Vaccine Hesitancy and Alternative Vaccine Schedules

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## Presenter Disclosures

<table>
<thead>
<tr>
<th>Category</th>
<th>Disclosures</th>
</tr>
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<tr>
<td>Consultant/ Speakers bureaus</td>
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| Research funding                              | Agency for Healthcare Research and Quality  
                                           | National Institutes of Health      |
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Objectives

• Explore factors that contribute to vaccine hesitancy

• Review evidence related to the safety of the currently recommended vaccine schedule

• Review common questions and misperceptions among parents that contribute to requests for ‘alternative’ vaccine schedules

• Explore strategies for addressing vaccine concerns
### 2016 Vaccine Schedule

Figure 1. Recommended immunization schedule for persons aged 0 through 18 years – United States, 2016.

(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</td>
<td>2nd</td>
<td></td>
<td></td>
<td>3rd</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4th</td>
<td>5th</td>
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</tr>
<tr>
<td>Rotavirus (RV/ FV) (2-dose series; RSV (3-dose series)</td>
<td>1st</td>
<td>2nd</td>
<td>3rd</td>
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</tr>
<tr>
<td>Diphtheria, tetanus, &amp; acellular pertussis (DTaP; &lt;7 yrs)</td>
<td>1st</td>
<td>2nd</td>
<td>3rd</td>
<td></td>
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<td>5th</td>
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</tr>
<tr>
<td>Haemophilus influenzae type b (Hib)</td>
<td>1st</td>
<td>2nd</td>
<td>3rd</td>
<td></td>
<td>4th</td>
<td></td>
<td></td>
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<td>5th</td>
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<tr>
<td>Pneumococcal conjugate (PCV13)</td>
<td>1st</td>
<td>2nd</td>
<td>3rd</td>
<td></td>
<td></td>
<td>4th</td>
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<td>5th</td>
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<tr>
<td>Inactivated poliovirus (IPV; &lt;18 yrs)</td>
<td>1st</td>
<td>2nd</td>
<td>3rd</td>
<td></td>
<td></td>
<td>4th</td>
<td></td>
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<td>5th</td>
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</tr>
<tr>
<td>Influenza (IIV, LAIV)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3rd</td>
<td></td>
<td></td>
<td>4th</td>
<td>Annual vaccination (IIV only) 1 or 2 doses</td>
<td>Annual vaccination (LAIV or IIV) 1 or 2 doses</td>
<td>Annual vaccination (LAIV or IIV) 1 dose only</td>
<td></td>
<td></td>
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<tr>
<td>Measles, mumps, rubella (MMR)</td>
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<td></td>
<td></td>
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<td>2nd</td>
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<tr>
<td>Varicella (VAR)</td>
<td></td>
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<td></td>
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<tr>
<td>Hepatitis A (HepA)</td>
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</tr>
<tr>
<td>Meningococcal B-1 (Hib-MenCY ≥ 6 weeks; MenACWY-D ≥ 9 mos; MenACWY-CRM ≥ 2 mos)</td>
<td></td>
<td></td>
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<td></td>
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<td>2nd</td>
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</tr>
<tr>
<td>Tetanus, diphtheria, &amp; acellular pertussis (Tdap ≥ 7 yrs)</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2nd</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Human papillomavirus (2xHPV; females only: 4xHPV, 9xHPV; males and females)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2nd</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meningococcal B-2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2nd</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Pneumococcal polysaccharide (PPSV23)</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>2nd</td>
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</tr>
</tbody>
</table>

- **Range of recommended ages for all children**
- **Range of recommended ages for catch-up immunization**
- **Range of recommended ages for certain high-risk groups**
- **Range of recommended ages for non-high-risk groups that may receive vaccine, subject to individual clinical decision making**
- **No recommendation**
# Impact of Vaccines

