• Nothing to disclose
Objectives

• Apply the changes in vaccine schedule, 2017 and predicted for 2018
• Integrate advice on changes in schedule
• Highlight implications of preferential recommendations from ACIP
• Learn new data on dealing with vaccine hesitant families
## Vaccine Schedule History (0-18 years)

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>By Late 1940s</th>
<th>By Late 1970s</th>
<th>2015</th>
<th># of Doses in 2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smallpox</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Tetanus*</td>
<td>Diphtheria*</td>
<td>Diphtheria*</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Diphtheria*</td>
<td>Tetanus*</td>
<td>Tetanus*</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Pertussis*</td>
<td>Pertussis*</td>
<td>Pertussis*</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Polio (OPV)</td>
<td>Polio (IPV)</td>
<td></td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Mumps**</td>
<td>Measles**</td>
<td>Measles**</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Measles**</td>
<td>Mumps**</td>
<td></td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Rubella**</td>
<td>Rubella**</td>
<td></td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Hib</td>
<td></td>
<td></td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Hepatitis B</td>
<td></td>
<td></td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Hepatitis A</td>
<td></td>
<td></td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Varicella</td>
<td></td>
<td></td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Pneumococcal</td>
<td></td>
<td></td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Influenza</td>
<td></td>
<td></td>
<td>19</td>
<td></td>
</tr>
<tr>
<td>Rotavirus</td>
<td></td>
<td></td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>HPV</td>
<td></td>
<td></td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Meningococcus</td>
<td></td>
<td></td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

* Combination DTP  
** Combination MMR

Taken from CDC Schedule History

- Total = 69 Doses  
  (49 before age 6)

217 Vaccines Currently in the Pipeline
# First Harmonized Vaccine Schedule, 1995

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>Birth</th>
<th>2 Months</th>
<th>4 Months</th>
<th>6 Months</th>
<th>12 Months</th>
<th>15 Months</th>
<th>18 Months</th>
<th>4–6 Years</th>
<th>11–12 Years</th>
<th>14–16 Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hepatitis B</td>
<td></td>
<td></td>
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<td></td>
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<td>HB-1</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Diphtheria-Tetanus-Pertussis (DTP)</td>
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<td>DTP</td>
<td>DTP</td>
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<td></td>
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<tr>
<td>Haemophilus influenzae type b</td>
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<tr>
<td>Poliovirus</td>
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<td></td>
</tr>
<tr>
<td>Measles-Mumps-Rubella</td>
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<td></td>
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</tr>
</tbody>
</table>

**Source:** CDC. Recommended childhood immunization schedule—United States, 1995;44(No. RR-5).

Vaccine Schedules, 2017—0-18 yr

### Table: Recommended Immunization Schedule for Children and Adolescents Aged 18 Years or Younger—United States, 2017

**Figure 1.** Recommended Immunization Schedule for Children and Adolescents Aged 18 Years or Younger—United States, 2017.

(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 in gray.

<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>8 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 yrs</th>
<th>17-18 yrs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hepatitis B (HepB)</td>
<td>1 dose</td>
<td></td>
<td>2nd</td>
<td></td>
<td></td>
<td></td>
<td>3rd</td>
<td></td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>Rotavirus (RV)(2-dose series); RSV (2-dose series)</td>
<td>1 dose</td>
<td>2nd</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4th</td>
<td></td>
<td>5th</td>
<td></td>
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</tr>
<tr>
<td>Diphtheria, tetanus, &amp; acellular pertussis (Tdap)</td>
<td>1 dose</td>
<td>2nd</td>
<td>3rd</td>
<td></td>
<td></td>
<td></td>
<td>4th</td>
<td></td>
<td>5th</td>
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<td></td>
</tr>
<tr>
<td>Haemophilus influenzae type b (Hib)</td>
<td>1 dose</td>
<td>2nd</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3rd</td>
<td></td>
<td>4th</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Pneumococcal conjugate (PCV13)</td>
<td>1 dose</td>
<td>2nd</td>
<td>3rd</td>
<td></td>
<td></td>
<td></td>
<td>4th</td>
<td></td>
<td>5th</td>
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</tr>
<tr>
<td>Inactivated poliovirus (IPV &lt;18 yrs)</td>
<td>1 dose</td>
<td>2nd</td>
<td>3rd</td>
<td></td>
<td></td>
<td></td>
<td>4th</td>
<td></td>
<td>5th</td>
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<tr>
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<tr>
<td>Annual vaccination (IV) 1 dose only</td>
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<td></td>
<td>Annual vaccination (IV) 1 dose only</td>
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<td></td>
</tr>
<tr>
<td>Measles, mumps, rubella (MMR)</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1st</td>
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</tr>
<tr>
<td>Varicella (v140)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td>1st</td>
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<td></td>
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<tr>
<td>Hepatitis A (HepA)</td>
<td></td>
<td></td>
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<td></td>
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<td></td>
<td>2nd</td>
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<td></td>
</tr>
<tr>
<td>Meningococcal (HBI-MenCY ≥6 weeks; MenACWY-D ≥9 mos; MenACWY-CRM ≥2 mos)</td>
<td></td>
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<td></td>
<td></td>
<td>1st</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Tetanus, diphtheria, &amp; acellular pertussis (Tdap) ≥7 y</td>
<td></td>
<td></td>
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<td></td>
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<td></td>
<td></td>
<td>1st</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Human papillomavirus (HPV)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td>1st</td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Meningococcal (HBI-MenCY ≥6 weeks; MenACWY-D ≥9 mos; MenACWY-CRM ≥2 mos)</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td>1st</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Pneumococcal polysaccharide (PPSV23)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1st</td>
<td></td>
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</tr>
</tbody>
</table>

**NOTE:** The above recommendations must be read along with the footnotes of this schedule.

[Link to CDC vaccine schedule](https://www.cdc.gov/vaccines/schedules/downloads/child/0-18yrs-child-combined-schedule.pdf)
# Vaccine Schedule, 2017, Adults

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>19-21 years</th>
<th>22-26 years</th>
<th>27-59 years</th>
<th>60-64 years</th>
<th>≥ 65 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Influenza</td>
<td>1 dose annually</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Td/Tdap</td>
<td></td>
<td>Substitute Tdap for Td once, then Td booster every 10 years</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MMR</td>
<td>1 or 2 doses depending on indication</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VAR</td>
<td>2 doses</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HZV</td>
<td></td>
<td></td>
<td></td>
<td>1 dose</td>
<td></td>
</tr>
<tr>
<td>HPV Female</td>
<td>3 doses</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HPV Male</td>
<td>3 doses</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PCV13</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 dose</td>
</tr>
<tr>
<td>PPSV23</td>
<td>1 or 2 doses depending on indication</td>
<td></td>
<td></td>
<td>1 dose</td>
<td></td>
</tr>
<tr>
<td>HepA</td>
<td></td>
<td></td>
<td>2 or 3 doses depending on indication</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HepB</td>
<td></td>
<td></td>
<td>3 doses</td>
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<td></td>
</tr>
<tr>
<td>MenACWY/MPSV4</td>
<td></td>
<td></td>
<td>1 or more doses depending on indication</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MenB</td>
<td></td>
<td></td>
<td>2 or 3 doses depending on vaccine</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hib</td>
<td></td>
<td></td>
<td>1 or 3 doses depending on indication</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Recommended for adults who meet the age requirement, lack documentation of vaccination, or lack evidence of past infection**
- **Recommended for adults with additional medical conditions or other indications**
- **No recommendation**

