Immunization Update: Controversies, Facts and Myths

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Objectives

- Immunization Schedule
  - Determination of immune status: Make a vaccine plan!
- Update on Vaccine Preventable Diseases
- Controversies, Facts and Myths
- Vaccine Update
- Questions
Vaccines Work

Table 1. Impact of vaccines on vaccine-preventable diseases in the United States compared to the pre-vaccine era.

<table>
<thead>
<tr>
<th>Disease</th>
<th>Reported Illness before Vaccine</th>
<th>Reported cases 2009</th>
<th>Percent Decrease</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smallpox</td>
<td>29,005</td>
<td>0</td>
<td>100%</td>
</tr>
<tr>
<td>Diphtheria</td>
<td>21,053</td>
<td>0</td>
<td>100%</td>
</tr>
<tr>
<td>Polio (paralytic)</td>
<td>16,316</td>
<td>1</td>
<td>&gt; 99%</td>
</tr>
<tr>
<td>Measles</td>
<td>530,217</td>
<td>71</td>
<td>&gt; 99%</td>
</tr>
<tr>
<td>Rubella</td>
<td>47,745</td>
<td>3</td>
<td>&gt; 99%</td>
</tr>
<tr>
<td>Congenital Rubella Syndrome</td>
<td>152</td>
<td>2</td>
<td>99%</td>
</tr>
<tr>
<td>Haemophilus influenza (Hib)</td>
<td>20,000</td>
<td>213</td>
<td>99%</td>
</tr>
<tr>
<td>Mumps</td>
<td>162,344</td>
<td>1,991</td>
<td>99%</td>
</tr>
<tr>
<td>Tetanus</td>
<td>580</td>
<td>18</td>
<td>97%</td>
</tr>
<tr>
<td>Pertussis (whooping cough)</td>
<td>200,752</td>
<td>16,858</td>
<td>92%</td>
</tr>
</tbody>
</table>
Figure 1. Recommended immunization schedule for persons aged 0 through 18 years – United States, 2015. (FOR THOSE WHO FALL BEHIND OR START LATE, SEE THE CATCH-UP SCHEDULE [FIGURE 2]). These recommendations must be read with the footnotes that follow. For those who fall behind or start late, provide catch-up vaccination at the earliest opportunity as indicated by the green bars in Figure 1. To determine minimum intervals between doses, see the catch-up schedule (Figure 2). School entry and adolescent vaccine age groups are shaded.

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>Birth</th>
<th>1 mo</th>
<th>2 mos</th>
<th>4 mos</th>
<th>6 mos</th>
<th>9 mos</th>
<th>12 mos</th>
<th>15 mos</th>
<th>18 mos</th>
<th>19-23 mos</th>
<th>2-3 yrs</th>
<th>4-6 yrs</th>
<th>7-10 yrs</th>
<th>11-12 yrs</th>
<th>13-15 yrs</th>
<th>16-18 yrs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hepatitis B (HepB)</td>
<td>1st dose</td>
<td>2nd dose</td>
<td>3rd dose</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Rotavirus (RotaV)</td>
<td>1st dose</td>
<td>2nd dose</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Diphtheria, tetanus, &amp; acellular pertussis (DTaP)</td>
<td>1st dose</td>
<td>2nd dose</td>
<td>3rd dose</td>
<td></td>
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<tr>
<td>Tetanus, diphtheria, &amp; acellular pertussis (Tdap)</td>
<td>1st dose</td>
<td>2nd dose</td>
<td>3rd dose</td>
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</tr>
<tr>
<td>Haemophilus influenzae type b (Hib)</td>
<td>1st dose</td>
<td>2nd dose</td>
<td></td>
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<tr>
<td>Pneumococcal conjugate (PCV13)</td>
<td>1st dose</td>
<td>2nd dose</td>
<td></td>
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<tr>
<td>Pneumococcal polysaccharide (PPSV23)</td>
<td>1st dose</td>
<td>2nd dose</td>
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<tr>
<td>Inactivated poliovirus (IPV)</td>
<td>1st dose</td>
<td>2nd dose</td>
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<tr>
<td>Influenza (IIV)</td>
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<td>Annual vaccination (IIV only) 1 or 2 doses</td>
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<tr>
<td>Measles, mumps, rubella (MMR)</td>
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<td></td>
<td>Annual vaccination (IIV or EV) 1 or 2 doses</td>
<td></td>
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<tr>
<td>Varicella (Var)</td>
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<td></td>
<td></td>
<td>Annual vaccination (IIV or EV) 1 dose only</td>
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<tr>
<td>Hepatitis A (HepA)</td>
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<td>Human papillomavirus (HPV)</td>
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<tr>
<td>Meningococcal C (MenC)</td>
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<td></td>
<td></td>
<td>Annual vaccination (MenC only) 2 doses</td>
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</tr>
</tbody>
</table>

This schedule includes recommendations in effect as of January 1, 2015. Any dose not administered at the recommended age should be administered at a subsequent visit, when indicated and feasible. The use of a combination vaccine generally is preferred over separate injections of its equivalent component vaccines. Vaccination providers should consult the relevant Advisory Committee on Immunization Practices (ACIP) statement for detailed recommendations, available online at http://www.cdc.gov/vaccines/hcp/acip-recs/index.html. Clinically significant adverse events that follow vaccination should be reported to the Vaccine Adverse Event Reporting System (VAERS) online (http://www.vaers.hhs.gov) or by telephone (800-822-7967). Suspected cases of vaccine-preventable diseases should be reported to the state or local health department. Additional information, including precautions and contraindications for vaccination, is available from CDC online (http://www.cdc.gov/vaccines/recs/vac-admin/contraindications.htm) or by telephone (800-CDC-INFO [800-332-4636]).

This schedule is approved by the Advisory Committee on Immunization Practices (http://www.cdc.gov/vaccines/acip), the American Academy of Pediatrics (http://www.aap.org), the American Academy of Family Physicians (http://www.aafp.org), and the American College of Obstetricians and Gynecologists (http://www.acog.org).