<table>
<thead>
<tr>
<th>DISEASE</th>
<th>PRE-VACCINE ERA ESTIMATED ANNUAL MORBIDITY*</th>
<th>MOST RECENT REPORTS OR ESTIMATES† OF U.S. CASES</th>
<th>PERCENT DECREASE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diphtheria</td>
<td>21,053</td>
<td>0†</td>
<td>100%</td>
</tr>
<tr>
<td><em>H. influenzae</em> (invasive, &lt;5 years of age)</td>
<td>20,000</td>
<td>31‡</td>
<td>&gt;99%</td>
</tr>
<tr>
<td>Hepatitis A</td>
<td>117,333</td>
<td>2,890§</td>
<td>98%</td>
</tr>
<tr>
<td>Hepatitis B (acute)</td>
<td>66,232</td>
<td>18,800§</td>
<td>72%</td>
</tr>
<tr>
<td>Measles</td>
<td>530,217</td>
<td>187†</td>
<td>&gt;99%</td>
</tr>
<tr>
<td>Mumps</td>
<td>162,344</td>
<td>584†</td>
<td>&gt;99%</td>
</tr>
<tr>
<td>Pertussis</td>
<td>200,752</td>
<td>28,639†</td>
<td>86%</td>
</tr>
<tr>
<td>Pneumococcal disease (invasive, &lt;5 years of age)</td>
<td>16,069</td>
<td>1,900‡</td>
<td>88%</td>
</tr>
<tr>
<td>Polio (paralytic)</td>
<td>16,316</td>
<td>1†</td>
<td>&gt;99%</td>
</tr>
<tr>
<td>Rotavirus (hospitalizations, &lt;3 years of age)</td>
<td>62,500**</td>
<td>12,500†</td>
<td>80%</td>
</tr>
<tr>
<td>Rubella</td>
<td>47,745</td>
<td>9†</td>
<td>&gt;99%</td>
</tr>
<tr>
<td>Congenital Rubella Syndrome</td>
<td>152</td>
<td>1†</td>
<td>99%</td>
</tr>
<tr>
<td>Smallpox</td>
<td>29,005</td>
<td>0†</td>
<td>100%</td>
</tr>
<tr>
<td>Tetanus</td>
<td>580</td>
<td>26†</td>
<td>96%</td>
</tr>
<tr>
<td>Varicella</td>
<td>4,085,120</td>
<td>167,490§‡‡‡‡</td>
<td>96%</td>
</tr>
</tbody>
</table>

* CDC. JAMA November 14, 2007; 298(18):2135–63.
‡ An additional 10 cases of Hib are estimated to have occurred among the 185 reports of Hib (<5 years) with unknown serotype.
†‡ CDC. New Vaccine Surveillance Network, 2013 data (unpublished); U.S. rotavirus disease now has a biennial pattern.
Epidemiology of Vaccine Refusal

• Majority of physicians report >1 vaccine refusal / month

• >90% report request to spread out vaccines
  • 1 out of 5 report that at least 10% of parents make request

• 13% children under-vaccinated due to parental choice

Epidemiology of Vaccine Refusal

- Received first vaccine at age 4-5 mo
- Received first vaccine at age 6-11 mo
- Received first vaccine at age 12-23 mo
- No vaccines before age 24 mo
- No hepatitis B, polio, MMR, or varicella vaccines
- First 3 doses of pneumococcal and Hib given on the same day but on a different day from DTaP

Graph showing the number of children per 10,000 in the study population by birth cohort from 2004 to 2008.
HPV Vaccine Rates Low Compared to Other Adolescent Vaccines

National Estimated Vaccination Coverage Levels among Adolescents 13-17 Years, NIS-Teen 2006-2014

[Graph showing vaccination coverage levels for various adolescent vaccines from 2006 to 2014, with notes on adolescents aged 13-17 years in the United States in 2014 and the revised APD definition.]
Pediatricians and Delayed Schedules

- Growing number of pediatricians always / often accept requests for delay (13 → 37%)
  - But...<10% agree with parents who make requests

| Parents choosing to “spread out” vaccines put their children at risk for getting/contracting a vaccine preventable disease.* | 53% | 34% | 13% |
| It is more painful to children to bring them back repeatedly for shots rather than give them multiple shots at the same time.* | 49% | 35% | 16% |
| If I agree to work with parents in “spreading out” vaccines, it allows for a greater degree of trust between us. | 24% | 58% | 18% |

- Likelihood of accepting requests associated with beliefs about the vaccine schedule
- Providers may overestimate parental concerns about # of shots