[https://www.cdc.gov/vaccines/schedules/hcp/imz/adult.html](https://www.cdc.gov/vaccines/schedules/hcp/imz/adult.html)
**Vaccine Schedules, 2017—0-18 yr**

![Image of vaccine schedule]

*NOTE: The above recommendations must be read along with the footnotes of this schedule.*

Hep B at Birth

- Stronger recommendation for HBV within 24 hours of birth for infants >2,000 gm
- Other recommendations unchanged
Hep B Laboratory “Window” (MOM)

Polio (changed 2/17/17)

- OPV counts towards polio vaccination, if given:
  - Before 4/1/16 (and not specified as part of a vaccination campaign)
  - After 4/1/16 and specified as tOPV (trivalent)
  - 4 weeks between doses, at least 6 months before final dose, and final dose on/after 4th birthday
  - If not, boost with IPV

https://www.cdc.gov/mmwr/volumes/66/wr/mm6606a7.htm
Figure 3. Vaccines that might be indicated for children and adolescents aged 18 years or younger based on medical indications

<table>
<thead>
<tr>
<th>VACCINE ▼</th>
<th>INDICATION ▶</th>
<th>Pregnancy</th>
<th>Immunocompromised status (excluding HIV infection)</th>
<th>HIV infection CD4+ count (cells/µL)</th>
<th>Kidney failure, end-stage renal disease, on hemodialysis</th>
<th>Heart disease, chronic lung disease</th>
<th>CSF leaks/cochlear implants</th>
<th>Asplenia and persistent complement component deficiencies</th>
<th>Chronic liver disease</th>
<th>Diabetes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hepatitis B</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Rotavirus</td>
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<tr>
<td>Diphtheria, tetanus, &amp; acellular pertussis (DTaP)</td>
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<tr>
<td><em>Haemophilus influenzae type b</em></td>
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<tr>
<td>Pneumococcal conjugate</td>
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<tr>
<td>Inactivated poliovirus</td>
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<td>Influenza</td>
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<tr>
<td>Measles, mumps, rubella</td>
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<tr>
<td>Varicella</td>
<td></td>
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<td></td>
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<tr>
<td>Hepatitis A</td>
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<tr>
<td>Meningococcal ACYW</td>
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<tr>
<td>Tetanus, diphtheria, &amp; acellular pertussis (Tdap)</td>
<td></td>
<td></td>
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<tr>
<td>Human papillomavirus</td>
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<tr>
<td>Meningococcal B</td>
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</tbody>
</table>

Vaccination according to the routine schedule recommended
Recommended for persons with an additional risk factor for which the vaccine would be indicated
Vaccination is recommended, and additional doses may be necessary based on medical condition. See footnotes.
No recommendation
Contraindicated
Precaution for vaccination

*Severe Combined Immunodeficiency

NOTE: The above recommendations must be read along with the footnotes of this schedule.
Medical Conditions

- Pregnancy
- Immunocompromised (including SCID; not including HIV)
- HIV
- Kidney failure/ESRD, on hemodialysis
- Heart disease, chronic lung disease
- CSF leak/cochlear implants
- Asplenia and persistent complement component deficiencies
- Chronic liver disease
- Diabetes
DTaP/Tdap

- 4th dose can be given as early as age 12 mo, as long as there has been six months since the third dose
  - As long as the fourth dose was at least four months after the third dose, and the child is at least 12 months of age, the fourth dose can still count

- Tdap can be given to pregnant teens/women between 27 and 36 weeks, but with a preference towards the earlier end
Hib

- Comvax removed from market and thus the schedule
- Two dose or three dose series allowed for primary schedule
New HPV schedule

- Now can start as young as age 9 (does not need to be high risk)
- 2-dose series for patients starting before 15 yr
  - *Must be given 6-12 months apart*
- No more bivalent HPV on the market
Influenza

- LAIV (live attenuated influenza vaccine) removed
- New flu changes
  - High dose
  - Single dose
Not LAIV (FluMist)

• Nasal flu
• Had been more effective in pre-release trials
• Less effective in years when H1N1 prominent
• Other countries used last year and it was comparable, but H3N2 season
Meningococcal vaccine

- MCV booster should be given at 16 years (hence new 16 year column)
- MCV for patients with HIV
- Meningococcal B vaccine
  - “Clinical discretion”
  - Ages 16-23, but preferably 16-18 y
  - Two MenB vaccines not interchangeable
  - If second dose of Trumenba is given less than six months after first, a third dose needs to be given at least four weeks after the second dose and six months after the first
MMRV—not for first dose

• Higher rate of fevers and febrile seizures
Changes to Adult Schedule

• Influenza
• Hep B
• HPV
• Meningococcal
# Vaccine Schedule, 2017, Adults

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>19-21 years</th>
<th>22-26 years</th>
<th>27-59 years</th>
<th>60-64 years</th>
<th>≥ 65 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Influenza</td>
<td>1 dose annually</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Td/Tdap</td>
<td>Substitute Tdap for Td once, then Td booster every 10 years</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MMR</td>
<td>1 or 2 doses depending on indication</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VAR</td>
<td>2 doses</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HZV</td>
<td></td>
<td></td>
<td></td>
<td>1 dose</td>
<td></td>
</tr>
<tr>
<td>HPV Female</td>
<td>3 doses</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HPV Male</td>
<td>3 doses</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PCV13 Z</td>
<td></td>
<td></td>
<td></td>
<td>1 dose</td>
<td></td>
</tr>
<tr>
<td>PPSV23 Z</td>
<td>1 or 2 doses depending on indication</td>
<td></td>
<td></td>
<td>1 dose</td>
<td></td>
</tr>
<tr>
<td>HepA</td>
<td>2 or 3 doses depending on indication</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HepB</td>
<td>3 doses</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MenACWY/MPSV4</td>
<td>1 or more doses depending on indication</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MenB</td>
<td>2 or 3 doses depending on vaccine</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Hib</td>
<td>1 or 3 doses depending on indication</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

### Legend

- Yellow: Recommended for adults who meet the age requirement, lack documentation of vaccination, or lack evidence of past infection
- Purple: Recommended for adults with additional medical conditions or other indications
- Light gray: No recommendation

[https://www.cdc.gov/vaccines/schedules/hcp/imz/adult.html](https://www.cdc.gov/vaccines/schedules/hcp/imz/adult.html)
Influenza

