Vaccine Exemptions

Joshua D. Arthur, MD, MTS, FAAP
Assistant Professor of Pediatrics, Saint Louis University School of Medicine
at SSM Health Cardinal Glennon Children's Hospital
September 14, 2016
Objectives

- Discuss family attitudes around vaccinations
- Discuss types of vaccine exemptions and their implications
- Discuss ways to address those who have or request a vaccine exemption
Case

- Patient is a 4 year old boy who presents to his physician for evaluation. His father declines immunizations due to recent concerns for recurrent diarrhea. He suggests that it might be better for his child to be infected with diseases “naturally” rather than receiving vaccination. He is particularly concerned with the risks of the immunization causing harm to the child.

Case

- In 1736 I lost one of my sons, a fine boy of four years old, by the smallpox taken in the common way. I long regretted bitterly and still regret that I had not given it to him by inoculation. This I mention for the sake of the parents who omit that operation, on the supposition that they should never forgive themselves if a child died under it; my example showing that the regret may be the same either way, and that, therefore, the safer should be chosen.”

  - Ben Franklin

The Vaccine Monster

- UK Vaccination acts of 1840, 1853, 1867
  - Mandatory vaccine for infants, then up to age 14
- Violent rioting ensued!
  - Focus on personal liberty and choice
- 1855 and on: state legislation in the US

Why vaccinate?

### Impact of Vaccines in the 20th & 21st Centuries

#### Comparison of 20th Century Annual Morbidity & Current Morbidity

<table>
<thead>
<tr>
<th>Disease</th>
<th>20th Century Annual Morbidity</th>
<th>2013 Reported Cases</th>
<th>% 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>Pertussis</td>
<td>200,752</td>
<td>28,639</td>
<td>86%</td>
</tr>
<tr>
<td>Tetanus</td>
<td>580</td>
<td>26</td>
<td>96%</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>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>Rubella</td>
<td>47,745</td>
<td>9</td>
<td>&gt;99%</td>
</tr>
<tr>
<td>CRS</td>
<td>152</td>
<td>1</td>
<td>99%</td>
</tr>
<tr>
<td><em>Haemophilus influenzae</em></td>
<td>20,000 (est.)</td>
<td>31†</td>
<td>&gt;99%</td>
</tr>
</tbody>
</table>

Sources:
- † CDC. MMWR August 15, 2014;63(32):702-715. (MMWR 2013 final data)
- § *Haemophilus influenzae* type b (Hib) <5 years of age. An additional 10 cases of Hib are estimated to have occurred among the 185 reports of Hi (<5 years of age) with unknown serotype.
Why not vaccinate?
Prevalence of vaccine hesitancy

- In a 2010 US national telephone survey, 3% had refused all vaccines, 19.4% refused or delayed at least 1 vaccine

- Not purely bimodal:
  - Immunization Advocates (33.0%) – strongly agree
  - Go Along to Get Alongs (26.4%) - agree
  - Health Advocates (24.8%) – slightly agree, but less sure about safety
  - Fencesitters (13.2%) – mixed feelings, neutral towards provider
  - Worrieds (2.6%) – concerned about side effects and trust of medical professionals

Kathryn M. Edwards, Jesse M. Hackell, Countering Vaccine Hesitancy. THE COMMITTEE ON INFECTIOUS DISEASES, THE COMMITTEE ON PRACTICE AND AMBULATORY MEDICINE. Pediatrics Sep 2016, 138 (3) e20162146; DOI: 10.1542/peds.2016-2146
Deborah Gust, PhD, MPH; Cedric Brown, MS; Kristine Sheedy, PhD Beth Hibbs, RN, MPH; Donna Weaver, RN, MN; Glen Nowak, PhD. Immunization Attitudes and Beliefs Among Parents: Beyond a Dichotomous Perspective. Am J Health Behav.™ 2005;29(1):81-92
Why not vaccinate?

- Vaccine hesitant parents
  - 44%-pain associated with multiple injections
  - 34%-unease about too many vaccines
  - 26%-autism or learning difficulties
  - 13.5%-vaccines could lead to chronic illness
  - 13.2%-vaccines not tested enough for safety

- Tend to have greater distrust of health care professionals and the government

- Tend to use more alternative medicine

- *Note that many of these factors may limit the effectiveness of arguing directly from scientific data*
Who should decide?

- Vaccination is a unique intervention because it effects not only the patient, but also society
- So, who is the best party to assess benefits and risks of immunization?
  - The government?
  - The parent?
What is the government’s role in vaccination?