Kempe A. Pediatrics, 2015; Wallace et al, Vaccine 2014
A consequence of success

- Low perceived risk of VPD’s and underappreciation of transmission risks
- Underappreciation of disease severity
- Easy access to misinformation → persistent vaccine safety concerns
A consequence of success and changing times

- Distrust and scientific denialism
- Rapid dissemination of information
- Naturalism
- Changes in Decision-making
- Distortion of risk
Defining Vaccine Hesitancy

- WHO Strategic Advisory Group of Experts on Immunization and the National Vaccine Advisory Committee established vaccine hesitancy working groups

- Define Vaccine Hesitancy
- Model Determinants of Vaccine Hesitancy
- Identify Strategies to Measure and Address Hesitancy
Adapted from MacDonald NE, SAGE Working Group on Vaccine Hesitancy; Vaccine 33 (2015).
The spectrum of vaccine acceptance

- Worried (2.6%)
- Fence Sitter (13%)
- Go along to get along (26%)
- Health advocate (25%)
- Immunization Advocate (33%)
- Refuser (<2%)
- Late / Selective Vaccinator (2-27%)
- The hesitant (20-30%)
- Cautious Acceptor (25-35%)
- Unquestioning Acceptor (30-40%)

WHY PARENTS REFUSE OR DELAY VACCINES FOR THEIR CHILDREN: ADDRESSING COMMON Misperceptions

- Too many shots
- Flooding the child with vaccines
- Too many preservatives
- Not natural immunity
- That vaccine hasn’t been around long enough yet
- I want to decide what is best for my child
- We never see this disease anymore
- Pharmaceutical companies are just pushing vaccines to make money

Isn’t natural immunity better?
Why do parents request alternative vaccine schedules?

- Vaccine safety concerns about long term side effects or specific outcomes like autism
- Low perceived risk of child contracting a vaccine preventable disease
- Concern that vaccination will affect immune system
- Parents’ desire to be involved in child’s medical care
- Concerns about vaccine additives
- Concerns about fever, pain associated with vaccination
<table>
<thead>
<tr>
<th>Age</th>
<th>Vaccines</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 months</td>
<td>DTaP, Rotavirus</td>
</tr>
<tr>
<td>3 months*</td>
<td>Pc, HIB</td>
</tr>
<tr>
<td>4 months</td>
<td>DTaP, Rotavirus</td>
</tr>
<tr>
<td>5 months*</td>
<td>Pc, HIB</td>
</tr>
<tr>
<td>6 months</td>
<td>DTaP, Rotavirus</td>
</tr>
<tr>
<td>7 months*</td>
<td>Pc, HIB</td>
</tr>
<tr>
<td>9 months</td>
<td>Polio, Flu (2 doses†)</td>
</tr>
<tr>
<td>12 months</td>
<td>Mumps, Polio</td>
</tr>
<tr>
<td>15 months</td>
<td>Pc, HIB</td>
</tr>
<tr>
<td>18 months</td>
<td>DTaP, Chickenpox</td>
</tr>
</tbody>
</table>
Are all of these vaccines too much for the immune system, especially in babies?
### The schedule has changed...

<table>
<thead>
<tr>
<th>Year</th>
<th>Vaccines</th>
<th># shots by 2 years of age</th>
<th># shots at one time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1900</td>
<td>Smallpox</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>1980</td>
<td>DTwP, Polio (OPV), MMR</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>2011</td>
<td>DTaP, Polio (IPV), MMR, Varicella, Hib, Pneumococcal conj. Hepatitis A and B Influenza, Rotavirus</td>
<td>26</td>
<td>5</td>
</tr>
</tbody>
</table>
Fewer immunologic components are in vaccines today than 100 years ago.
<table>
<thead>
<tr>
<th>Year</th>
<th>Vaccines</th>
<th># shots by age 2 yrs</th>
<th># shots at one time</th>
<th># antigens</th>
</tr>
</thead>
<tbody>
<tr>
<td>1900</td>
<td>Smallpox</td>
<td>1</td>
<td>1</td>
<td>200</td>
</tr>
<tr>
<td>1980</td>
<td>Diptheria, Tetanus, Pertussis (wc), Polio (OPV), Measles, Mumps, Rubella</td>
<td>5</td>
<td>2</td>
<td>~3,041</td>
</tr>
</tbody>
</table>
## Number of antigens in vaccines