- Do not use LAIV
- Adults with history of egg allergy who only had hives can still receive vaccine
- Adults with history of egg allergy who had more symptoms than hives, but will need to be observed
New Influenza Vaccine Changes

- High dose
- Single dose
Pneumococcus

- PCV13—conjugate vaccine
  - Previously only for children
- PPSV 23—polysaccharide vaccine
Hep B vaccine

- Indicated for adults with chronic liver disease and AST and ALT twice upper limit of normal (including, but not limited to, hep C, cirrhosis, fatty liver disease, alcoholic liver disease, autoimmune hepatitis)
HPV

- Females through age 26 years and males through age 21 years who have not received any vaccine should receive three-dose series. Males 22 through 26 may receive three-dose series.
- If initiated series before age 15 and second dose was at least five months apart – adequately vaccinated
  - Otherwise, need additional dose
Meningococcal disease

- Anatomic or functionally Splenda or persistent complement component deficiencies should receive
  - *Two dose series of MenACWY*
    - At least two months apart
    - Repeated every five years
  - *MenB series*
- Microbiologists who are exposed should receive one dose on MenACWY, repeated every five years, plus MenB series
- Young adults 16-23 years (ideally 16-18) may receive MenB
Changes coming for 2018

- New Zoster vaccine
- 3rd MMR in outbreaks
- Tdap for adults
- Hep B
Shingles—epidemiology

- Lifetime risk of developing: 1 in 3, esp if over 65 yo
Shingles--symptoms

• Pain, preceding the rash
  – *Lasts 1-5 days, but can extend into post-herpetic neuralgia*
Shingles vaccines

• Current vaccine—Zostavax
  – *Live, attenuated vaccine*
  – *Same vaccine as Varivax, but 14 times the dose*
  – *Efficacy*
    • Against rash 51%
    • Against postherpetic neuralgia: 67%
    • Decreases with time
New Shingles Vaccine “Shingrix”

- Licensed 10/20/17
- Subunit vaccine (usually less good) + 2 adjuvants (QS21, a plant-based soap, and monophosphoryl lipid A [adjuvant in Cervarix])
  - Side effects higher, bc of adjuvants, but <5% affected ADLs
- 2 doses
  - 2nd 2-6 mo later
- Efficacy
  - Against rash: 97%, no decrease with age
  - Against PHN: 91%, decreases to 71.2% in those ≥80
  - After four years, duration against rash drops only to 85%
Preferential Recommendations from ACIP

• High-dose vs standard dose influenza (no recommendation, even those high-dose statistically more effective)

• HZ/su
  – Should still give even if have received HZ/la
Mumps vaccine

- Merck researcher Hilleman
- Live “Jeryl Lynn” virus
- Unlike with measles and rubella, mumps efficacy fades after about 10 years
Mumps--Epidemiology

https://vaccines.procon.org/view.additional-resource.php?resourceID=005969;
Mumps--Epidemiology

The mumps vaccine was introduced in 1967. There were 37 deaths from the virus that year.

The MMR combination vaccine was introduced in 1971. There were 22 deaths from the mumps virus that year.

https://vaccines.procon.org/view.additional-resource.php?resourceID=005969
Mumps—change in epidemiology

• Used to be 5-9 yo
• Now 18-22 yo
  – Almost ¾ had appropriate vaccine hx
• Outbreak at University of Iowa
  – Before outbreak, 98.1% had received 2 doses MMR
  – <½ the rate of infection in those receiving 3rd dose
  – If >13 years since last dose, 9-fold higher risk of mumps than those more recently

The Science of Waning Immunity

- Mumps vaccine triggers poorer memory B cell response (300 vs 5000/10^6)
How to respond clinically?

- ACIP Recommendation to give 3rd dose if Public Health says at increased risk
  - ? Give at college entry?
Hepatitis B Vaccine—new changes
New Hep B Vaccine (Heplisav)

- Licensed 11/9/2017 for use > 18 years
- 2-dose series
  - Time 0 and 1 month later
- Uses innate immune system to recognize adjuvant
Comparison to Energix

• Protection

<table>
<thead>
<tr>
<th></th>
<th>Heplisav-B</th>
<th>Energix</th>
</tr>
</thead>
<tbody>
<tr>
<td>OVERALL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>28 weeks</td>
<td>95%</td>
<td>81%</td>
</tr>
<tr>
<td>32 weeks</td>
<td>90%</td>
<td>71%</td>
</tr>
<tr>
<td>DIABETES</td>
<td>90</td>
<td>65</td>
</tr>
</tbody>
</table>

• Haplisav has 8% loss in efficacy with older patients, while 20% in Energix
Safety

• Basically the same, with 2 exceptions
  – Acute MI—higher in Heplisav-B (0.17 vs 0.05%)
  – Prostate cancer—higher in Energix (0.18 vs 0.04%)
Vaccine Hesitancy--Update

- ICD-10 codes

Codes
- Z28  Immunization not carried out and underimmunization status
  - Z28.0  Immunization not carried out because of contraindication
  - Z28.01  Immunization not carried out because of acute illness of patient
  - Z28.02  Immunization not carried out because of chronic illness or condition of patient
  - Z28.03  Immunization not carried out because of immune compromised state of patient
  - Z28.04  Immunization not carried out because of patient allergy to vaccine or component
  - Z28.09  Immunization not carried out because of other contraindication
  - Z28.1  Immunization not carried out because of patient decision for reasons of belief or group pressure
  - Z28.2  Immunization not carried out because of patient decision for other and unspecified reason
  - Z28.20  Immunization not carried out because of patient decision for unspecified reason
  - Z28.21  Immunization not carried out because of patient refusal
  - Z28.29  Immunization not carried out because of patient decision for other reason
  - Z28.3  Underimmunization status
  - Z28.8  Immunization not carried out for other reason
  - Z28.81  Immunization not carried out due to patient having had the disease
  - Z28.82  Immunization not carried out because of caregiver refusal
  - Z28.89  Immunization not carried out for other reason
  - Z28.9  Immunization not carried out for unspecified reason
Vaccine pipeline: prelicensure and postlicensure vaccine development activities
Vaccine Hesitancy--Update

• “Countering Vaccine Hesitancy” Pediatrics 2016 (Sept); 138(3)

• Most mothers report wanting information before visit
Vaccine Hesitancy--Update

• **Opel** “The architecture of provider–parent vaccine discussions at health supervision visits.” *Pediatrics* 2013; 132(6):1037-46
  
  – *Nearly half of initially hesitant parents accepted vaccines after having provider explain rationale*
  
  – *Presumptive style (required immunizations to maintain optimal disease prevention) > permissive*

• Most mothers report wanting information before visit (Vannice, *Pediatrics* 2011)
“Extras” in Vaccines

• Preservatives (mercury)
  – NOT in single-dose vaccines

• Adjuvants (aluminum)

• Fluid
Questions?

