General Recommendations on Immunization
Part Two and Vaccination Safety
General Best Practice Guidelines = General Recommendations

Vaccine Recommendations and Guidelines of the ACIP

General Best Practice Guidelines for Immunization

Best Practices Guidance of the Advisory Committee on Immunization Practices (ACIP)

Kroger AT, Duchin J, Vázquez M

Printer friendly version

INTRODUCTION
Purpose and topics covered in this report...

METHODS
Method of development: Timing and Spacing, Contraindications and Precautions, Preventing and Managing Adverse Reactions...

TIMING AND SPACING OF IMMUNOBIOLOGICS
Vaccine scheduling, supply and lapsed schedule, spacing of doses, simultaneous and nonsimultaneous administration, licensed combination vaccines, interchangeability of formulations, extra doses, conjugate vaccines...
General Recommendations on Immunization

- ACIP MMWR Table of Contents
  - Timing and spacing
  - Contraindications and precautions
  - Preventing and managing adverse reactions to immunization
  - Vaccine administration
  - Storage and handling
  - Altered immunocompetence
  - Special situations
  - Vaccination records
  - Vaccination programs
  - Vaccine information sources
General Recommendations on Immunization

- A chapter in the Pink Book
  - Timing and spacing
  - Contraindications and precautions
General Recommendations on Immunization

- A chapter in the Pink Book
  - Timing and spacing
  - Contraindications and precautions
    - Screening
Screening

- Specific questions intended to identify contraindications or precautions to vaccination

- Screening must occur at every immunization encounter (not just before the first dose)

- Use of a standardized form will facilitate effective screening

- Following questions written from the perspective of the pediatric patient, but can be adjusted for the adult patient
Screening Questions

- Is the child sick today?

- Does the child have an allergy to any medications, food, or any vaccine?

- Has the child had a serious reaction to a vaccine in the past?
Screening Questions

- Has the child had a seizure, brain, or nerve problem?

- Has the child had a health problem with asthma, lung disease, heart disease, kidney disease, metabolic disease (such as diabetes), or a blood disorder?
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 medications, or had x-ray treatments in the past 3 months?
Screening Questions

- Has the child received a transfusion of blood or blood products, or been given a medicine called immune (gamma) globulin in the past year?

- Is the child/teen pregnant or is there a chance she could become pregnant during the next month?

- Has the child received vaccinations in the past 4 weeks?
Screening Questionnaire for Child and Teen Immunization

For parents/guardians: The following questions will help us determine which vaccines your child may be given today. If you answer “yes” to any question, it does not necessarily mean your child should not be vaccinated. It just means additional questions must be asked. If a question is not clear, please ask your healthcare provider to explain it.

1. Is the child sick today? [ ] No [ ] Yes [ ] I don’t know

2. Does the child have allergies to medications, foods, a vaccine component, or latex? [ ] No [ ] Yes [ ] I don’t know

3. Has the child had a serious reaction to a vaccine in the past? [ ] No [ ] Yes [ ] I don’t know

4. Has the child had a health problem with lung, heart, kidney or metabolic disease (e.g., diabetes, asthma, or a blood disorder) is he/she on long-term aspirin therapy? [ ] No [ ] Yes [ ] I don’t know

5. If the child is to be vaccinated between the ages of 2 and 4 years, has a healthcare provider told you that the child had wheezing in the past 12 months? [ ] Yes [ ] No [ ] I don’t know

6. Has the child, a sibling, or a parent a stenurtense? Has the child had a history of other nervous system problems? [ ] Yes [ ] No [ ] I don’t know

7. Does the child have cancer, leukemia, AIDS, or any other immune system problem? [ ] Yes [ ] No [ ] I don’t know

8. In the past 3 months, has the child taken corticosteroids, prednisone, other steroids, or narcotic drugs, or had radiation treatments? [ ] Yes [ ] No [ ] I don’t know

9. In the past year, has the child received a transfusion of blood or blood products, or been given immune gamma globulin or an antirabies drug? [ ] Yes [ ] No [ ] I don’t know