NOTE: The above recommendations must be read along with the footnotes of this schedule.
### FIGURE 2. Catch-up immunization schedule for persons aged 4 months through 18 years who start late or who are more than 1 month behind — United States, 2015.

The figure below provides catch-up schedules and minimum intervals between doses for children whose vaccinations have been delayed. A vaccine series does not need to be restarted, regardless of the time that has elapsed between doses. Use the section appropriate for the child's age. Always use this table in conjunction with Figure 1 and the footnotes that follow.

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>Minimum Age for Dose 1</th>
<th>Dose 1 to Dose 2</th>
<th>Minimum Interval Between Doses</th>
<th>Dose 3 to Dose 4</th>
<th>Dose 4 to Dose 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hepatitis Bf</td>
<td>Birth</td>
<td>4 weeks</td>
<td>16 weeks after first dose</td>
<td>8 weeks</td>
<td>8 weeks</td>
</tr>
<tr>
<td>Rotavirus</td>
<td>6 weeks</td>
<td>6 weeks</td>
<td>4 weeks</td>
<td>4 weeks</td>
<td>4 weeks</td>
</tr>
<tr>
<td>Diptheria, tetanus, and acellular pertussis</td>
<td>6 weeks</td>
<td>4 weeks</td>
<td>4 weeks</td>
<td>6 months</td>
<td>6 months</td>
</tr>
<tr>
<td>Haemophilus influenza type b2</td>
<td>6 weeks</td>
<td>4 weeks</td>
<td>8 weeks if first dose was administered before the 1st birthday.</td>
<td>8 weeks</td>
<td>8 weeks</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>8 weeks as final dose.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>If current age is younger than 12 months, and first dose was administered after the 1st birthday.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pneumococcal</td>
<td>6 weeks</td>
<td>4 weeks</td>
<td>8 weeks as final dose for healthy children.</td>
<td>8 weeks</td>
<td>8 weeks</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inactivated poliovirus</td>
<td>6 weeks</td>
<td>4 weeks</td>
<td>4 weeks if current age is younger than 12 months and previous dose given at age 24 months or older.</td>
<td>4 weeks</td>
<td>6 months</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meningococcal</td>
<td>6 weeks</td>
<td>8 weeks</td>
<td>See footnote 13</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measles, mumps, rubella</td>
<td>12 months</td>
<td>4 weeks</td>
<td>See footnote 13</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Varicella</td>
<td>12 months</td>
<td>3 months</td>
<td>See footnote 13</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hepatitis A</td>
<td>12 months</td>
<td>6 months</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Immunization Schedules

For Health Care Professionals

NEW 2014 SCHEDULES

Schedules and Tools
Schedules to order or print, recommendations to consult, and tools to download.

- Birth-18 Years and Catch-up Versions
  Find printable versions in various formats: regular paper, pocket size, MMWR, and laminated; load on your smartphone; check the binational resource...

- Adult Version
  Find printable formats in various sizes, download the interactive tool, or load the schedule on your smartphone...

For Everyone

Easy-to-read Schedules for All Ages
Easy-to-read formats to print, tools to download, and ways to prepare for your office visit.

- Infants and Children (birth through 6 years old)
  Find easy-to-read formats to print, create an instant schedule for your child, determine missed or skipped vaccines, and prepare for your office visit...

- Preteens & Teens (7 through 18 years old)
  Print this friendly schedule, take a quick quiz, fill out the screening form before your child's doctor visit, or download a tool to determine vaccines needed...

- Adults (19 years and older)
  Print the easy-to-read adult schedule, take the quiz, or download a tool to determine vaccines needed...
**View or Print a Schedule**

**Recommended Immunizations for Children (Birth through 6 years)**

- Recommended immunizations for children [2 pages]
- See also Spanish version

See also [Immunizations and Developmental Milestones](#) [2 pages]

You can display the immunization schedule in the easy-to-read format on your website. See how the [children (birth through 6 years)](#) schedule will appear on your website. For instructions, see [Display Immunization Schedules on Your Website](#).

**Create a Schedule of Vaccines Needed Since Birth**

[Make a Schedule for Your Child](#) for those birth through 6 years

For a complete list of recommended immunizations, just select your child’s birth date. You can personalize it by adding your child’s name. Once printed, review with your child’s doctor.

**Spanish Version (en español)**

**Recommended Immunizations for Children from Birth through 6 years** [2 pages] (Vacunas recomendadas para niños, desde el nacimiento hasta los 6 años de edad)
## Immunizations and Developmental Milestones for Your Child from Birth Through 6 Years Old

<table>
<thead>
<tr>
<th></th>
<th>Birth</th>
<th>1 Month</th>
<th>2 Months</th>
<th>4 Months</th>
<th>6 Months</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Recommended Immunizations</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hepatitis B</td>
<td>○ HepB</td>
<td>○ HepB(^1)</td>
<td></td>
<td></td>
<td>○ HepB</td>
</tr>
<tr>
<td>Rotavirus</td>
<td></td>
<td>○ RV</td>
<td>○ RV</td>
<td>○ RV</td>
<td>○ RV</td>
</tr>
<tr>
<td>Diphtheria, Tetanus, Pertussis</td>
<td>○ DTaP</td>
<td>○ DTaP</td>
<td>○ DTaP</td>
<td>○ DTaP</td>
<td>○ DTaP</td>
</tr>
<tr>
<td>Haemophilus influenza type b</td>
<td>○ Hib</td>
<td>○ Hib</td>
<td>○ Hib</td>
<td>○ Hib</td>
<td>○ Hib</td>
</tr>
<tr>
<td>Pneumococcal</td>
<td>○ PCV</td>
<td>○ PCV</td>
<td>○ PCV</td>
<td>○ PCV</td>
<td>○ PCV</td>
</tr>
<tr>
<td>Inactivated Poliovirus</td>
<td>○ IPV</td>
<td>○ IPV</td>
<td>○ IPV</td>
<td>○ IPV</td>
<td>○ IPV</td>
</tr>
<tr>
<td>Influenza (Flu)</td>
<td></td>
<td>○ Influenza, first dose(^2)</td>
<td>○ Influenza, second dose(^2)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Milestones

Milestones should be achieved by the end of the age indicated. Talk to your child’s doctor about age-appropriate milestones if your child was born prematurely.