• Susan.Fisher-Owens@UCSF.edu
Objectives—addressing what we know and what we do not

• What’s behind the fears—*vaccines are not perfect!*  
• Review common concerns about vaccines and how to dispel common myths  
• Detail “alternative schedules”  
• Describe communication techniques for discussing with families the importance of vaccines and possible consequences of refusal  
• Provide reliable resources for parents (and providers) to further address their immunization concerns
Scope of Problem
Proportions of parents who reported vaccine doubt indicators on last National Immunization Survey (2003 – 2004)

No vaccine doubt indicators, 71.7%
Vaccine doubt indicators, 28.2%

- Unsure, 8.9%
- Delayed, 10.2%
- Refused, 1.6%
- Unsure and delayed, 3.2%
- Delayed and refused, 2.3%
- Unsure and refused, 0.4%
- Unsure, delayed, and refused, 1.6%
Vaccine Hesitant Parent Types

- Uninformed but educable and seek information to learn more even if is not anti-vaccine
- Misinformed but correctable and not fully aware of vaccine benefits
- Well read and open-minded, wishes to discuss the issues intelligently, with consideration of advantages and disadvantages
- Strongly vaccine hesitant, willing to listen to the other side of the argument that unlikely to change viewpoint right away
- Strong-willed and committed, wants to convince the provider to agree with their argument against vaccines
What’s behind the fears—vaccines are not perfect!

- Desire not to hurt child
- Lack of knowledge or even misinformation
Understanding what’s behind the fears

- Dramatic increase in the number of vaccines available and recommended for routine use (up to 26 inoculations by 2 years of age)
- Failure to appreciate the seriousness of vaccine preventable diseases
  - Vaccines are “victims of their own success”
- Misinformation via media/internet
“I don’t want to hurt my baby”
Figure 1 – The risk of measles encephalitis is significantly higher than the risk of encephalitis after measles, mumps, and rubella (MMR) vaccination.

(Data from the National Network for Immunization Information.)
Objectives—addressing what we know and what we do not

• What’s behind the fears—vaccines are not perfect!
• Review common concerns about vaccines and how to dispel common myths
• Detail “alternative schedules”
• Describe communication techniques for discussing with families the importance of vaccines and possible consequences of refusal
• Provide reliable resources for parents to further address their immunization concerns
Common myths and concerns

• Too many vaccines for the immune system to handle
• Too many shots at once is too stressful
• Isn’t natural infection better?
• Let’s “hide in the herd”
• What about autism?
• Heavy metals & other ingredients
  – Mercury
  – Aluminum
• Abortion
• Pork
• Chiropractic
• Profit motive
• Promiscuity
How Many Vaccines Will Your Child Get?

...by 6 months □ 45 injected vaccines
...by 18 months □ 64 injected vaccines
...by 4-6 years □ 74 injected vaccines

A. Hepatitis B (birth)
B. Hepatitis B (4 months)
C. DTaP (2 months) Each shot has 3 vaccines
D. HiB (2 months) Each shot has 2 vaccines
E. IPV (2 months)
F. PCV (6 months) Each shot has 2 vaccines
G. Hepatitis B (2-4 months)
H. DTaP (4 months) Each shot has 3 vaccines
I. HiB (6 months) Each shot has 2 vaccines
J. IPV (6 months)
K. PCV (4 months) Each shot has 2 vaccines
L. DTaP (6 months) Each shot has 3 vaccines
M. HiB (4 months) Each shot has 2 vaccines
N. PCV (6 months) Each shot has 8 vaccines
O. Influenza (yearly from 6 months onwards)
P. IPV (6-18 months)
Q. HiB (12-18 months) Each shot has 2 vaccines
R. MMR (12-18 months) Each shot has 2 vaccines
S. PCV (12-18 months) Each shot has 8 vaccines
T. Varicella (12-18 months)
U. DTaP (15-18 months) Each shot has 3 vaccines
V. DTaP (4-6 years) Each shot has 3 vaccines
W. MMR (4-6 years) Each shot has 3 vaccines
X. Td every 10 years throughout life

Vaccines:
DTaP = diphtheria, pertussis, tetanus
HiB = hemophilus influenzae type b
IPV = inactivated polio vaccine
MMR = measles, mumps, rubella
Varicella = varicella
PCV = pneumococcal conjugate vaccine
Td = tetanus & diphtheria

Note: These numbers are conservative as there are currently over 100 vaccines in development.


UCSF Benioff Children’s Hospital

http://tuberose.com/Graphics/HowManyVaccines.gif
### Immune systems’ ability to tolerate vaccines

- Load in vaccines today vs 20 years ago
- Antigen

---

**Figure 1. Recommended immunization schedule for persons aged 0 through 18 years – 2013.**

[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 in bold.

![Immunization schedule chart](http://www.cdc.gov/vaccines/schedules/downloads/child/0-18yrs-schedule.pdf)
How many shots can my baby handle at once?

• The body deals with 2000 – 6000 antigens/day
• The entire childhood immunization schedule only presents 150 antigens
• Theoretically, a baby’s immune system is capable of handling up to 100,000 vaccines at once
• Research shows that infants respond to multiple vaccines given at the same time in a manner similar to the way they respond when given separately
  – Possible exception

What’s more stressful: multiple vaccines at once or multiple visits?

• Cortisol, the stress hormone level, no greater when infants were given 2 simultaneously as opposed to 1 vaccine
  – *One’s body is maximally “stressed” after receiving 1 shot; additional shots do not add to the stress*

• Separating shots should mean more visits
  – *More stress*
  – *More time vulnerable to those diseases*
Why didn’t you say in the first place? We could have used this new all-in-one vaccination rather than the traditional multiple injections.

Oh well! We’ll do it this way next year . . . How about that!
Hiding in Herd Immunity

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“Well, we don’t do any vaccinating on our place, and none of the survivors ever get sick!”
Hide in the Herd?

• Herd immunity breaks down if not enough of the population is vaccinated—resulting in outbreaks of disease

• Depending on the vaccine, need between 75 – 93% of the population immunized for herd immunity:
  – Pertussis 92-94%
  – Mumps 75-86%
  – Measles 83-94%
Herd failures

• Outbreaks occur in undervaccinated communities, esp combined w/ global exposures:
  – Measles outbreak San Diego 2008
  – Intentionally unvaccinated 7 year old exposed in Switzerland
  – Resulted in 839 exposed persons, 11 additional cases (all in unvaccinated children), and the hospitalization of an infant too young to be vaccinated
  – 48 children too young to be vaccinated were exposed and quarantined at a cost of $750 / family

• Message to Parents
Social Responsibility

• When clusters of unvaccinated children allow a vaccine preventable illness to gain a toe-hold in community, the risk of serious infections is increased for:
  – *Children with leukemia or other immunosuppression*
  – *Infants too young to be vaccinated*
  – *Elderly persons who may not be immune*
  – *Adults receiving chemotherapy or other immunosuppressive agents*
  – *Others who may not have a good response to vaccines*

• Unvaccinated children may be required to stay at home and be quarantined during outbreaks
Isn’t Natural Infection Better?