<table>
<thead>
<tr>
<th>Year</th>
<th>Vaccines</th>
<th># shots by age 2 yrs</th>
<th># shots at one time</th>
<th># antigens</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>Diptheria \n Tetanus \n Pertussis (ac) \n Polio (IPV) \n MMR \n Varicella \n Hib \n Pneumococcal conj. \n Hepatitis A and B \n Influenza \n Rotavirus</td>
<td>26</td>
<td>5</td>
<td>1 \n 1 \n 2-5 \n 15 \n 24 \n 69 \n 2 \n 8 \n 5 \n 8 \n 15</td>
</tr>
</tbody>
</table>
That still seems like a lot - can infants handle 150 antigens?

• From birth, infants are challenged by bacteria in the environment (colonizing bacteria on intestines, skin, and throat; bacteria inhaled on dust).

• Vigorous sIgA responses within the first week of life keeps colonizing bacteria from invading.
Are infants too young to be vaccinated?

• Excellent immune responses to HBV vaccines given at birth.

• About 95% of infants will develop protective immune responses to HepB, Hib, DTaP, polio, and pneumococcal vaccines by 6 months of age.

• Need to be fully immunized against certain infections (Hib, pertussis, pneumococcus) by 6 months of age.
This just seems like too many shots at one time- why can’t I spread them out?
Spreading out shots does not reduce stress for infant

- Study showing that two shots are not more likely to induce cortisol (as a marker for stress) than one shot.

- Antigen load from vaccine is MUCH smaller than what an infant confronts every day in the environment

Are alternative vaccine schedules safer?

• Alternative schedules have NOT been evaluated for safety and efficacy
• IOM report supports safety of currently recommended schedule

The Childhood Immunization Schedule and Safety
Stakeholder Concerns, Scientific Evidence, and Future Studies
What about all of the additives in vaccines? Aluminum? Thimerosal?
“The alternative schedule suggests only one aluminum containing vaccine at a time in infant years. By spreading out the shots, you spread out the exposure so infants can process the aluminum without it reaching toxic levels.”

Robert Sears, *The Vaccine Book*, p. 239
Aluminum and Thimerosal

• Aluminum is the third most abundant element on the earth’s surface and the most abundant metal
  – Occurs naturally in teas, herbs, and spices
  – Added to foods such as leavening agents, anti-caking agents, emulsifiers, and coloring agents

• Thimerosal contains mercury (ethylmercury) which is also everywhere including food and water sources
Aluminum and mercury in food

- Aluminum and mercury are found in breast milk and infant formulas.

- By 6 months of age infants ingest:
  - 10mg aluminum from breast milk and 30mg from infant formula compared to 4mg from vaccines
  - 400µg mercury from breast milk compared to <200µg from vaccines

- Ethylmercury is readily excreted from body-breastmilk, fish and other food sources contain methylmercury which is more likely to accumulate
“The dose makes the poison”

- Aluminum can cause encephalopathy, osteomalacia and anemia in severely premature infants and patients on chronic dialysis.
- 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.
“The dose makes the poison”

• Thimerosal removed from vaccines in 2001
  – Now only in multidose preparations of inactivated influenza vaccines

• No evidence of mercury toxicity among children who received thimerosal-containing vaccines in multiple studies

• Everyone has small quantities heavy metals in body
Can you really be sure that vaccines don’t cause autism?
Vaccines and autism

• Sparked by 1998 publication in *The Lancet* by Wakefield, et al linking autism and MMR
  – Vaccine causes bowel inflammation letting brain-damaging proteins circulate

• Study retracted and findings refuted by multiple studies that have shown no evidence of this link

• Concern shifted to thimerosal and mercury

• No link found in multiple studies AND even after thimerosal removed from vaccines, autism rates have increased

Has evidence removed concern?
Why do parents refuse or delay HPV vaccines?