- Recognizes caregiver’s voice
- Turns head toward breast or bottle
- Communicates through body language, fussing or crying
- Starts to smile
- Raises head when on tummy
- Calms down when rocked, cradled or sung to
- Begins to smile at people
- Coos, makes gurgling sounds
- Begins to follow things with eyes
- Can hold head up
- Babbles with expression
- Likes to play with people
- Reaches for toy with one hand
- Brings hands to mouth
- Knows familiar faces
- Responds to own name
- Brings things to mouth
- Rolls over in both directions

### Growth

At each well child visit, enter date, length, weight, and percentile information to keep track of your child’s progress.

- WEIGHT / PERCENTILE
- LENGTH / PERCENTILE
- HEAD CIRCUMFERENCE

Shaded boxes indicate the vaccine can be given during shown age range.

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1. The second dose of HepB may be given either at the 1 month or 2 month visit.
2. Two doses given at least four weeks apart are recommended for children aged 6 months through 8 years of age who are getting a flu vaccine for the first time and for some other children in this age group.
4. If your child has any medical conditions that put him at risk for infections or is traveling outside the United States, talk to your child’s doctor about additional vaccines that he may need.

---

**Visit Dates**

<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>VISIT DATE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**U.S. Department of Health and Human Services Centers for Disease Control and Prevention**

**American Academy of Family Physicians**

**American Academy of Pediatrics**
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Create a Schedule of Vaccines Needed Since Birth

2015 Create a Customized Schedule of Vaccines Needed (birth to 6 years)
Use this tool to create a personalized schedule you can give to and discuss with parents. Parents also can use this print-out to record their child’s vaccinations. Just enter your patient’s date of birth, click “get schedule”, and then click “printable schedule.”

Interactive Tools

2015 CDC Vaccine Schedules app for clinicians and other health care professionals offers you immediate access to CDC’s latest recommended immunization schedules. See childhood, adolescent, adult and catch-up vaccine schedules and footnotes on your smartphone and tablet devices. Download this free app from the iTunes App Store or from Google Play.

Note: If you previously downloaded the tool, check that you have version 2.0.1 with 2015 schedules and footnotes.

Pocket-size

Combined version in smaller, portable format; includes birth through 18 years schedule and catch-up schedule with footnotes applying to both.

- Print Color POCKET-SIZE for office printer
- Order free laminated cards
CDC Vaccine Schedules App for Clinicians and Other Immunization Providers

Healthcare professionals who recommend or administer vaccines can immediately access all CDC recommended immunization schedules and footnotes using the CDC Vaccine Schedules app. Optimized for tablets and useful on smartphones, the app shows the child, adolescent, and adult vaccines recommended by the Advisory Committee on Immunization Practices (ACIP).

The app visually mimics the printed schedules, which are reviewed and published annually. Users can identify correct vaccine, dosage, and timing with 2 or 3 clicks. Any changes in the schedules will be released through app updates. This app is one of an expanding collection of applications from CDC on a variety of specific topics, each optimized for your mobile device.

This free tool provides the most current version of the

- Child and adolescent schedules with immunization recommendations from birth through age 18
- Catch-up schedule for children 4 months through 18 years
- Adult schedule, including recommended vaccines for adults by age group and by medical condition
- Contraindications and precautions table, with all footnotes that apply to schedules
Measles

Measles Cases and Outbreaks,
January 1 to June 13, 2014*


16 Outbreaks representing 87% of reported cases this year

U.S. Measles Cases by Year

*Provisional data reported to CDC’s National Center for Immunization and Respiratory Diseases
Measles Cases and Outbreaks
January 1 to February 20, 2015*

154 Cases

3 Outbreaks

reported in 17 states and Washington DC: Arizona, California, Colorado, Delaware, Georgia, Illinois, Michigan, Minnesota, Nebraska, New Jersey, New York, Nevada, Pennsylvania, South Dakota, Texas, Utah, Washington

representing 90% of reported cases this year

*Provisional data reported to CDC’s National Center for Immunization and Respiratory Diseases
2015 Measles Cases in the U.S.
January 1 to February 20, 2015

Cases*:
- 0
- 1-4
- 5-9
- 10-19
- 20+

*Provisional data reported to CDC's National Center for Immunization and Respiratory Diseases

† CDC will update these data weekly on Mondays.
Measles U.S. 2014-15

- 125 cases reported between 12/28-2/8/15
- 110 CA residents
  - 35% got it at Disney
  - 34% unknown exposure
  - 31% confirmed secondary cases (n=34)
    - N-26 household or close contacts
    - N-8 exposed in a community setting
  - 12% vaccinated
  - 43% unknown or undocumented vaccination status
  - 45% unvaccinated (n=49)
    - N-12 infants too young to be vaccinated
    - N-28 intentionally did not vaccinate
      - 18 children
      - 10 adults
EBOLA VIRUS SPREADS BEYOND WEST AFRICA

Thomas Eric Duncan of Monrovia, Liberia, is the first patient to be diagnosed with the Ebola virus in the USA. While visiting relatives, he developed symptoms and is being treated at Texas Health Presbyterian hospital in Dallas. Since December, there have been 7,492 cases and 3,439 deaths attributed to the Ebola virus in five countries in West Africa and the USA, according to the World Health Organization.