• While natural immunity is generally better than vaccine-induced immunity (that is why booster doses of vaccines are needed), the high price of natural immunity – occasional severe and fatal disease – is not a risk worth taking

  – *Before vaccines – pneumococcus caused 17,000 cases of invasive disease in kids < 5 yo / year, 700 cases meningitis & 200 deaths*

• In some cases, vaccine induced immunity is better (i.e. for Hib – body has difficulty mounting a lasting response and responds better to conjugated vaccine)

Is Natural Infection Better?

Risk of Disease

- Measles
  - Pneumonia: 1 in 20
  - Encephalitis: 1 in 2000
  - Death: 1 in 3000

- Mumps
  - Encephalitis 1 in 300

- Rubella
  - Congenital Rubella 1 in 4 if woman infected early in pregnancy

Risk of Vaccine

- MMR
  - Encephalitis or severe allergic reaction: 1 in a million

“Six Common Misconceptions about Vaccination and how to respond to them.”
http://www.cdc.gov/nip/publications/6mishome.htm

http://www.cdc.gov/vaccines/vac-gen/images/measles_incidence.gif
### Natural Infection Better?

#### Risk of Disease

- **Diptheria**
  - *Death*: 1 in 20

- **Tetanus**
  - *Death*: 3 in 100

- **Pertussis**
  - *Pneumonia*: 1 in 8
  - *Encephalitis*: 1 in 20
  - *Death*: 1 in 200

#### Risk of Vaccine

- **DTaP**
  - Continuous crying, then full recovery: 1 in 100
  - Seizure/convulsion or shock, then full recovery: 1 in 1750
  - Acute encephalopathy: 0 – 10.5 in 1,000,000
  - Death: None proven

---

**“Six Common Misconceptions about Vaccination and how to respond to them.”**
[http://www.cdc.gov/nip/publications/6mishome.htm](http://www.cdc.gov/nip/publications/6mishome.htm)
<table>
<thead>
<tr>
<th>Disease</th>
<th>Maximum cases (yr)</th>
<th>1998(^a)</th>
<th>Percentage change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diphtheria</td>
<td>206,939 (1921)</td>
<td>1</td>
<td>-99.99</td>
</tr>
<tr>
<td>Measles</td>
<td>894,134 (1941)</td>
<td>89</td>
<td>-99.99</td>
</tr>
<tr>
<td>Mumps</td>
<td>152,209 (1968)</td>
<td>606</td>
<td>-99.60</td>
</tr>
<tr>
<td>Pertussis</td>
<td>265,269 (1934)</td>
<td>6279</td>
<td>-97.63</td>
</tr>
<tr>
<td>Polio (wild)</td>
<td>21,269 (1952)</td>
<td>0</td>
<td>-100.00</td>
</tr>
<tr>
<td>Cong. Rubella synd.</td>
<td>20,000(^b) (1964–5)</td>
<td>6</td>
<td>-99.98</td>
</tr>
<tr>
<td>Tetanus</td>
<td>1560(^b) (1948)</td>
<td>34</td>
<td>-97.82</td>
</tr>
<tr>
<td>Invasive Hib disease</td>
<td>20,000(^b) (1984)</td>
<td>51</td>
<td>-99.75</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1,639,066</strong></td>
<td><strong>7411</strong></td>
<td><strong>-99.55</strong></td>
</tr>
<tr>
<td>Vaccine adverse events(^c)</td>
<td>0(^b)</td>
<td>(10,236)</td>
<td></td>
</tr>
</tbody>
</table>

\(^a\) Final totals of reported cases to the CDC.

\(^b\) Estimated because no national reporting existed in the prevaccine era.

\(^c\) Total reports of adverse event after vaccination against the diseases listed = 5,522.
Vaccines and Autism

• Wakefield
  – Where he got his data
  – What he did with it
  – How others responded
    • Study has since been discredited; journal and co-authors have retracted findings

• Studies since have disproven link, including one large study of 500,000 Danish children
  – Autism rates increasing in face of stable MMR vaccination rates
  – Rate of autism increasing even though thimerosal no longer in vaccines
PUBLIC HEALTH

Is Katie Couric The Next Jenny McCarthy?
A former Playboy Bunny spreading misinformation is bad enough

By Alexandra Sifferlin @acsifferlin | Dec. 04, 2013 | 181 Comments
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Thursday, December 05, 2013 | Stay Connected

Physicians’ Organization Advises Caution Before Getting Vaccine

http://ideas.time.com/2013/12/04/is-katie-couric-the-next-jenny-mccarthy/
Katie Couric’s discussion on HPV vaccine sparks backlash

On her talk show, journalist Katie Couric hosted two mothers who said they lost their daughters after they received the human papillomavirus vaccine, as well as Dr. Diane Harper, a lead researcher in the development of HPV vaccines Gardasil and Cervarix. Harper claimed that the vaccine’s effectiveness wanes after five years, contradicting CDC data showing no evidence of waning protection. Couric was criticized for offering a platform to the anti-vaccine movement. Los Angeles Times (tiered subscription model) (12/5), The Washington Times (12/5)

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CONSPIRACIES

NOVEMBER 11, 2013

I've Got Whooping Cough. Thanks a Lot, Jenny McCarthy.

BY JULIA IOFFE

@juliaioffe

Share Tweet
What About Mercury?

- Thimerosal (compound containing ETHYLmercury) added as a preservative to vaccines to prevent bacterial contamination
  - Concerns about possible link to autism based on neurotoxicity of METHYLmercury (a different type of mercury found in tunafish, etc)
    - Iran, 1971
- Taken out of vaccines as precautionary measure in 2003 (neurotoxicity of ETHYLmercury was not well studied at the time)
  - Denmark
- Currently only found in certain influenza vaccines
- Institute of Medicine has since rejected any link between autism and thimerosal
"All we have to do is place them on the waiting room chairs!"
What about Aluminum?

- 3rd most abundant element on the earth’s surface and the most abundant metal
- In the air we breathe, the food we eat, and the water we drink
  - *Breast milk and infant formulas*
- The amount in vaccines is approximately equivalent to 33 oz of infant formula
Disposition of Aluminum

• 100% of aluminum is absorbed following vaccination

• Only 1% of aluminum is absorbed after ingestion

• Aluminum enters the circulation, binds to transferrin, and is eliminated by kidneys
  – 50% eliminated in 24 hour
  – 85% eliminated in 13 days
  – 96% eliminated in 3 years
What are the safety concerns with aluminum?

