 18
  - Indications Prevention of cervical cancers in females
  - Intramuscular (IM)

  *off-label

- **HPV4 (Gardasil)**
  - 9 yrs thru 26 yrs
  - Schedule 3 doses
  - Contents HPV types 16, 18, 6 & 11
  - Indications Prevention of cervical, vaginal, and vulvar cancers in females and genital warts in females and males
  - Intramuscular (IM)

---

Right Vaccine – Common Mix-ups

- **VAR (Varivax)**
  - 12 mos and older
  - Schedule 2 doses
  - Contents Live attenuated varicella vaccine virus
  - Subcutaneous (subcut)

- **MMRV (ProQuad)**
  - 12 mos thru 12 yrs
  - Schedule 2 doses
  - Contents Live attenuated measles, mumps, rubella, and varicella vaccine virus (~7 times as much as in varicella vaccine)
  - Subcutaneous (subcut)

- **ZOS (Zostavax)**
  - 60 yrs and older
  - Schedule 1 dose
  - Contents Live attenuated varicella vaccine virus (~14 times as much as in varicella vaccine)
  - Subcutaneous (subcut)
## Right Diluent - check the label at least 3 times

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>Diluent</th>
<th>Lyophilized vaccine (Powder)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ActHIB</td>
<td>0.4% sodium chloride (sanofi)</td>
<td>Hib</td>
</tr>
<tr>
<td>Hibrex</td>
<td>0.9% sodium chloride (GSK)</td>
<td>Hib</td>
</tr>
<tr>
<td>MMR-ll</td>
<td>Sterile water (Merck)</td>
<td>MMR</td>
</tr>
<tr>
<td>Menomune</td>
<td>SDV - Distilled water, MDV - Distilled water + thimerosal (sanofi)</td>
<td>MPSV4</td>
</tr>
<tr>
<td>Menveo</td>
<td>MenCWT (Novartis)</td>
<td>MenA</td>
</tr>
</tbody>
</table>

## Right Diluent - check the label at least 3 times

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>Diluent</th>
<th>Lyophilized vaccine (Powder)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pentacel</td>
<td>DTaP-IPV (sanofi)</td>
<td>Hib (ActHIB)</td>
</tr>
<tr>
<td>ProQuad</td>
<td>Sterile water (Merck)</td>
<td>MMRV</td>
</tr>
<tr>
<td>Rotarix</td>
<td>Sterile water, calcium carbonate, and xanthan (GSK)</td>
<td>RV1</td>
</tr>
<tr>
<td>Varivax</td>
<td>Sterile water (Merck)</td>
<td>VAR</td>
</tr>
<tr>
<td>Zostavax</td>
<td>Sterile water (Merck)</td>
<td>ZOS</td>
</tr>
</tbody>
</table>

### And Remember ... NO Home Brews!!!

- Never attempt to make your own combination vaccines
- All combination vaccines will come to you already premixed with the exception of MCV4 (Menveo) and DTaP-IPV/Hib (Pentacel)
- Use only the specific diluent supplied by the manufacturer for their vaccine
Right Time

- Right age
- Right interval
- Before expiration date

Right Time – Right Age and Right Interval

- Recommended and minimum ages
- Recommended and minimum intervals
- 4-day grace period
- Repeat doses administered 5 or more days before the minimum age or interval


Right Time – Common Errors

- HepB
  - Only vaccine that can be given before 6 wks of age
  - Minimum of 4 wks between Dose 1 and Dose 2; 8 wks between Dose 2 and Dose 3; 16 wks between Dose 1 and Dose 3
  - Minimum age for Dose 3 is 24 wks
- Hib
  - Administering Hib before 6 wks of age can lead to immune tolerance and reduced response to subsequent doses of Hib
- Hib-HepB (Comvax)
  - Dose 3 should not be administered before 12 mos of age
Right Time – Common Errors

- **DTaP**
  - Minimum age for Dose 4 is 12 mos*
  - Minimum interval between Dose 3 and Dose 4 is 6 calendar mos
- **IPV**
  - Minimum age for Dose 4 is 4 yrs
  - Minimum interval between next-to-last and last dose is 6 calendar mos
- **DTaP-IPV (Kinrix)**
  - Only approved for Dose 5 of DTaP and Dose 4 of IPV
  - Only approved for children 4 through 6 yrs of age
- **DTaP-IPV/Hib (Pentacel)**
  - Only approved for first 4 doses of DTaP, IPV, and Hib
  - Only approved for children 6 wks through 4 yrs of age

- **MMR and VAR**
  - Minimum age for each of these vaccines is 12 mos
- **MMRV (ProQuad)**
  - Maximum age for this vaccine is 12 yrs of age
- **RV**
  - Dose 1 – should only administer between 6 wks and 14 wks 6 days of age.* Do not start series for infants aged 15 wks or older
  - Minimum interval between doses is 4 wks
  - Maximum age for last dose is 8 mos 0 days*

*off-label

---

Right Time - Check the Expiration Date

- If an expired dose of a live virus vaccine is administered, wait at least 4 weeks to repeat the dose
- If an expired dose is not a live vaccine, the dose should be repeated as soon as possible
Right Dosage – Check labels at least 3 times