EBOLA OUTBREAKS

- CASES
- DEATHS

1. OUTBREAK AREAS
   - SENEegal: 0 deaths, 1 case
   - GUINEA: 739 cases
   - SIERRA LEONE: 623 cases
   - LIBERIA: 2,069 cases
   - NIGERIA: 3,834 cases

2. EFFECTS ON HUMANS
   - NIGERIA: 8 deaths, 20 cases
Measles U.S. 2014*

* Provisional reports to CDC through May 16, 2014

- 216 cases reported from 15 states including 15 outbreaks
  - 45 importations
    - 22 from the Philippines
    - 38 (85%) US residents
  - 96% cases import-associated
  - 38 cases (17%) hospitalized
- Cases in US residents (N=207)
  - 63% unvaccinated
    - 83% were personal belief exemptors
    - 7% too young to be vaccinated
  - 25% unknown vaccination status (90% of those adults)
  - 12% vaccinated (including 8% with 2 or more doses)
Measles isn’t so bad. I had chicken pox and I was fine.

- So is a car accident- it may be just a bump or it may be a killer- since you don’t know, you should still wear your seatbelt.
Immunization Controversies, Facts, Myths
Vaccine knowledge

- Parents had poor vaccine knowledge…
  - Belief that their 3-6 month old infant had received vaccines against chickenpox, smallpox, or measles, mumps, and rubella
  - Belief that they themselves had received a vaccination against chickenpox as a child
  - Belief that their infant could become infected with HIV from vaccines
  - Belief that vitamin K is a vaccine
  - Belief that infants develop influenza from the vaccine

Questions

- Where can we get separate immunizations (M, M, R)?
- Understanding timing of vaccines, scheduling and changes
- Concern for Autism
- Expected and unexpected adverse events
- Rusty Nail- immunization needed
- HPV resistance from parents
- Adverse reactions
- Transmissibility of live vaccines
- Aborted fetus 1960- cell lines for vaccines?
Common Questions (CDC Website)

- Is it okay for my baby to have so many shots at once? [children are exposed to 100s of antigens]
- What will happen if my child doesn’t get his vaccinations? [infectious consequences]
- Why do children need so many shots? [each is justified]
- Why are vaccines given at such an early age? [maximize impact]
- How safe are vaccines? [very safe]
- What are my child’s chances of being exposed to one of these diseases? [not that remote]
“Vaccines overwhelm the immune system”

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>1900</th>
<th>1960</th>
<th>1980</th>
<th>2000</th>
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<td>~200</td>
<td>~3000</td>
<td>~3041</td>
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<tr>
<td>Smallpox*</td>
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<td>~200</td>
<td></td>
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<tr>
<td>Total</td>
<td>~200</td>
<td>~200</td>
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<td></td>
</tr>
<tr>
<td>Diphtheria†</td>
<td>1</td>
<td>1</td>
<td>15</td>
<td>1</td>
</tr>
<tr>
<td>Tetanus†</td>
<td>1</td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>WC-Pertussis§</td>
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<td>~3000</td>
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<td>2–5</td>
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<td>Measles¶</td>
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<tr>
<td>Mumps#</td>
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<td></td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Rubella**</td>
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</tr>
<tr>
<td>Total</td>
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<td></td>
<td>~3041</td>
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<tr>
<td>Diphtheria</td>
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<tr>
<td>Tetanus</td>
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<tr>
<td>Rubella</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Hib†</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Varicella††</td>
<td>69</td>
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<td></td>
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<tr>
<td>Pneumococcus §§</td>
<td>8</td>
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</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>123–126</td>
<td></td>
</tr>
</tbody>
</table>

Avoiding Missed Opportunities

• Any vaccine can safely be given at the same time as other recommended vaccines

• Provide vaccine(s) at any health care encounter (sports or camp physicals)

• Review the immunization record even at acute care visits

• Encourage parents to keep accurate vaccination records and to review the immunization schedule
National Estimated Vaccination Coverage Levels among Adolescents 13-17 Years, NIS-Teen, 2006-2012

Source: MMWR. 2013;62;685-93
Actual and Achievable Vaccination Coverage if Missed Opportunities Were Eliminated: Adolescents 13-17 Years, NIS-Teen 2012

Among girls unvaccinated for HPV, 84% had a missed opportunity

Missed opportunity: Encounter when some, but not all ACIP-recommended vaccines are given.
HPV-1: Receipt of at least one dose of HPV.
Top 5 reasons for not vaccinating daughter, among parents with no intention to vaccinate in the next 12 months, NIS-Teen 2012

- Not sexually active
- Lack of knowledge
- Safety concerns/side effects
- Not recommended by provider
- Not needed or necessary**

* Not mutually exclusive.
** Did not know much about HPV or HPV vaccine.
Strength of HPV Vaccine Recommendation for Female Patients, Pediatricians and Family Physicians (N=609)

- **11-12 y.o. females**: 51% strongly recommend, 36% recommend, but not strongly, 8% make no recommendation.
- **13-15 y.o. females**: 79% strongly recommend, 15% recommend, but not strongly, 6% make no recommendation.
- **16-18 y.o. females**: 85% strongly recommend, 10% recommend, but not strongly, 5% make no recommendation.

Allison et al. [https://cdc.confex.com/cdc/nic2011/webprogram/Paper25181.html](https://cdc.confex.com/cdc/nic2011/webprogram/Paper25181.html)
Why at 11 or 12 years old?

- Parents want a concrete reason why 11-12 year olds should receive HPV vaccine
  - In audience research with moms, almost all respondents were unaware of the correct age range the vaccine was recommended
  - Respondents also missed the concept of vaccinating before sexual activity
Try saying:

We vaccinate people well before they are exposed to an infection, as is the case with measles and the other routinely recommended childhood vaccines. Similarly, we want to vaccinate children long before they begin any type of sexual activity and are exposed to HPV.

Also HPV vaccine produces a better immune response in preteens than it does in older teens and young women.
A green light for sexual activity?

- Parents may be concerned that vaccinating may be perceived by the child as permission to have sex
  - In focus groups, some parents expressed concern that in getting HPV vaccine for their child, they would be giving their child permission to have sex
  - This was one of the top four reasons respondents gave when asked why they would not vaccinate their daughter
Try saying:

*Multiple research studies have shown that getting the HPV vaccine does not make kids more likely to be sexually active.*

*These studies have also shown that getting the HPV vaccine does not make kids more likely to start having sex a younger age.*
Would you give it to your child?