- Can cause encephalopathy, osteomalacia, and anemia in two groups: severely premature infants and patients on chronic dialysis
- Must meet two criteria to cause problems
  - Decreased or absent renal function AND
  - Large source of exogenous aluminum (i.e., IV solutions or antacid)
- Circulating levels of aluminum in those with symptoms between 100-1,000 ng/ml
- Typically, children and adults have between 1-5 ng/ml of aluminum in blood
- Injected vaccines do not raise that level
Abortions

- Some vaccines made using cell lines from aborted fetuses
- May choose to “take a prophetic stand”
- “But Catholic parents who wish to consent to its use can be assured that there is no general obligation to refuse permission for the vaccination to be given. Consenting does not condone abortion, nor amount to encouraging further abortions for this vaccine. The substantial benefits of this vaccine, for which there is no substitute available, may be accepted.”
Specific Vaccines

• **A) Live vaccines against rubella**:  
  – the monovalent vaccines against rubella Meruvax®!! (Merck) (U.S.), Rudivax® (Sanofi Pasteur, Fr.), and Ervevax® (RA 27/3) (GlaxoSmithKline, Belgium);  
  – the combined vaccine MR against rubella and measles, commercialized with the name of M-R-VAX® (Merck, US) and Rudi-Rouvax® (AVP, France);  
  – the combined vaccine against rubella and mumps marketed under the name of Biavax®!! (Merck, U.S.),  
  – the combined vaccine MMR (measles, mumps, rubella) against rubella, mumps and measles, marketed under the name of M-M-R® II (Merck, US), R.O.R.®, Trimovax® (Sanofi Pasteur, Fr.), and Priorix® (GlaxoSmithKline UK).

• **B) Other vaccines, also prepared using human cell lines from aborted foetuses**:  
  – two vaccines against hepatitis A, one produced by Merck (VAQTA), the other one produced by GlaxoSmithKline (HAVRIX), both of them being prepared using MRC-5;  
  – one vaccine against chicken pox, Varivax®, produced by Merck using WI-38 and MRC-5;  
  – one vaccine against poliomyelitis, the inactivated polio virus vaccine Poliovax® (Aventis-Pasteur, Fr.) using MRC-5;  
  – one vaccine against rabies, Imovax®, produced by Aventis Pasteur, harvested from infected human diploid cells, MRC-5 strain;  
  – one vaccine against smallpox, AC AM 1000, prepared by Acambis using MRC-5, still on trial.
Pork

- Rabbi Abraham Adler, BPharm MRPharm S
  Kashrus and Medicines Information Service

  *It should be noted that according to Jewish laws, there is no problems with porcine or other animal derived ingredients in non oral products. This includes vaccines, injections, suppositories, creams and ointments.*

- **1995 at a seminar convened by the Islamic Organization for Medical Sciences on the topic "The Judicially Prohibited and Impure Substances in Foodstuff and Drugs."**

  “Consequently, the scholars determined that the transformation of pork products into gelatin alters them sufficiently to make it permissible for observant Muslims to receive vaccines containing pork gelatin and to take medicine packaged in gelatin capsules.”
<table>
<thead>
<tr>
<th>Gelatin (Porcine)</th>
<th>Flumist Quad (MedImmune)</th>
<th>Influenza</th>
<th>2.00 mg/0.2mL dose hydrolyzed gelatin</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Fluzone (sp)</td>
<td>Influenza</td>
<td>0.05% in 0.25 mL and 0.5 mL dose (Trivalent only)</td>
</tr>
<tr>
<td></td>
<td>JE-Vax</td>
<td>Japanese Encephalitis</td>
<td>500 mcg (per 1 mL dose)</td>
</tr>
<tr>
<td></td>
<td>MMR II (Merck)</td>
<td>MMR</td>
<td>14.5 mg hydrolyzed gelatin</td>
</tr>
<tr>
<td></td>
<td>ProQuad (Merck)</td>
<td>MMR+varicella</td>
<td>11 mg hydrolyzed gelatin</td>
</tr>
<tr>
<td></td>
<td>Varivax (Merck)</td>
<td>Varicella</td>
<td>12.5 mg hydrolyzed gelatin</td>
</tr>
<tr>
<td></td>
<td>YF-Vax (sp)</td>
<td>Yellow Fever</td>
<td>as stabilizer</td>
</tr>
<tr>
<td></td>
<td>Zostavax (Merck)</td>
<td>Varicella Zoster</td>
<td>15.58 mg hydrolyzed gelatin</td>
</tr>
</tbody>
</table>
Bovine Gelatin

- No objection from Hindu or Buddhism sources
- Jains
  - “perhaps with some regret”
  - When considering vaccination, Jains may benefit from an explanation of the seriousness of the diseases to be prevented, to explain the rationale for killing microorganisms in the course of vaccine production
## Yeast

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>Disease</th>
<th>Yeast Presence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comvax (Merck)</td>
<td>Hib-HepB</td>
<td>No detectable yeast DNA; ≤1% yeast protein</td>
</tr>
<tr>
<td>Engerix-B (GSK)</td>
<td>Hep B</td>
<td>≤5% yeast protein</td>
</tr>
<tr>
<td>Gardasil (Merck)</td>
<td>HPV</td>
<td>&lt;7 mcg yeast protein</td>
</tr>
<tr>
<td>Menevo (Novartis)</td>
<td>Meningococcal</td>
<td>&quot;...CY medium containing yeast extracts ...&quot;</td>
</tr>
<tr>
<td>Pediarix (GSK)</td>
<td>Hep B</td>
<td>≤5% yeast protein</td>
</tr>
<tr>
<td>Prevnar (WL)</td>
<td>Pneumococcal</td>
<td>&quot;...and yeast extract-based medium&quot;</td>
</tr>
<tr>
<td>Recombivax HB (Merck)</td>
<td>Hep B</td>
<td>&lt;1% yeast protein</td>
</tr>
<tr>
<td>Twinrix (GSK)</td>
<td>Hep AB</td>
<td>≤5% yeast protein</td>
</tr>
<tr>
<td>Vivotif Berna (Berna)</td>
<td>Typhoid</td>
<td>yeast extract from media</td>
</tr>
</tbody>
</table>
• **Amish and related communities**
  – *Immunization not prohibited, but vaccination uptake varies*

• **Christian scientists**
  – *Generally decline*
  – *Spiritual leader Mary Eddy said:*
    • Rather than quarrel over vaccination, I recommend, if the law demand, that an individual submit to this process, that he obey the law, and then appeal to the gospel to save him from bad physical results”

• **Jehovah’s Witnesses—since 1990s, accepts vaccination**

• Vaccination campaign can be equivalent to “being your brother’s keeper” or “loving thy neighbor”
Chiropractors

• Historical
Suspicions of Profit Motive

http://tastyspoonful.blogspot.com/

http://english.cntv.cn/program/bizasiaamerica/20120301/113636.shtml

thetruthsource.org
Suspicions of Profit Motive

Promiscuity

• No statistically significant increased rates sexual activity related outcomes

• HPV--potential to reduce worldwide cancer deaths by more than 200,000
Objectives—addressing what we know and what we do not