10. Is the child pregnant or is there a chance she could become pregnant during the next month? [ ] Yes [ ] No [ ] I don’t know

11. Has the child received vaccinations in the past 4 weeks? [ ] Yes [ ] No [ ] I don’t know

Form completed by: ____________________________ Date: ____________________________

Form reviewed by: ____________________________ Date: ____________________________

Did you bring your child’s immunization record card with you? [ ] Yes [ ] No

It is important to have a personal record of your child’s vaccinations. If you don’t have a personal record, ask the child’s healthcare provider to give you one with all the records. Keep this record in a safe place and bring it with you every time you seek medical care for your child. Your child’s record will be the most important document for him or her for the rest of his or her life.
Invalid Contraindications

- **Mild Illness**
  - Vaccinate with:
    - Low grade fever
    - Upper respiratory infection
    - Otitis media
    - Mild diarrhea
Household Contacts and Pregnancy

- Susceptible household contacts of pregnant women
  - SHOULD receive MMR and varicella vaccines
  - SHOULD receive either non-live influenza or LAIV
  - SHOULD receive zoster and rotavirus vaccines if eligible
Invalid Contraindications

- **Preterm Birth (less than 37 weeks)**
  - Generally, infants and children should be vaccinated according to chronologic age (not gestational age)
  - Use full recommended dose
  - Birth weight and size not factors but, as with all rules, there are exceptions (HepB)
Vaccine Safety
Comparison of 20th Century Annual Morbidity and Current Morbidity: Vaccine-Preventable Diseases

<table>
<thead>
<tr>
<th>Disease</th>
<th>20th Century Annual Morbidity†</th>
<th>2014 Reported Cases † †</th>
<th>Percent Decrease</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diphtheria</td>
<td>21,053</td>
<td>1</td>
<td>&gt; 99%</td>
</tr>
<tr>
<td>Measles</td>
<td>530,217</td>
<td>628</td>
<td>&gt; 99%</td>
</tr>
<tr>
<td>Mumps</td>
<td>162,344</td>
<td>1,151</td>
<td>99%</td>
</tr>
<tr>
<td>Pertussis</td>
<td>200,752</td>
<td>32,971</td>
<td>86%</td>
</tr>
<tr>
<td>Polio (paralytic)</td>
<td>16,316</td>
<td>0</td>
<td>100%</td>
</tr>
<tr>
<td>Rubella</td>
<td>47,745</td>
<td>8</td>
<td>&gt; 99%</td>
</tr>
<tr>
<td>Congenital Rubella Syndrome</td>
<td>152</td>
<td>0</td>
<td>100%</td>
</tr>
<tr>
<td>Tetanus</td>
<td>580</td>
<td>21</td>
<td>96%</td>
</tr>
<tr>
<td><em>Haemophilus influenzae</em></td>
<td>20,000</td>
<td>27*</td>
<td>&gt; 99%</td>
</tr>
<tr>
<td>Total</td>
<td>999,159</td>
<td>34,807</td>
<td>97%</td>
</tr>
</tbody>
</table>

Vaccine Adverse Events

| Vaccine Adverse Events        | Not available                  | ~30,000                 | Not available   |

†† CDC. MMWR January 9, 2015 / 63(53);ND-733-ND-746. (MMWR 2014 provisional week 53 data)

* Haemophilus influenzae type b (Hib) < 5 years of age. An additional 12 cases of Hib are estimated to have occurred among the 226 reports of Hi (< 5 years of age) with unknown serotype.
Importance of Vaccine Safety

- Vaccinations universally recommended or mandated

- Ongoing safety monitoring needed for the development of sound policies and recommendations
Importance of Vaccine Safety

- Decreases in disease risks and increased attention on vaccine risks

- Public confidence in vaccine safety is critical
  - Higher standard of safety is expected of vaccines
  - Vaccinees generally healthy (vs. ill for medications)
  - Lower risk tolerance = need to search for rare reactions
  - Vaccination universally recommended and mandated
What is “Safe”?  