- Emphasizing your personal belief in the importance of HPV vaccine helps parents feel secure in their decision.
- Some respondents in focus groups stated that they would feel more comfortable knowing that the doctor had vaccinated their own child or was planning to (if the child was <11).
- Respondents in an online survey stated that knowing that oncologists supported the recommendation made them more likely to get their child vaccinated.
Try saying:

*I have given HPV vaccine to my son/daughter (or grandchild/niece/nephew/friend's children).*
A POPULATION-BASED STUDY OF MEASLES, MUMPS, AND RUBEILLA VACCINATION AND AUTISM

Kresten Meldgaard Madsen, M.D., Anders Hvid, M.Sc., Mogens Vestergaard, M.D., Diana Schendel, Ph.D., Jan Wohlfahrt, M.Sc., Poul Thorsen, M.D., Jørn Olsen, M.D., and Mads Melbye, M.D.

ABSTRACT

Background  It has been suggested that vaccination against measles, mumps, and rubella (MMR) is a cause of autism.

Methods  We conducted a retrospective cohort study of all children born in Denmark from January 1991

T has been suggested that the measles, mumps, and rubella (MMR) vaccine causes autism.1-4 The widespread use of the MMR vaccine has reportedly coincided with an increase in the incidence of autism in California,5 and there are case reports of children in whom signs of both developmental regres-
Denmark Population Based Study

- January 1991 through December 1998. There were a total of 537,303 children in the study; 440,655 of the children were vaccinated with MMR and 96,648 were not.
- The researchers did not find a higher risk of autism in the vaccinated than in the unvaccinated group of children. Furthermore, there was no association between the age at time of vaccination, the amount of time that had passed since vaccination, or the date of vaccination and the development of any autistic disorder.
Do Vaccines Cause Autism (2)?

- Thimerosal preservative as possible cause?
  - Used in multi-dose vials or to prevent contamination during manufacturing (trace amts)
  - By 2003, no vaccines in the US schedule for <6mo contained thimerosal as preservative
  - 2004 IOM review could find no compelling mechanism by which thimerosal could cause autism
  - 8 large studies found no link (Sweden, Denmark, US, UK and Canada) and cases in CA increase despite no thimerosal
Another Denmark Population-Based Study

![Graph showing autism incidence per 10,000 over years with different age groups (2-4, 5-6, 7-9) and an arrow indicating Thimerosal-containing vaccines removed.](image-url)
Benefit and Risk Communications

- Providers should ask questions regarding any possible adverse reactions associated with previous vaccination(s)
- Opportunities for questions from recipient should be provided
- Vaccine information statements (VISs) must be provided before each dose of vaccine
Making the CASE for Vaccines

• **C**orroborate: Acknowledge the parents’ concern and find some point on which you can agree. Set the tone for a respectful, successful talk.

• **A**bout Me: Describe what you have done to build your knowledge base and expertise

• **S**cience: Describe what the science says

• **E**xplain/Advise: Give your advice to patient, based on the science
Make a CASE for Vaccines

• Corroborate: There’s certainly been a lot of coverage on television about vaccines and autism so I can understand why you have questions.

• About Me: I always want to make sure I’m up to date on the latest information so that I can do what’s best for my patients, so I’ve researched this thoroughly. In fact, I just returned from a professional conference…

• Science: The scientific evidence does not support a causal link. The CDC, the AAP, the NIH, the IOM (etc) all reviewed the data and all reached the same conclusion. Dozens of studies have been done. None show a link. In fact, the latest autism science indicates…

• Explain/Advise: Vaccines are critical to maintaining health and well being. They prevent diseases that cause real harm. Choosing not to vaccinate does not protect children for autism, but does leave them open to diseases. Kids need these vaccines.
The “Flu Shot” Gave Me “The Flu”

- Inactivated influenza injectable vaccine
  - Dead virus – can’t grow or replicate
  - Induces protective immune response
  - Generating immune response needs certain immune related chemicals, e.g. interferon
  - Small amounts of these can cause transient mild fatigue or headache

- This is not true influenza
  - Similar to sequelae of walking several miles

- Local reactions not uncommon
  - Like those from tetanus toxoid containing vaccines
“I got flu even though I had the shot.”

- Influenza vaccine efficacy 60-85% with good seasonal match
- The myriad forms of pseudo-”flu”
  - 2-day flu, stomach flu, summer flu, diarrheal flu, etc.
  - Vaccine only affects true influenza
- Intranasal provides better protection than injectable – particularly mismatched years
Transmissibility of Live Vaccines

Vaccine
- Influenza-LAIV
- Varicella
- MMR
- Rotavirus
- Oral polio

Potential for Transmission
- Low
- Very low from normal hosts
- Not transmitted to contacts (except rubella via breast milk)
- Excreted, potential
- Excreted, transmission, and disease documented
## Tetanus Prophylaxis

### Table 3.73.

Guide to Tetanus Prophylaxis in Routine Wound Management

<table>
<thead>
<tr>
<th>History of Adsorbed Tetanus Toxoid (Doses)</th>
<th>Clean, Minor Wounds</th>
<th>All Other Wounds&lt;sup&gt;a&lt;/sup&gt;</th>
<th>TIG&lt;sup&gt;c&lt;/sup&gt;</th>
<th>DTaP, Tdap, or Td&lt;sup&gt;b&lt;/sup&gt;</th>
<th>TIG&lt;sup&gt;c&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fewer than 3 or unknown</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>3 or more</td>
<td>No if &lt;10 y since last tetanus-containing vaccine dose</td>
<td>No</td>
<td>No&lt;sup&gt;d&lt;/sup&gt; if &lt;5 y since last tetanus-containing vaccine dose</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Yes if ≥10 y since last tetanus-containing vaccine dose</td>
<td>No</td>
<td>Yes if ≥5 y since last tetanus-containing vaccine dose</td>
<td>No</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Tdap indicates booster tetanus toxoid, reduced diphtheria toxoid, and acellular pertussis vaccine; DTaP, diphtheria and tetanus toxoids and acellular pertussis vaccine; Td, adult-type diphtheria and tetanus toxoids vaccine; TIG, Tetanus Immune Globulin (human).