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>Age</th>
<th>Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hepatitis A</td>
<td>12 mos thru 18 yrs</td>
<td>0.5 mL</td>
</tr>
<tr>
<td></td>
<td>19 yrs and older</td>
<td>1 mL</td>
</tr>
<tr>
<td>Hepatitis B</td>
<td>Birth thru 19 yrs</td>
<td>0.5 mL</td>
</tr>
<tr>
<td></td>
<td>20 yrs and older</td>
<td>1 mL</td>
</tr>
<tr>
<td>HepA-HepB</td>
<td>18 yrs and older</td>
<td>1 mL</td>
</tr>
</tbody>
</table>

Remember – Always use the age-appropriate dose!!!

The Right Dosage - Split or Partial Doses

- Split or partial (incomplete) doses are NOT valid doses
- Exceptions to partial doses
  - LAIV if person sneezes
  - RV if infant regurgitates, spits out, or vomits

Right Dosage - Common Errors

<table>
<thead>
<tr>
<th>Age</th>
<th>Dosage</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 through 35 months</td>
<td>0.25 mL</td>
</tr>
<tr>
<td>3 years and older</td>
<td>0.5 mL</td>
</tr>
</tbody>
</table>

- The correct dose of TIV is based on age
- Give 0.25 mL to children 6 mo-35 mo. If the child needs 2 doses, give 2 doses of 0.25 mL
- Give 0.5 mL to children 3 years of age & older. If the child needs 2 doses, give 2 doses of 0.5 mL
- All adults should be given 0.5 mL- no half doses!
Right Route for the Vaccine
Rotavirus Vaccine Oral (PO) Route

RV5 RotaTeq
RV1 Rotarix

Right Route for the Vaccine
Intranasal (NAS) Route

LAIV FluMist

- Deliver ½ dose (0.1 mL) in each naris

Right Route for the Vaccine
Subcutaneous (subcut) Injections

- MMR
- MMRV
- VAR
- ZOS
- MPSV4
- IPV (subcut or IM)
- PPSV23 (subcut or IM)
Right Needle Length and Technique for Subcutaneous (subcut) Injections

- Needle size: 23 - 25 gauge, 5/8”
- Dermis
- Fatty tissue (SubQ)
- Muscle tissue

Right Site for Subcutaneous (subcut) Injections

Right Route for the Vaccine Intramuscular (IM) Injections

- DTaP, DT, Tdap, Td, TT
- HepA, HepB
- Hib
- HPV2, HPV4
- Influenza (TIV)
- MCV4
- PCV7
- IPV (subcut or IM)
- PPSV23 (subcut or IM)
Right Needle Length and Technique for Intramuscular (IM) Injections

- Needle size: 22 – 25 gauge
- Newborn/Preterm
  - Anterolateral thigh - 5/8”
- Infant (1 through 12 mos)
  - Anterolateral thigh - 1”
- Toddler (1 - 2 yrs)
  - Anterolateral thigh - 1” - 1¼”
  - Deltoid - 5/8” - 1”
- Children (3–18 yrs)
  - Deltoid - 5/8” - 1”
  - Anterolateral thigh – 1” - 1¼”
- Adults (19 yrs and older)
  - Deltoid - 1” - 1½”
- Aspiration is NOT required

Right Site for Intramuscular (IM) Injections

Right Route – Common Errors

- Influenza vaccines administered by an incorrect route
  - Inactivated influenza vaccines (TIV) should be administered by the intramuscular (IM) route
  - Live attenuated influenza vaccine (LAIV, FluMist) should be administered by the intranasal (NAS) route
- Meningococcal vaccines administered by an incorrect route
  - Meningococcal polysaccharide vaccine (MPSV4, Menomune) should be administered by the subcutaneous (subcut) route
  - Meningococcal conjugate vaccines (MCV4, Menactra & Menveo) should be administered by the intramuscular (IM) route
- Rotavirus vaccines administered by an incorrect route
  - Rotavirus vaccines should be administered by the Oral (PO) route
Right Needle Length – Common Error

- Using a needle that is too short for the recommended route
  - Deviation from the recommended route may reduce vaccine efficacy or increase local adverse reactions
  - Longer needles associated with less redness or swelling than occurs with shorter needles because of injection into deeper muscle mass

For obese, vaccine needle size matters

NEW YORK (Reuters Health) - Our ever-expanding waistlines may have outgrown the doctor’s needle, researchers say, in what could be another casualty of the obesity epidemic.