Reasons for not vaccinating (females), NIS-Teen 2008-13

<table>
<thead>
<tr>
<th>Reason</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not recommended</td>
<td>10.8%</td>
<td>8.5%</td>
<td>9.0%</td>
<td>13%</td>
</tr>
<tr>
<td>Not needed / not necessary</td>
<td>14.4%</td>
<td>15.5%</td>
<td>17.4%</td>
<td>14.7%</td>
</tr>
<tr>
<td>Lack of knowledge</td>
<td>15.8%</td>
<td>15.7%</td>
<td>10.2%</td>
<td>15.5%</td>
</tr>
<tr>
<td>Safety concerns</td>
<td>4.5%</td>
<td>7.7%</td>
<td>16.4%</td>
<td>14.2%</td>
</tr>
<tr>
<td>Not sexually active</td>
<td>14.1%</td>
<td>12.3%</td>
<td>11.1%</td>
<td>11.3%</td>
</tr>
</tbody>
</table>

My child doesn’t need HPV vaccine yet

• No benefit in waiting to initiate or complete the HPV vaccine series...early vaccination ensures protection before exposure

• HPV vaccines work most effectively when given prior to exposure

• No matter when your child becomes sexually active, young adults are at highest risk of HPV infection

• HPV vaccines give strongest immune response in younger adolescents

• HPV vaccination can be administered as part of the adolescent vaccine platform

¹Pedersen C, JAH 2007, Reisinger KS etal, PIDJ 2007
Addressing parental concerns: Let’s talk about sex?

- The “HPV vaccine is cancer prevention” message resonates strongly with parents

- HPV vaccination has not been associated with increase in sexual activity
I’ve heard that HPV vaccines haven’t been studied enough and aren’t safe

- HPV vaccine was tested for 7 years in about 30,000 women pre-licensure.

- Post-licensure, the vaccine has been tested in studies of more than 1 million people
  - GBS, seizures, syncope, appendicitis, stroke, VTE, autoimmune disorders, anaphylaxis, or congenital abnormalities.

- Known side effects
  - 1 in 60 will develop mild fever
  - 1 in 30 will develop discomfort around injection site

- Only syncope (0.1%) was found to correlate with vaccine administration
ADDRESSING HESITANCY
Communication and Policy
General Principles: A Multi-Faceted Approach

• Majority of parents look to their health care provider for reliable information and recommendations regarding vaccines

• Health care providers may also have questions and concerns about vaccines

• Parents also receive information from a wide range of sources

• Parents want to make the best decision to keep their child safe and healthy
  – Health care providers also want to keep children safe and healthy
Provider recommendation is one the most important predictors of vaccine acceptance.
Media, Politics and Vaccines
Provider recommendation matters

• Be proactive
• Know the disease
• Find a common ground
• Use numbers to communicate risk and provide perspective
• Use personal stories
• Know the vaccine- acknowledge known side effects but also emphasize evidence supporting safety and benefit
• Know about additional resources
• Make recommendation strong and consistent

A Strong Recommendation Can Drive Acceptance

- Parents whose provider used a participatory approach were significantly more likely to resist vaccine recommendation compared to a presumptive approach.

Targeted Messaging

- Worried (2.6%)
- Fence Sitter (13%)
- Go along to get along (26%)
- Health advocate (25%)
- Immunization Advocate (33%)

- Refuser (<2%)
- Late / Selective Vaccinator (2-27%)
- The hesitant (20-30%)
- Cautious Acceptor (25-35%)
- Unquestioning Acceptor (30-40%)

Each group requires a different approach.

4 approaches for different types of hesitancy

**Confidence**
- Most difficult to convince
- Focus on trust

**Convenience**
- Remove barriers to access
- Reminder / Recall

**Calculation**
- Address concerns
- Reliable information

**Complacent**
- Use a firm recommendation
- Raise awareness about disease outbreaks

Addressing Concerns: Dr. Bob’s Message

- Recommended schedule exposes infants to too much aluminum
- Vaccine preventable diseases (VPDs) are not that serious
- It is okay to hide in the herd
- Natural infection is better than vaccination
- Suggests vaccines cause chronic diseases
- Vaccine safety testing is insufficient

- Everyone has small quantities heavy metals in body → injected vaccines do not raise level
- Natural infection comes at risk of disease that could be severe
- Herd immunity has eroded due to delay and refusal
- Misrepresents risk
- Clear evidence that recommended vaccines are NOT associated with chronic diseases such as diabetes, eczema, or MS

Offit P, Moser C. Pediatrics 2009
Addressing Concerns: Dr. Bob’s Message

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Offit P, Moser C. Pediatrics 2009
What communication strategies do providers use?