• What’s behind the fears—*vaccines are not perfect!*

• Review common concerns about vaccines and how to dispel common myths

• **Detail “alternative (DELAYED) schedules”**

• Describe communication techniques for discussing with families the importance of vaccines and possible consequences of refusal

• Provide reliable resources for parents to further address their immunization concerns
“Alternative” schedules = DELAYED
Dr. Bob’s “alternative” vaccine schedule

Dr. Bob’s Alternative Vaccine Schedule

- **2 months**: DTaP, Rotavirus
- **3 months**: Pc, HIB
- **4 months**: DTaP, Rotavirus
- **5 months**: Pc, HIB
- **6 months**: DTaP, Rotavirus
- **7 months**: Pc, HIB
- **9 months**: Polio, Flu (2 doses†)
- **12 months**: Mumps, Polio
- **15 months**: Pc, HIB
- **18 months**: DTaP, Chickenpox
"The good news is your anxiety over the flu vaccine shortage is highly treatable."
Objectives—addressing what we know and what we do not

• What’s behind the fears—*vaccines are not perfect!*

• Review common concerns about vaccines and how to dispel common myths

• Detail “alternative schedules”

• Describe communication techniques for discussing with families the importance of vaccines and possible consequences of refusal

• Provide reliable resources for parents to further address their immunization concerns
Good news: Talking to parents can make a difference… Main reason parents who planned to delay or not to get a vaccine for their child changed their minds: talk from their health care provider
Don’t give up!

• If dismiss the patient/family, lose opportunity to continue to advocate
• Many parents who initially refuse will eventually vaccinate
  – *May after continued discussions*
Communication Strategies

• Start with questions
  – Assess the parent’s reasons for wanting to delay or forgo vaccination in a non-confrontational manner
    • Tell me what you know about vaccines
    • How did you learn about them?
  – If parents have safety concerns or misconceptions about vaccination, ask them to identify the source(s) of those concerns or beliefs
  – Listen carefully, paraphrase to the parent what they have told you, and ask them if you have correctly understood what they have said
Communication strategies

- Respect & address concerns. Provide factual information in understandable language that addresses the specific concerns or misconceptions the parent has about vaccination.
- Educate parents about the dangers of vaccine-preventable disease and the risks of not vaccinating as they relate to the child, family, and community.
- Provide reliable resources for follow up information.
- Express your personal support for vaccinations and share experiences you have had with children with vaccine preventable diseases.
Motivational Interviewing

• Getting patient to arrive at their goal
• Successful
• Decentralizes power—empowers patient
• Patient based solutions, keeping in mind stages of change
  – Particularly effective for individuals were initially less ready to change (Resnicow) or unsure/ambivalent (Barnes)
  – Helping them to resolve their own ambivalence
• Principles
MI Principles

- Express empathy
- Develop discrepancies
- Support self efficacy
- Roll with resistance
- Spirit of collaboration
- Spirit of evoking motivations and commitment to change
- Spirit of encouraging autonomy
MI Technique

• OARS
  – Open-ended questions
  – Affirmations
  – Reflective listening
  – Summaries

• Elicit-provide-elicit
  – Neutrally

Barnes 2012; http://casaa.unm.edu/download/misc.pdf
MI and developmental stages

• Prochaska’s transtheoretical model of change
  – Pre-contemplation
  – Contemplation
  – Preparation
  – Action
  – Maintenance
  – (Relapse)
Refusal to Vaccinate

Child's Name ___________________________ Child's ID ___________________________

Parent(s)/Guardian's Name ___________________________

My child's doctor/nurse has advised me that my child (named above) should receive the following vaccines:

**Recommended**
- Hepatitis B vaccine
- Diphtheria, tetanus, acellular pertussis (DTaP) or tetanus toxoid
- Diphtheria tetanus (DT) or tetanus vaccine
- Poliovirus (IPV) vaccine
- Pneumococcal conjugate or polysaccharide vaccine
- Inactivated poliovirus (IPV) vaccine
- Measles-mumps-rubella (MMR) vaccine
- Varicella (chickenpox) vaccine
- Influenza (flu) vaccine
- Meningoconjugate or polysaccharide vaccine
- Hepatitis A vaccine
- Rotavirus vaccine
- Human papillomavirus vaccine
- Other ______

**Declined**

That some vaccine-preventable diseases are common in other countries and that my unvaccinated child could easily get one of these diseases while traveling or from a traveler.

If my child does not receive the vaccine(s) according to the medically accepted schedule, the consequences may include:

- Contracting the illness the vaccine is designed to prevent
- The outcomes of these illnesses may include one or more of the following: certain types of cancer, pneumonia, illness requiring hospitalization, death, brain damage, paralysis, meningitis, seizures, and deafness; other severe and permanent effects from these vaccine-preventable diseases are possible as well.

- Transmitting the disease to others (including those too young to be vaccinated or those with immune problems), possibly requiring my child to stay out of school or school and requiring someone to miss work to stay home with my child during disease outbreaks.

- My child's doctor and the American Academy of Pediatrics, the American Academy of Family Physicians, and the Centers for Disease Control and Prevention all strongly recommend that the vaccine(s) be given according to the recommendations.

Nevertheless, I have decided at this time to decline or defer the vaccine(s) recommended for my child, as indicated above, by checking the appropriate box under the column titled "Declined." I know that failure to follow the recommendations about vaccination may endanger the health or life of my child and others with whom my child might come into contact. I therefore agree to tell all health care professionals in all settings what vaccines my child has not received because he or she may need to be isolated or may require immediate medical evaluation and tests that might not be necessary if my child had been vaccinated.

I know that I may read this issue with my child's doctor or nurse, who has answered all of my questions about the recommended vaccine(s). A list of reasons for vaccinating, possible health consequences of non-vaccination, and possible side effects of each vaccine is available at www.cdc.gov/vaccines/pubs/vac/rf.pdf.

I understand the following:

- The purpose of and the need for the recommended vaccine(s).
- The risks and benefits of the recommended vaccine(s).

Parent/Guardian Signature: ___________________________ Date: ___________________________

Witness: ___________________________ Date: ___________________________

I have had the opportunity to redesign my decision not to vaccinate my child and still decline the recommended immunizations.

[Signatures and dates]

American Academy of Pediatrics
Dedicated to the Health of All Children

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www2.aap.org/immunization/pediatricians/pdf/refusaltovaccinate.pdf
Objectives—addressing what we know and what we do not

- What’s behind the fears—*vaccines are not perfect!*
- Review common concerns about vaccines and how to dispel common myths
- Detail “alternative schedules”
- Describe communication techniques for discussing with families the importance of vaccines and possible consequences of refusal
- Provide reliable resources for parents (and providers) to further address their immunization concerns
Websites and Resources for Parents

  Excellent website includes vaccine safety info, testimonials and videos from parents whose children have suffered from vaccine preventable diseases as well as a blog for parents.