<sup>a</sup> Such as, but not limited to, wounds contaminated with dirt, feces, soil, and saliva; puncture wounds; avulsions; and wounds resulting from missiles, crushing, burns, and frostbite.

<sup>b</sup> DTaP is used for children younger than 7 years of age. Tdap is preferred over Td for underimmunized children 7 years of age and older who have not received Tdap previously.

<sup>c</sup> Immune Globulin Intravenous should be used when TIG is not available.

<sup>d</sup> More frequent boosters are not needed and can accentuate adverse effects.
Vaccines and aborted Fetus

Two cell lines in question derived from ("therapeutically") aborted fetuses:

- WI-38 (Wistar Institute-380, USA), which originated in the U.S.

It is important to point out that the purpose of isolating these cell lines was to study cancer, i.e. cell immortality, not to make vaccines this allows some moral distance between the abortionist and the parent wanting to protect her child from disease.

The following vaccines are grown in these cell lines:

- Rubella (WI-38)
- Adenovirus (WI-38)
- Hepatitis A (MRC-5)
- Rabies-HDC (MRC-5)
- Varicella and herpes zoster (MRC-5)
- Poliovax (IPV in Pentacel) (MRC-5)

The rubella vaccine virus itself was isolated from a therapeutically aborted fetus. The mother was 25 years old and was exposed to rubella 8 weeks after her last menstrual period. Sixteen days after exposure she developed a rash, and cultures were positive for rubella. The fetus was surgically aborted 17 days after the illness began. Ref: Plotkin SA, et al. Amer J Dis Child 1965;110:381-389.

There are officials statement from the Vatican, and the statement from the U.S. Conference of Catholic Bishops can be found at http://old.usccb.org/prolife/issues/bioethic/vaccfac2.shtml

I am not aware of any "official" statements from Jewish, Muslim, or Protestant groups regarding vaccines grown in fetal cells. It's fair to say that Jews may see immunizations as an imperative, in fulfillment of the obligation to guard one's own health and to prevent others from becoming sick (see http://www.aish.com/ci/sam/48943486.html).
Vaccine Information Statements (VISs)

- What are VISs?
  - CDC-developed
  - Standardized
  - Mandatory

- Required by federal law:
  - Most current VIS
  - Record date the VIS was given
  - Record publication date of VIS

- The VIS is a standardized way to present objective information about vaccine benefits and adverse events.
MEASLES MUMPS & RUBELLA VACCINES
WHAT YOU NEED TO KNOW

1. Why get vaccinated?

Measles, mumps, and rubella are serious diseases.

**Measles**
- Measles virus causes rash, cough, runny nose, eye irritation, and fever.
- It can lead to ear infection, pneumonia, seizures (jerking and staring), brain damage, and death.

**Mumps**
- Mumps virus causes fever, headache, and swollen glands.
- It can lead to deafness, meningitis (infection of the brain and spinal cord covering), painful swelling of the testicles or ovaries, and, rarely, death.

**Rubella (German Measles)**
- Rubella virus causes rash, mild fever, and arthritis (mostly in women).
- If a woman gets rubella while she is pregnant, she could have a miscarriage or her baby could be born with serious birth defects.

You or your child could catch these diseases by being around someone who has them. They spread from person to person through the air.

Measles, mumps, and rubella (MMR) vaccine can prevent these diseases.

Most children who get their MMR shots will not get these diseases. Many more children would get them if we stopped vaccinating.

2. Who should get MMR vaccine and when?

Children should get **2 doses** of MMR vaccine:
- The first at 12-15 months of age
- And the second at 4-6 years of age.

These are the recommended ages. But children can get the second dose at any age, as long as it is at least 28 days after the first dose.

Some **adults** should also get MMR vaccine. Generally, anyone 18 years of age or older, who was born after 1956, should get at least one dose of MMR vaccine, unless they can show that they have had either the vaccines or the diseases.

Ask your doctor or nurse for more information.

MMR vaccine may be given at the same time as other vaccines.

3. Some people should not get MMR vaccine or should wait

- People should not get MMR vaccine who have ever had a life-threatening allergic reaction to gelatin, the antibiotic neomycin, or a previous dose of MMR vaccine.
- People who are moderately or severely ill at the time the shot is scheduled should usually wait until they recover before getting MMR vaccine.
- Pregnant women should wait to get MMR vaccine until after they have given birth. Women should avoid getting pregnant for 4 weeks after getting MMR vaccine.
- Some people should check with their doctor about whether they should get MMR vaccine, including anyone who:
  - Has HIV/AIDS, or another disease that affects the immune system
  - Is being treated with drugs that affect the immune system, such as steroids, for 2 weeks or longer.
  - Has any kind of cancer
  - Is taking cancer treatment with x-rays or drugs
  - Has ever had a low platelet count (a blood disorder)
Vaccine Information Statements

Publications:
Vaccine Information Statements (VISs) are information sheets produced by the Centers for Disease Control and Prevention (CDC) that explain to vaccine recipients, their parents, or their legal representatives both the benefits and risks of a vaccine. Federal law requires that VISs be handed out whenever (before each dose) certain vaccinations are given.