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Always / Often %</th>
<th>Very / Somewhat Effective%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tell parents you immunize your own kids on schedule</td>
<td>66</td>
<td>20 / 64</td>
</tr>
<tr>
<td>Explain risk of deviating from schedule</td>
<td>68</td>
<td>9 / 55</td>
</tr>
<tr>
<td>Tell parents delaying vaccines is against your recommendation</td>
<td>66</td>
<td>7 / 52</td>
</tr>
<tr>
<td>Talk about outbreaks</td>
<td>60</td>
<td>14 / 58</td>
</tr>
<tr>
<td>Explain that not vaccinating puts other people at risk</td>
<td>49</td>
<td>2 / 32</td>
</tr>
<tr>
<td>Involve parents in vaccine administration (hold child for comfort)</td>
<td>49</td>
<td>14 / 36</td>
</tr>
<tr>
<td>Refer to another provider</td>
<td>3</td>
<td>4 / 12</td>
</tr>
</tbody>
</table>

Kempe A, Pediatrics 2015
Communication: Is Providing Information Effective?

• Different types of information about measles did not change beliefs about MMR and side effects or vaccines and autism
  – Parents who received a narrative about measles disease were more likely to report belief that MMR causes significant side effects
  – Parents who saw images of a child with measles were more likely to report agreement with the statement that vaccines cause autism

“Arguing unproductively about factual misconceptions only serves to further polarize views. It might feel good to rant and rave, but people rarely change their minds because someone called them stupid or wrong.”


Nyhan B, etal. Pediatrics 2014
Communication: It is both WHAT and HOW

- In a pilot study among 77 parents of young children, more parents who received a tailored message reported positive MMR vaccine intentions compared to parents who received an untailored message
  - Name
  - Content
  - Experience
  - Image

‘Based upon your answers, it sounds like you may be worried about…’

‘You may have heard things in the news…’

‘It may seem scary to get Sue vaccinated…’

Hendrix, et al. PEDIATRICS, 2014; 134(3)
Public health policy and vaccine acceptance
How can policy influence vaccine decision-making

Policy Approaches

- Mandatory Vaccination Programs
- Incentives or Penalties
- Optimize Access
- Reshape Social Norms
- Social Restriction
- Liability

Calculation

Complacency

Confidence

Convenience
How can policy influence vaccine decision-making

Policy Approaches

- Mandatory Vaccination Programs
- Economic Incentives or Penalties
- Optimize Access
- Reshape Social Norms
- Social Restriction
- Liability
Mandatory Vaccination: Individual Choice and Public Good

- Protects those who cannot be vaccinated
- Beneficence
- Share public health burden
- Makes vaccination a default

- Challenges autonomy
- Undermines trust
- Coercive
- May not address root cause of hesitancy
Mandatory Vaccination and Constitutional Law

• *Jacobson v. Massachusetts* (1905)
  – Smallpox outbreak → require vaccine or $5 fine
  “The liberty secured by the Constitution of the United States...does not import an absolute right...to be wholly freed from restraint. There are *manifold restraints to which every person is necessarily subject for the common good*....”

• *Prince v. Massachusetts* (1944)
  – Jehovah’s Witness claims right to have young children distribute pamphlets → religious freedom did not trump child labor laws
  “[A parent] cannot claim freedom from compulsory vaccination for the child any more than for himself on religious grounds. The right to practice religion freely does not include the liberty to expose the community to infectious disease...’
Mandatory vaccination as state policy

- All 50 states in U.S. have school entry requirements for childhood vaccines but states may allow exemptions
  - First amendment
- 47 states allow religious exemptions
- In 2013, CDC identifies about 30,000 children whose parents had chosen not to vaccinate for religious reasons
  - 17 states allow personal belief / philosophical exemptions
- Ease of obtaining an exemption significantly differs across states
How do Exemption Policies Influence Hesitancy?