In a new study, the researchers report that using a standard 1-inch needle to immunize obese

http://pediatrics.aappublications.org/cgi/reprint/125/3/e508

Right Site – Common Errors

- NEVER
  - Too High
  - Too Low
Right Documentation

- **Required documentation**
  - Date of administration
  - Vaccine manufacturer
  - Vaccine lot number
  - Name & title of person who administered vaccine & address of clinic or facility where permanent record will reside
  - Vaccine Information Statement (VIS)
    - date printed on the VIS
    - date VIS given to patient or parent/guardian

- **Recommended documentation**
  - Route
  - Site
  - Dosage

Vaccine Information Statements

- Every healthcare provider, public or private, who administers a vaccine covered by the National Childhood Vaccine Injury Act is required by law to provide a copy of the most current VIS with EACH DOSE of vaccine

http://www.cdc.gov/vaccines/pubs/vis/default.htm

Preventing Adverse Reactions

- **Screen for contraindications and precautions**

  - http://www.cdc.gov/vaccines/recs/vac-admin/contraindications.htm
Best Practices When Preparing for Vaccine Administration

- Hand hygiene
  - Wash hands before preparing vaccines for administration and between patients

- Opening the vial
  - Discard any single-dose vial at end of clinic day if rubber diaphragm is exposed

- Drawing up the vaccine
  - Not always necessary to use air displacement when drawing up vaccine
  - Never leave a needle in a multidose vial for drawing up multiple doses

Best Practices When Preparing for Vaccine Administration

- Filling syringes
  - CDC strongly discourages prefilling syringes
  - Unused syringes prefilled by provider should be discarded at end of clinic day

- Preparing manufacturer prefilled syringes
  - Sterile seal is broken when syringe cap is removed or needle is added to manufacturer prefilled syringes so discard at end of clinic day, even if unused

Don’ts of Vaccine Preparation

- Never combine vaccines into same syringe unless FDA-approved for combination
- Never transfer vaccine from one syringe to another
- Never combine partial doses from different vials to obtain a complete dose
Best Practices: Atraumatic Care

- Promote a sense of security and trust by:
  - having a positive attitude
  - using a soft and calm tone of voice
  - making eye contact, even with small children
  - explaining why vaccines are needed
    - “this medicine will protect you from getting sick” or “this shot is a shield to protect your body against infection”
  - being honest and explaining what to expect
    - do not say that the injection will not hurt

http://www.armtoollkit.org/talk/Helping_With_Pain_Vaccines.pdf

Best Practices: Making Injections Easier

- Assess strategies that worked in the past when vaccines were administered
  - Distraction techniques
  - Positioning techniques
  - Comfort measures
- Review topical medications used to decrease injection site pain if available
- Discuss pain management during after care instructions

Administer Vaccines SAFELY!

http://www.eziz.org/PDF/IMM-720ES.pdf
Administer Vaccines SAFELY!

- Have patients seated for vaccination
- Consider observing patients for 15 minutes after they are vaccinated
- If syncope develops, patients should be observed until symptoms resolve

http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5717a2.htm

Antipyretics and Vaccine Administration

- "The evidence does not support use of antipyretics before or at the time of vaccination, but they can be used for the treatment of fever that might occur following vaccination. Studies of children with previous febrile seizures have not demonstrated antipyretics to be effective in the prevention of febrile seizures (ref AAP Steering Committee on Quality Improvement and Management, Subcommittee on Febrile Seizures, Pediatrics, 2008)."

Multiple Vaccinations

- Use the thigh for multiple IM injections in infants and young children
- The deltoid muscle can be used for older children and adults
- Separate each injection by at least 1"
- Administer vaccine and immune globulin at separate sites
- Combination vaccines can reduce the number of injections needed
- Use injection site map for consistent site selection

http://www.aimtoolkit.org/children_immun.htm
Recent Off-label Recommendations
- Pneumococcal polysaccharide vaccine and Zoster vaccine at same visit
  - Merck revised Zostavax PI Dec 2009 (concerns of lower VZV titers)
  - CDC has NOT changed its recommendations for either vaccine, continue to administer both at the same visit if indicated

Managing Acute Vaccine Reactions
- Have procedures in place for emergencies
- Staff should be familiar with signs and symptoms of anaphylaxis
- All staff should know their role in an emergency
- Vaccinators should be trained in CPR
- At a minimum, have epinephrine and equipment to maintain airway on hand
- Stabilize patient and transfer to emergency facility for further evaluation and treatment

Strategies to Prevent Administration Errors
- Strict adherence to “Rights of Medication Administration”
- Ongoing training and education of staff
- Involve staff in selection of vaccine products
- Keep current reference materials available on each vaccine
- Rotate vaccines with the shortest expiration dates in the front and remove and discard any expired vaccine

http://www.immunize.org/handouts/vaccine-reactions.asp
Strategies to Prevent Administration Errors

- Label vaccines clearly and do not store look-alike and sound-alike vaccines next to each other
- Administer only vaccines you have prepared
- Triple check your work BEFORE administering vaccine
- Counsel parents and patients on vaccines to be administered and importance of maintaining immunization records for family members
- Screen patients EVERY time a vaccine dose is administered

Vaccine Administration Resources

- ACIP General Recommendations on Immunization
- Immunization Action Coalition
- California EZIZ Vaccine Administration Training and Job Aids
- Michigan Immunization Toolkit
  - http://www.aimtoolkit.org/

CDC Vaccines and Immunization Contact Information

- Telephone 800.CDC.INFO
  (for patients and parents)
- Email nipinfo@cdc.gov
  (for providers)
- Website www.cdc.gov/vaccines/
- Vaccine Safety www.cdc.gov/od/science/iso/