- SAFE = No harm from the vaccine?  
  No vaccine is 100% safe

- SAFE = No harm from the disease?  
  No vaccine is 100% effective

- Remind parents that to do nothing is to take a risk
Pre-licensure Vaccine Safety Studies

- Laboratory
- Animals
- Humans
Pre-licensure Human Studies

- Phase I, II, III trials

- Phase III trials usually include a control group which receive a placebo

- Common reactions are identified

- Most Phase III trials include 2,000 to 5,000 participants

- Largest recent Phase III trial was REST (rotavirus) – around 70,000 infants
Post-licensure Surveillance

- Identify rare reactions
- Monitor increases in known reactions - Identify risk factors for reactions
- Identify vaccine lots with increased rates of reactions
- Identify “signals” – reports of adverse events more numerous than would be expected
Vaccine Adverse Event Reporting System (VAERS)

- Jointly administered by CDC and FDA
- National reporting system
- Receives ~30,000 reports per year
- Passive - depends on healthcare providers and others to report

https://vaers.hhs.gov/index
Vaccine Adverse Event Reporting System (VAERS)

- Detects:
  - New or rare events
  - Increases in rates of known events
  - Patient risk factors

- VAERS cannot establish causality
  - Additional studies required to confirm VAERS signals and causality

- Not all reports of adverse events are causally related to vaccine

- Reportable Events Table (PinkBook Appendix D-2)
Post hoc ergo propter hoc

“After this therefore because of this”

- Temporal association does not prove causation
- Just because one event follows another does not mean that the first caused the second
### Elements Needed To Assess Correlation of Vaccine Adverse Events

<table>
<thead>
<tr>
<th>Disease</th>
<th>No disease</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vaccine</td>
<td>a</td>
</tr>
<tr>
<td>No vaccine</td>
<td>c</td>
</tr>
</tbody>
</table>

Rate in “vaccine” group

\[
\text{Rate in “vaccine” group} = \frac{a}{a + b}
\]

Rate in “no vaccine” group

\[
\text{Rate in “no vaccine” group} = \frac{c}{c + d}
\]

If the rate in “vaccine” group is higher than the rate in the “no vaccine” group, then vaccines may be the cause

<table>
<thead>
<tr>
<th></th>
<th>ASD</th>
<th>No ASD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vaccine</td>
<td>345</td>
<td>440,310</td>
</tr>
<tr>
<td>No vaccine</td>
<td>77</td>
<td>96,571</td>
</tr>
</tbody>
</table>

Risk in “vaccine” group = \[
\frac{7.83}{10,000} = 7.96/10,000
\]

Relative Risk = 0.98

Post-licensure Vaccine Safety Activities

- Phase IV Trials
  - ~10,000 participants
  - Better but still limited

- Vaccine Safety Data Link (Large Linked Databases)

- Clinical Immunization Safety Assessment Project
Vaccine Safety Datalink

- Vaccine Safety Datalink (Large linked database):
  - Links vaccination and health records
  - Partnership with large health plans: population under “active surveillance”
    - 9 HMOs
    - 3% (~10 million) of U.S. population

- Plans, executes immunization safety studies

- Investigates hypotheses from medical literature, VAERS reports, changes in schedules, introduction of new vaccines
- Improve understanding of vaccine safety issues at individual level

- Evaluate individual cases with adverse health events

- Develop strategies to assess individuals

- Conduct studies to identify risk factors
Vaccine Injury Compensation Program

- Established by National Childhood Vaccine Injury Act (1986)  
  http://www.hrsa.gov/vaccinecompensation/index.html

- “No fault” program

- Covers all routinely recommended childhood vaccines

- Vaccine Injury Table (Appendix D-5,D-6)
The Provider’s Role

- Immunization providers can help ensure the safety and efficacy of vaccines through proper:
  - vaccine storage and administration
  - timing and spacing of vaccine doses
  - screening of contraindications and precautions
  - management of adverse reactions
  - reporting to VAERS
  - benefit and risk communication
Benefit and Risk Communication