# of Administrative Requirements (i.e. notarization, specific forms)
Ease of refusal can influence likelihood of refusal

Between 2009-12, none of the 31 bills introduced in 18 states to expand exemptions passed; 3 of 5 to restrict exemptions did pass

Omer SB, etal. NEJM 2012; 367; Omer SB JAMAPediatrics 2014;311(6).
Vaccine Exemption Rates for Children Entering Kindergarten: 2014-2015 School Year

MMWR August 28, 2015 / 64(33)
How can policy influence vaccine decision-making

- Mandatory Vaccination Programs
- Economic Incentives or Penalties
- Liability
- Social Restriction
- Optimize Access
- Reshape Social Norms

Policy Approaches
Public Policy to Influence Social Norms: Social Marketing

- Social marketing principles: Product, Price, Place, Promotion to change how vaccines are valued
How can policy influence vaccine decision-making

Policy Approaches:
- Mandatory Vaccination Programs
- Liability
- Economic Incentives or Penalties
- Social Restriction
- Optimize Access
- Reshape Social Norms
Removing system and cost barriers to improve access

2014/2015 School-Based Immunization Schedule

<table>
<thead>
<tr>
<th>Activity</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>June</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade 7 Hepatitis B</td>
<td>Dose 1</td>
<td>Dose 1</td>
<td></td>
<td></td>
<td>Dose 2</td>
<td>Dose 2</td>
<td>Dose 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grade 7 Meningococcal</td>
<td></td>
<td></td>
<td>Dose 1</td>
<td>Dose 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grade 8 HPV</td>
<td>Dose 1</td>
<td>Dose 1</td>
<td>Dose 2</td>
<td>Dose 2</td>
<td>Dose 3</td>
<td>Dose 3</td>
<td>Dose 3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Vaccines for Children
20 years of protecting America's children

The Vaccines for Children program was established in 1994 to make vaccines available to uninsured children. VFC has helped prevent disease and save lives...big time.

CDC estimates that vaccination of children born between 1994 and 2013 will:

- prevent 322 million illnesses
- help avoid 732,000 deaths
- save nearly $1.4 trillion in total societal costs

www.cdc.gov/features/vfcprogram

- http://www.hkpr.on.ca/portals/0/Images%20-%20Youth/imunization_sked.jpg
Vaccine hesitancy is a complex challenge that will require a multifaceted approach. A strong consistent message is crucial.
Resources

2013 Recommended Immunizations for Children from 7 Through 18 Years Old

7–10 YEARS
- Tdap
- MCV4
- Influenza (Yearly)*
- Pneumococcal Vaccine*
- Hepatitis A (HepA) Vaccine Series
- Hepatitis B (HepB) Vaccine Series
- Inactivated Polio Vaccine (IPV) Series
- Measles, Mumps, Rubella (MMR) Vaccine Series
- Varicella Vaccine Series

11–12 YEARS
- Tdap
- Human Papillomavirus (HPV) Vaccine: 3 Doses
- Meningococcal Conjugate Vaccine (MCV4) Dose 1
- MCV4 Dose 2
- Booster at age 16 years

13–18 YEARS
- Tdap
- HPV

Immunization

Communicating with Families

Despite vaccines’ success at preventing disease, parents still question the necessity of vaccinating. There are many reasons that parents state for not vaccinating, as well as different ways to build confidence during office conversations.

Vaccine-Hesitant Parents
Learn methods and strategies for talking with vaccine-hesitant parents.

Common Parental Concerns
Find sample responses to and resources for common parental concerns.

The Facts About Childhood Vaccines

Q&A Volume 7, Fall 2012

The Children’s Hospital of Philadelphia
Vaccine Education Center

vaccine safety resources
Resources

- Vaccine Education Center at The Children’s Hospital of Philadelphia (http://www.chop.edu/service/vaccine-education-center/home.html)
- National Network for Immunization Information (www.immunizationinfo.org)
- Vaccine Safety Datalink Project (www.cdc.gov/od/science/iso/vsd)
- Centers for Disease Control and Prevention: http://www.cdc.gov/vaccines/vpd-vac/hpv/default.htm#clinical
- Immunization Action Coalition: http://www.immunize.org
- Every Child By Two: http://www.ecbt.org
- Measles and Rubella Initiative: http://www.measlesrubellainitiative.org/
- Interagency Autism Coordinating Center (IACC): http://iacc.hhs.gov/index.shtml
Thank you!

“We’re Immunized!” Parents of Kids with Infectious Diseases “I’m Immunized” Campaign