- **Herd immunity**
  - Requires 30-95% of community members to be immunized
  - Health People 2020 goals: 90% for all vaccines
  - Pertussis and measles require >95% coverage

- Of the infants born in 2009, immunizations will prevent:
  - 42,000 early deaths
  - 20 million cases of disease
  - $13.5 billion in direct costs
  - $68.8 billion in societal costs

Medical Versus Nonmedical Immunization Exemptions for Child Care and School Attendance, COMMITTEE ON PRACTICE AND AMBULATORY MEDICINE et. al, Pediatrics Sep 2016, 138 (3) e20162145; DOI: 10.1542/peds.2016-2145
The government’s role

- Thus, all 50 states have requirements for proof of immunization for child care centers and public schools (and most private schools)
  - Entry requirements have been show to increase immunization rates
  - Entry requirements have been shown to decrease disease rates
- Government does not require all children to be vaccinated, only those attending school
What is the parent’s role in vaccination?

- Principal of best interest or parental authority
  - The parent is the most knowledgeable about their child’s current desires
  - The parent is most knowledgeable about the future values of the child
  - The parent will bear the consequences of medical decisions

- Least restrictive alternative
  - “If two options exist to address a public health problem, we are required, ethically, to choose the approach that poses fewer risks to other moral claims, such as liberty, privacy, opportunity, and justice, assuming benefits are not significantly reduced.”

What options exist for the hesitant parent?

- Medical exemptions
- Religious belief exemptions
- Philosophical or personal belief exemptions
- Over half of states (Missouri), exemptions can be withdrawn during an outbreak
Do exemptions matter? Pertussis and Measles

- Incidence of pertussis almost 50% higher in states with easily granted nonmedical exemptions
- From 1993-2004, 6 significant pertussis outbreaks in Michigan (1,111 pediatric pertussis cases)
- 23 clusters of immunization exemptions (RR 1.48-37.56)
  - In these clusters 3-fold chance of acquiring pertussis
- In the 5 largest statewide pertussis epidemics, 24-45% of affected were undervaccinated

Do exemptions matter? Pertussis and Measles

- Of 970 measles cases in a series, 574 were unvaccinated, 405 (41.8%) had nonmedical exemptions.
- Those with school exemptions are 35 times more likely to contract measles than a vaccinated child.


Medical Immunization Exemptions

- Every state allows medically indicated exemptions from school-required immunization
  - Allergy/adverse reaction to a vaccine component
  - Immunosuppression
- Some states distinguish between temporary and permanent contraindications and require varying recertification
- Missouri does not require annual renewal
- Illinois requires physician letter attached to physical form
Religious Immunization Exemption

- Almost all states allow exemptions on the basis of religious belief

  - Missouri
    - No physician signature
    - No annual renewal

  - Illinois
    - Annual form completion
    - Signed by parent and physician
    - School determines whether valid
    - Statement of religious belief for each vaccine
Missouri versus Illinois exemptions
Religious Immunization Exemption

- Varying requirements: notary, writing a letter, reporting to the health department, letter/signature from religious or state official
- There aren’t any religious bodies that specifically oppose vaccination

Omer SB et al. Nonmedical exemptions to school immunization requirements: Secular trends and association of state policies with pertussis incidence. JAMA 2006;296:1757-1763.


http://www.slate.com/articles/health_and_science/medical Examiner/2015/02/religious_exemption_for_vaccines_christian_scientists_catholics_and_dutch.html
Philosophical or “personal-belief” exemptions

- Require that a parent hold a personal belief that opposes vaccination
- Can help decrease opposition to mandatory school vaccination policies
- Can avoid concerns about the “establishment clause” (religious preference)
- Can decrease vaccine compliance

**Table 1.** Annual Change in State Nonmedical Exemption Rate Stratified by Ease of Obtaining an Exemption and Availability of Personal Belief Exemptions From 1991 Through 2004*

<table>
<thead>
<tr>
<th>Type of exemption permitted by states for school and daycare</th>
<th>No. of State-Years</th>
<th>Annual Change in Exemption Rate Incidence Rate Ratio† (95% Confidence Interval)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Only religious exemption</td>
<td>328</td>
<td>0.95 (0.90-1.01)</td>
<td>.07</td>
</tr>
<tr>
<td>Personal belief exemption</td>
<td>175</td>
<td>1.06 (1.01-1.12)‡</td>
<td>.01</td>
</tr>
</tbody>
</table>

Omer SB et al. Nonmedical exemptions to school immunization requirements: Secular trends and association of state policies with pertussis incidence. JAMA 2006;296:1757-1763.7
Philosophical or “personal-belief” exemptions

Table 2. Association of Ease of Obtaining Exemptions, Availability of the Personal Belief Exemption Option, and Acceptance of Parental Signature as Sufficient Proof of Having Met School Immunization Requirements With the Incidence of Pertussis From 1986 Through 2004