- Opportunities for questions should be provided before each vaccination

- Vaccine Information Statements (VISs)
  - Must be provided before each dose of vaccine
  - Public and private providers
  - Available in multiple languages
Fighting for My Autistic Son

In an emotional memoir, the star describes Evan's devastating diagnosis, his surprising breakthrough—and how Jim Carrey helped her heal.
Jennifer Lopez

WHOOPING COUGH

Campbell Brown
Communicating with Parents

- For providers:
  - If provider recommends it, parents more likely to follow
  - Ask, acknowledge, and advise
  - Start at prenatal visit, develop trust
  - Offer reliable resources
  - Know the science
  - Do not get defensive
Multiple population-based studies have examined the rate of autism among vaccinated and unvaccinated children.

Available evidence does not indicate that autism is more common among children who receive MMR or thimerosal-containing vaccines than among children who do not receive vaccines.
Studies of Autism and Vaccines*


*Partial listing of representative studies
... given what the scientific literature tells us today, there is no evidence that thimerosal or the MMR vaccine cause autism. Evidence does not support the theory that vaccines are causing an autism epidemic.

- Dr. Geri Dawson, July 30, 2009
Committee findings:
- CAUSAL RELATIONSHIP between some vaccines and adverse events
  • MMR, VZV, Influenza, etc., and anaphylaxis
- REJECTION OF 5 RELATIONSHIPS
  • Including MMR and autism, TIV and asthma

Overall, the committee concluded that few health problems are caused by, or clearly associated with, vaccines
Communicating with Parents

- What parents want:
  - Delayed vs. alternate schedules
  - Facts and statistics
  - Trust good websites
  - Do not want to be talked down to
  - Unbiased, non-coercive, credible, non-judgmental information
Childhood Immunization Schedule and Safety

- **Institute of Medicine - Mission**
  - Review scientific findings and stakeholder concerns related to the safety of the recommended childhood immunization schedule
  - Identify potential research approaches, methodologies, and study designs that could inform this question
  - Issue a summary report

- **Findings**
  - IOM committee finds no evidence that the schedule is unsafe
  - Following the complete childhood immunization schedule is strongly associated with reducing vaccine-preventable diseases
  - Committee calls for continued study of the immunization schedule using existing data systems

www.iom.edu/childimmunizationschedule
Vaccine Adverse Event Reporting System (VAERS) and VAERS reporting form

- **VAERS**
  - National spontaneous reporting system for monitoring the safety of U.S.-licensed vaccines
  - Co-managed by CDC and FDA

- **VAERS form**
  - VAERS-1 form in use since 1990
  - Paper version* of this form must be filled out by hand and mailed or faxed
  - Online reporting tool allows for web-based reporting

*VAERS-1 form is a PDF that does not have writable and savable features
Vaccine Adverse Event Reporting System (VAERS) 2.0

- Consists of two major initiatives
  - New VAERS form (VAERS 2.0) with revised data elements
    - Includes pregnancy status, race and ethnicity
  - Updated processes for submitting VAERS reports
    - Option 1: updated online reporting tool (preferred)
    - Option 2: writable PDF form combined with electronic document upload capability
Reporting using the VAERS 2.0 form

- June 30 - December 31, 2017: CDC and FDA are implementing the VAERS 2.0 form and phasing out the VAERS-1 form

- Reporting by:
  - Healthcare professionals, patients, parents, guardians, caregivers, and other non-manufacturer reporters

- Submitting reports:
  - Direct online reporting - use the VAERS 2.0 online reporting tool
  - Download and complete the writable and savable VAERS 2.0 form - use an electronic document upload feature
Partial screen shot of VAERS 2.0 online reporting tool (direct online reporting)

“Essential” items (high value data elements) highlighted with asterisks in the online reporting tool and with yellow boxes in the writable PDF form
Instructions for reporting to VAERS at https://vaers.hhs.gov/reportevent.html

Additional assistance
- Email at info@vaers.org
- Phone at 1-800-822-7967

Transition to the VAERS 2.0 form expected to be completed by the end of December 2017