Downloadable VISs:
- Multiple Vaccines (DTaP, IPV, Hib, PCV, Hepatitis B, and Rotavirus)
- Anthrax
- DTaP
- Hepatitis
- Hib
- Influenza
- Meningococcal
- PCV13 and PCV7
- Polio
- Rabies
- Rotavirus
- Shingles
- Smallpox
- Td/Tdap
- Typhoid
- Varicella
- Yellow Fever

VIS News: Information about new, existing, and upcoming VISs (Last updated 8/14/10)

Mandatory Instructions for Use of the Vaccine Information Statements
Q&A - VIS Facts (Updated 6/16/09)
Important VIS Information
Do NOT delay vaccination because of absence of VIS
Download VIS to Patient's Mobile Device

Get Email Updates
General Recommendations on Immunization
Recommendations of the Advisory Committee on Immunization Practices (ACIP)

Continuing Education Examination available at http://www.cdc.gov/mmwr/cms/content.html

U.S. Department of Health and Human Services
Centers for Disease Control and Prevention
Contraindication

- A condition in a recipient which greatly increases the chance of a serious adverse event
Precaution

- A condition in a recipient which *may* increase the chance or severity of an adverse event, or *may* compromise the ability of the vaccine to produce immunity
### TABLE 6. Contraindications and precautions* to commonly used vaccines

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>Contraindications</th>
<th>Precautions</th>
</tr>
</thead>
</table>
| DTaP      | Severe allergic reaction (e.g., anaphylaxis) after a previous dose or to a vaccine component  
Encephalopathy (e.g., coma, decreased level of consciousness, or prolonged seizures), not attributable to another identifiable cause, within 7 days of administration of previous dose of DTP or DTaP | Progressive neurologic disorder, including infantile spasms, uncontrolled epilepsy, progressive encephalopathy; defer DTaP until neurologic status clarified and stabilized  
Temperature of ≥105°F (≥40.5°C) within 48 hours after vaccination with a previous dose of DTP or DTaP  
Collapse or shock-like state (i.e., hypotonic hyporesponsive episode) within 48 hours after receiving a previous dose of DTP/DTaP  
Seizure ≤3 days after receiving a previous dose of DTP/DTaP  
Persistent, inconsolable crying lasting ≥3 hours within 48 hours after receiving a previous dose of DTP/DTaP  
GBS <6 weeks after previous dose of tetanus toxoid–containing vaccine  
History of arthus-type hypersensitivity reactions after a previous dose of tetanus toxoid–containing vaccine; defer vaccination until at least 10 years have elapsed since the last tetanus toxoid–containing vaccine  
Moderate or severe acute illness with or without fever |
| DT, Td    | Severe allergic reaction (e.g., anaphylaxis) after a previous dose or to a vaccine component | GBS <6 weeks after previous dose of tetanus toxoid–containing vaccine  
History of arthus-type hypersensitivity reactions after a previous dose of tetanus toxoid–containing vaccine; defer vaccination until at least 10 years have elapsed since the last tetanus toxoid–containing vaccine  
Moderate or severe acute illness with or without fever |
| Tdap      | Severe allergic reaction (e.g., anaphylaxis) after a previous dose or to a vaccine component  
Encephalopathy (e.g., coma, decreased level of consciousness, or prolonged seizures), not attributable to another identifiable cause, within 7 days of administration of previous dose of DTP, DTaP, or Tdap | GBS <6 weeks after a previous dose of tetanus toxoid–containing vaccine  
Progressive or unstable neurological disorder, uncontrolled seizures, or progressive encephalopathy until a treatment regimen has been established and the condition has stabilized  
History of arthus-type hypersensitivity reactions after a previous dose of tetanus toxoid–containing vaccine; defer vaccination until at least 10 years have elapsed since the last tetanus toxoid–containing vaccine  
Moderate or severe acute illness with or without fever |
| IPV       | Severe allergic reaction (e.g., anaphylaxis) after a previous dose or to a vaccine component | Pregnancy  
Moderate or severe acute illness with or without fever |
| MMR†,§    | Severe allergic reaction (e.g., anaphylaxis) after a previous dose or to a vaccine component  
Pregnancy  
Known severe immunodeficiency (e.g., from hematologic disorder)  
Recurrent purpura  
Recent (≤11 months) receipt of antibody-containing blood product (specific interval depends on product)**  
History of thrombocytopenia or thrombocytopenic purpura  
Need for tuberculin skin testing†† |
Permanent Contraindications to Vaccination

- Severe allergic reaction to a prior dose of vaccine or to a vaccine component
- Encephalopathy not due to another identifiable cause occurring within 7 days of pertussis vaccination (for pertussis vaccines)
- Severe Combined Immunodeficiency Disease (for live vaccines)
Temporary Contraindications

Temporary contraindications to vaccination with live vaccines:

- Pregnancy
- Immunosuppression
Temporary Precautions

- Moderate or severe acute illness (all vaccines)
- Recent receipt of an antibody-containing blood product (MMR and Varicella only)
- Fever: $> 100.4 = \text{moderate or severe}$
Invalid Contraindication

- Preterm birth
- Pregnancy or immunosuppression in the household
- Breastfeeding
- Allergies to products not in vaccines
- Need for TB skin testing
- Need for multiple vaccines
- Lack of a previous physical exam
- Mild/moderate local reaction or fever following a prior dose
Invalid Contraindications

- Minor illness
  - Vaccinate with:
    - low grade fever
    - upper respiratory infection
    - otitis media
    - mild diarrhea
- Disease exposure or convalescence
- Antimicrobial therapy
The Pink Book

- [http://www.cdc.gov/vaccines/pubs/pinkbook/default](http://www.cdc.gov/vaccines/pubs/pinkbook/default)

- To download go to [http://www.cdc.gov/vaccines/pubs/pinkbook/default.htm#download](http://www.cdc.gov/vaccines/pubs/pinkbook/default.htm#download)

ACIP Updates

- HPV-9
- Influenza vaccine for children
- Mening B vaccine
How Do We Evaluate Vaccine Safety?
Conditions Occurring by Chance Among Females (per 100,000 persons) Following a Randomly Selected Day