• [http://vaccine.chop.edu/parents](http://vaccine.chop.edu/parents)
  Another comprehensive website. Includes option of monthly newsletter for parents and a section on educational videos for parents to watch.

• [http://www.aap.org/immunization/](http://www.aap.org/immunization/)
  Includes the immunization schedule, robust information on vaccine safety concerns (target to parental audience), nice link to how to evaluate info on the internet, as well as documents addressing religious concerns re the use of aborted fetuses for live cell line vaccines and the use of porcine gelatin

• [http://www.familiesfightingflu.org](http://www.familiesfightingflu.org)

• Clear answers and Smart advice about Your Baby’s Shots (Ari Brown)
Billing When Vaccines are Recommended but not Given

- List appropriate code for the vaccine that is not given (V03–V06) + the V64 (vaccination not carried out) series of codes, as secondary to visit reason (eg, V20.2)
  - Allows practices to track a patient's immunization history and improve vaccine recall systems
  - Serves as a reminder to complete the Refusal to Vaccinate Form, if repeated
  - Lets payers know of the reason for not giving vaccine—not having forgotten—and for reporting vaccines and their administration when performed at a different time

- V15.83 (personal history of under-immunization status) should be reported when a patient is behind on immunizations
Billing—ICD-9

- V64.00 Vaccination not carried out, unspecified reason
- V64.01 Vaccination not carried out because of acute illness
- V64.02 Vaccination not carried out because of chronic illness or condition
- V64.03 Vaccination not carried out because of immune compromised state
- V64.04 Vaccination not carried out because of allergy to vaccine or component
- V64.05 Vaccination not carried out because of caregiver refusal
- V64.06 Vaccination not carried out because of patient refusal
- V64.07 Vaccination not carried out for religious reasons
- V64.08 Vaccination not carried out because patient had disease being vaccinated against
- V64.09 Vaccination not carried out for other reason
Billing, ICD-10

- **Z28 Immunization not carried out and underimmunization status**
  - **Z28.0** Immunization not carried out because of contraindication
  - **Z28.01** Immunization not carried out because of acute illness of patient
  - **Z28.02** Immunization not carried out because of chronic illness or condition of patient
  - **Z28.03** Immunization not carried out because of immune compromised state of patient
  - **Z28.04** Immunization not carried out because of patient allergy to vaccine or component
  - **Z28.09** Immunization not carried out because of other contraindication

- **Z28.1 Immunization not carried out because of patient decision for reasons of belief or group pressure**

- **Z28.2 Immunization not carried out because of patient decision for other and unspecified reason**
  - **Z28.20** Immunization not carried out because of patient decision for unspecified reason
  - **Z28.21** Immunization not carried out because of patient refusal
  - **Z28.29** Immunization not carried out because of patient decision for other reason

- **Z28.3 Underimmunization status**
  - **Z28.8** Immunization not carried out for other reason
  - **Z28.81** Immunization not carried out due to patient having had the disease
  - **Z28.82** Immunization not carried out because of caregiver refusal
  - **Z28.89** Immunization not carried out for other reason

- **Z28.9 Immunization not carried out for unspecified reason**
Billing – CPT

- CPT codes **99401–99404** (preventive medicine counseling, individual)
  - *For promoting health and preventing illness or injury*
  - *Not reported when counseling is related to a condition, disease, or treatment*
  - *Time-based codes: require documentation of the total time spent in counseling and a summary of the issues discussed.*
  - *May be reported separately from other E/M services (e.g., office visits, preventive medicine visits)*
    - Modifier 25

- Remember that reviewing or discussing the risks and benefits of vaccines and included in V20.2, so can only bill for this if vaccines are subsequently refused after counseling
Billing – CPT, cont’d

- Preventive medicine counseling or risk factor reduction intervention(s) provided to an individual
  - 99401--approximately 15 minutes
  - 99402--approximately 30 minutes
  - 99403--approximately 45 minutes
  - 99404--approximately 60 minutes
STFM Group on Immunization Education

Shots Online

2013 electronic schedules for your PC
- 2013 Childhood Immunization Schedules (CDC)
- 2013 Adult Immunization Schedule (CDC)

To access the mobile application, select the appropriate device below.

iPhone   Android
Websites and Resources For Providers

- AAP’s Collection of Resources to Help Communicate with Families About Vaccines:
  [http://www2.aap.org/immunization/pediatricians/communicating.html](http://www2.aap.org/immunization/pediatricians/communicating.html)
  [http://www2.aap.org/immunization/pediatricians/refusaltovaccinate.html](http://www2.aap.org/immunization/pediatricians/refusaltovaccinate.html)


- CDC. Six Common Misconceptions About Vaccinations and How to Respond to Them. [http://www.cdc.gov/vaccines/vac-gen/6mishome.htm](http://www.cdc.gov/vaccines/vac-gen/6mishome.htm)

- Immunization Action Coalition (IAC). Responding to Concerns About Vaccines. [www.immunize.org/concerns/index.htm](http://www.immunize.org/concerns/index.htm)

- IAC. Reliable Sources of Immunization Information. [www.immunize.org/catg.d/p4012.pdf](http://www.immunize.org/catg.d/p4012.pdf)

- Vaccine Related Journal Articles that Explore How to Communicate to Parents: [http://www.immunize.org/journalarticles/comm_talk.asp](http://www.immunize.org/journalarticles/comm_talk.asp)


Additional Resources/References

  [http://www.pediatrics.org/cgi/content/full/105/4/e43](http://www.pediatrics.org/cgi/content/full/105/4/e43)
  - *Mentioned in this talk but is a nice resource that helps explain the historical objection to vaccines you might face from patients who are listening to conservative chiropractors*

  - *Based on the National Immunization Survey (2003-2004) explores doubt indicators regarding vaccines via telephone survey of parents*
Additional Resources/References

  http://www.pediatrics.org/cgi/content/full/123/1/e164
  - Discusses point by point, scientific flaws / counterarguments to the alternative vaccine schedule as advocated in Dr. Sear’s well publicized book: “The Vaccine Book: Making the Right Decision for Your Child.”

- Lecture by Paul Offit: Communicating Good Science Under a Cloud of Doubt. Webinar can be viewed at:  
  http://www.nphic.net/component/content/article/326/190-mrsa-webinar-video.html
Responsibilities

• To patients
• To families
• To communities
The Five-Year Moving Average of Excess Deaths Attributed to Both Pneumonia and Influenza and All Causes, for Japan and the United States
Reichert NEJM 2001
Thank you!

fisherowens@peds.ucsf.edu
Questions?
Young, Geier, Geier paper refutation

- Imputed data
- Confounding
- Ecological design
MI--Reactions

- Affirmations—behaviors or characteristics
- Reflections
  - Simple
  - Complex
    - Reflection of emotion
    - Reflection of meaning
    - One-sided/Two-sided
    - Amplified
  - Reframing
- Summarizing
- Asking permission to provide information