<table>
<thead>
<tr>
<th>Type of exemption permitted by states for school and daycare</th>
<th>No. of States</th>
<th>Unadjusted Incidence Rate Ratio (95% Confidence Interval)</th>
<th>Adjusted Incidence Rate Ratio (95% Confidence Interval)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Only religious exemption</td>
<td>32*</td>
<td>Reference</td>
<td>Reference</td>
</tr>
<tr>
<td>Personal belief exemption</td>
<td>17†</td>
<td>2.06 (1.77-2.40)†</td>
<td>1.48 (1.03-2.13)§</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Exemption ease</th>
</tr>
</thead>
<tbody>
<tr>
<td>Difficult</td>
</tr>
<tr>
<td>Medium</td>
</tr>
<tr>
<td>Easy</td>
</tr>
<tr>
<td>No</td>
</tr>
<tr>
<td>14</td>
</tr>
<tr>
<td>15</td>
</tr>
<tr>
<td>1.27 (1.06-1.51)</td>
</tr>
<tr>
<td>1.90 (1.60-2.28)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Parental signature accepted as sufficient proof of compliance with school immunization requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
</tr>
<tr>
<td>Yes</td>
</tr>
</tbody>
</table>

Omer SB et al. Nonmedical exemptions to school immunization requirements: Secular trends and association of state policies with pertussis incidence. JAMA 2006;296:1757-1763.7
Complexity level matters

- Mean number of non-medical exemptions:
  - Easy: 2.9%
  - Medium: 1.5%
  - Difficult: 1.1%

Diverse practices

http://www.cdc.gov/phlp/publications/topic/vaccinations.html
What sort of exemptions are allowed?

# Missouri State Requirements

## Missouri School Immunization Requirements
Vaccines Received 0-18 Years of Age

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>Age</th>
<th>0-6 Months</th>
<th>7-18 Months</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hepatitis B (Hep B)</td>
<td>Birth</td>
<td>1st dose</td>
<td>2nd dose</td>
</tr>
<tr>
<td>Diphtheria, Tetanus, Pertussis (DTaP)</td>
<td>1st dose</td>
<td>2nd dose</td>
<td>3rd dose</td>
</tr>
<tr>
<td>Inactivated Poliovirus (IPV)</td>
<td>1st dose</td>
<td>2nd dose</td>
<td>3rd dose</td>
</tr>
<tr>
<td>Measles, Mumps, Rubella (MMR)</td>
<td>1st dose</td>
<td>2nd dose</td>
<td>3rd dose</td>
</tr>
<tr>
<td>Varicella (VAR)</td>
<td>1st dose</td>
<td></td>
<td>2nd dose</td>
</tr>
<tr>
<td>Tetanus, Diphtheria, Pertussis (Tdap)</td>
<td>1st dose</td>
<td></td>
<td>Tdap</td>
</tr>
<tr>
<td>Meningococcal (MCV)</td>
<td>1st dose</td>
<td></td>
<td>Booster</td>
</tr>
</tbody>
</table>
Vaccine coverage map

Currently Viewing: Estimated Vaccination Coverage Among Children Enrolled in Kindergarten >> MMR >> Coverage for 2014-15

Kansas 89.2
Missouri 95.8
Illinois 94.7
Arkansas 88.4
Iowa 91.9
Mississippi 99.2!
West Virginia 97.6

Darker = higher percentage

Missouri/Illinois exemption data - NA
What is the medical provider’s role?

- Directive counseling?
  - Not clear how to change patients’ minds
    - One study showed no change with giving additional info
    - Physicians report that 30-47% of refusing patients may change their mind
  - Takes 10-20 minutes on average
  - Nonetheless 80% of patients state that their decision to vaccinate was positively influenced by their provider
Dismiss from practice?

- Currently allowed by AAP (as last option)
- 6.1% → 11.7% of pediatricians from 2006 → 2013
- Reasons?
  - May persuade some patients to immunize
  - Save time/resources for the provider?
  - May improve safety in the clinic?
  - May reflect poor relationship between physician/patient
- Does the intervention improve (or worsen) health for either the child or their community?
- Is it consistent with way we perceive the therapeutic relationship and the idea of trust?

Catherine Hough-Telford, David W. Kimberlin, Inmaculada Aban, William P. Hitchcock, Jon Almquist, Richard Kratz, Karen G. O’Connor
“I trust you”

- Aaron is a 9 month old with blindness and severe developmental delay. His grandmother has custody.
- Jakayla is a 17 month old with a rare genetic disorder and is severely underweight. Her mother struggles to make ends meet.
Conclusions

- Vaccine hesitancy is a common experience for families of children
- Immunizations exemptions differ from state to state and have varying effects on health outcomes
- Those involved in care for children should seek to develop trusting relationships with families to encourage vaccine compliance