<table>
<thead>
<tr>
<th>Condition</th>
<th>9-18yo Females</th>
<th>19-30yo Females</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Time after a random day</td>
<td>Time after a random day</td>
</tr>
<tr>
<td></td>
<td>1 day</td>
<td>1 wk</td>
</tr>
<tr>
<td>Asthma</td>
<td>2.7</td>
<td>18.8</td>
</tr>
<tr>
<td>Allergy</td>
<td>1.5</td>
<td>10.6</td>
</tr>
<tr>
<td>IBD</td>
<td>0.2</td>
<td>1.0</td>
</tr>
<tr>
<td>Thyroid disease</td>
<td>0.1</td>
<td>0.9</td>
</tr>
<tr>
<td>Lupus</td>
<td>0.1</td>
<td>0.5</td>
</tr>
<tr>
<td>MS/optic neuritis</td>
<td>0.0</td>
<td>0.2</td>
</tr>
</tbody>
</table>

Siegrist C et al. Human papilloma virus immunization in adolescent and young adults: a cohort study to illustrate what events might be mistaken for adverse reactions. PIDJ 26:979-84, 2007
Vaccine Clinical Trials

- Phase 1 trials - small numbers of healthy subjects (e.g., up to 30)
  - determine safety in humans
  - determine whether the product causes vaccine adverse reactions with increasing dose levels
  - gain early evidence of efficacy, such as immunogenicity
- Phase 2 trials - utilize controls in larger numbers of subjects (e.g., 50–500)
  - further assess product safety and short-term vaccine adverse reactions
Vaccine Clinical Trials

- Phase 3 trials - large numbers of subjects (hundreds to thousands to tens of thousands) to assess efficacy and safety
  - critical in evaluation of overall benefit-risk relationship
  - source of information for package insert (physician labeling)
  - collect data on lot consistency and acceptability of manufacturing scale-up operations

*License application to FDA*

*Licensure*

- Phase 4 trials
  - post-marketing surveillance
    - detect rare adverse events
    - assess long term efficacy
Vaccine Adverse Event Reporting System (VAERS)

• Requires reporting by health care providers of:
  • any event listed by manufacturer as a contraindication to subsequent doses
  • any event listed in the Reportable Events Table that occurs within the specified time period after vaccination

• Encourages reporting by anyone of:
  • any clinically significant adverse event that occurs after the administration of any vaccine licensed in the United States even if you are unsure whether a vaccine caused the event
What to Report to VAERS

- The report contains information about pt, provider and reporter demographics, adverse event, vaccines received and any preexisting conditions.
- Vaccination details (e.g., vaccination location, date, vaccine type, lot number and dose number)
  - Reports with incomplete information accepted
- Encourage reporting as soon as adverse event is identified but no time limit on reporting
The Vaccine Adverse Event Reporting System (VAERS) is a national vaccine safety surveillance program co-sponsored by the Centers for Disease Control and Prevention (CDC) and the Food and Drug Administration (FDA). VAERS is a post-marketing safety surveillance program, collecting information about adverse events (possible side effects) that occur after the administration of vaccines licensed for use in the United States.

VAERS provides a nationwide mechanism by which adverse events following immunization may be reported, analyzed, and made available to the public. VAERS also provides a vehicle for disseminating vaccine safety-related information to parents and guardians, health care providers, vaccine manufacturers, state vaccine programs, and other constituencies.

Have you or your child had a reaction following vaccination?

1. Contact your health care provider
2. Report the reaction
3. Submit Follow-Up Information
4. Visit the National Vaccine Injury Compensation (if appropriate)

Important note: CDC and FDA do not provide individual medical treatment, advice, or diagnosis. If you need individual medical or health care advice, consult a qualified health care provider.

¿Ha tenido usted o su hijo una reacción adversa después de recibir una vacuna?

1. Contácte a su proveedor de salud
2. Reporte una reacción adversa
3. Visite el Programa Nacional de Compensación por Daños Derivados de Vacunas (si es necesario)

Search VAERS Data

Featured Resources

Seasonal Flu Update
- Summary of 2013-2014 Influenza Vaccine Information

Government Agencies
- Immunization Safety Office
- National Center for Immunization and Respiratory Diseases
- National Vaccine Injury Compensation Program
- National Vaccine Program Office
- Center for Biologics Evaluation and Research

Health Topics
- Vaccine Safety
- Immunization Schedules
- Preventing Flu with Vaccination
- Traveler’s Health: Vaccinations
Good Vaccine Safety Websites

- AAP Childhood Immunization Support Program
  http://www.cispimmunize.org/
- National Network for Immunization Information (NNii)
  http://www.immunizationinfo.org/
- CHOP Vaccine Education Center
  http://www.chop.edu/consumer/jsp/microsite/microsite.jsp?id=75918
- CDC Vaccines and Immunizations http://www.cdc.gov/vaccines/
- WHO Immunizations, Vaccines and Biologicals
  http://www.who.int/immunization/en/
For Specific Groups of People:

Provider Resources for Vaccine Conversations with Parents

Making time to talk with parents about vaccines during the well-child visit may be challenging.

Here's some help: CDC, AAP, and AAFP created these materials to help you assess parents' needs, identify the role they want to play in making decisions for their child's health, and then communicate in ways that meet their needs. These resources are collectively called Provider Resources for Vaccine Conversations with Parents.

For You and Your Practice

- Help strengthen communication between you and parents, and get information about:
  - Talking to parents about vaccines
  - Understanding vaccines and vaccine safety
  - Vaccine-preventable diseases
  - Immunization schedules

To Share With Parents

- Download and print these materials to help parents understand vaccine benefits and risks.
  - If you choose not to vaccinate
  - Vaccine-preventable disease fact sheets
  - Childhood immunization schedules
  - More resources

Spread the Word

Multimedia tools for sharing immunization information.
  - Send e-cards
  - Watch/share videos

Keep in Touch

- Give us your feedback
- Sign up to get e-mail updates
Available at NNii bookstore http://www.immunizationinfo.org/bookstore.cfm, $14.95 for book, $12.95 for ebook pdf version
CDC National Center for Immunization & Respiratory Diseases

- Call the hotline at 800-232-4636 (800-CDC-INFO)
- Email questions to nipinfo@cdc.gov
- See http://www.cdc.gov/vaccines/

- bapahud@cmh.edu
Questions?

bapahud@cmh.edu