School Immunization Requirements

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Compulsory Vaccination Laws in US

- Massachusetts (1809)
  - General Population
  - Jacobson v. Massachusetts
    - Upheld rights of states to compel vaccination
    - Foundation for public health law

- Focus on School Populations
  - Zucht v. King (1922)
Growth of State Laws requiring Vaccination

- 20 States – 1963
- 29 States – 1970
## Incidence of Measles according to evidence of Mandatory School Entry Requirements

<table>
<thead>
<tr>
<th>States</th>
<th>No. of States</th>
<th>1973 Cases</th>
<th>1974 Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>With Laws</td>
<td>35</td>
<td>26.5</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>33.1</td>
</tr>
<tr>
<td>Without Laws</td>
<td>16</td>
<td>53.9</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>55.4</td>
</tr>
</tbody>
</table>

1 = Cases per 100,000 <18 Years

Adapted from Orenstein et al, JID; 1978.
## Incidence of Reported Measles in States Enforcing School Immunization Laws

<table>
<thead>
<tr>
<th></th>
<th>1977 Cases 1</th>
<th>1978 (first 31 wks.) Cases 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 States that Strictly</td>
<td>40.6</td>
<td>2.7</td>
</tr>
<tr>
<td>Enforce Laws</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Remainder of Nation</td>
<td>90.3</td>
<td>35.2</td>
</tr>
</tbody>
</table>

1 = Reported Measles Cases per 100,000 < 18 years old

School Immunization Laws

• Prevent outbreaks
• Provide safety net
• Demonstrates public commitment to immunization
• Assist introduction of new vaccines
Estimated Varicella Vaccination Coverage among Children 19-35 Months of Age by State
US, National Immunization Survey, 2000

Vaccine Coverage (%)

State

- Indicates that a varicella childcare requirement was implemented prior to 2000. For these states, year of implementation is given.
How School Immunization Requirements Work in US

• All State Laws (not Federal)
• Wide Variability in Implementation
  ▪ Antigens required
  ▪ Process for adding antigens or making changes
  ▪ Applicable Populations
  ▪ Who provides documentation
Exemptions to School Immunization Laws

- Philosophic, Religious & Medical (20)
- Religious & Medical (29)
- Medical only (2)
State Implementation of Exemptions

- Wide variability
- Easy process = High rates

Rota et al. *AJPH*, 2000
## Easy Exemption Process Associated with High Rates

<table>
<thead>
<tr>
<th>Administrative Difficulty</th>
<th>Exemption Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low (&lt;0.5%)</td>
</tr>
<tr>
<td>Easy</td>
<td>RI, OK, MO, HI, PA</td>
</tr>
<tr>
<td></td>
<td>Medium (0.5% - 1.0%)</td>
</tr>
<tr>
<td>Medium</td>
<td>ND, CT, IL, NC, AL, NY, OH, KS, NJ, LA</td>
</tr>
<tr>
<td></td>
<td>High (&gt;1.0%)</td>
</tr>
<tr>
<td>Hard</td>
<td>WY, NH, MT, VA, IN, AR, MN, KY, GA, TN</td>
</tr>
<tr>
<td></td>
<td>IA, DE, CS, ME, NM, TX, NV, FL, NE</td>
</tr>
</tbody>
</table>

State Implementation of Exemptions

- Wide variability
- Easy process = High rates
- Little contact between parents and health personnel
- Majority of states (67%) never deny exemptions
- States rely on schools to implement exemptions

Increased Risk of Disease for Exemptions

- Measles
- Pertussis
- *Haemophilus influenzae type b*
- Varicella
- Pneumococcal
Relative Risk of Measles and Pertussis in Exemptors from School Laws

<table>
<thead>
<tr>
<th>Location</th>
<th>Measles</th>
<th>Pertussis</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO (1987-98)(^1)</td>
<td>22</td>
<td>5.9</td>
</tr>
</tbody>
</table>

School Exemption Rates in Counties With and Without Pertussis Outbreaks: Colorado

Counties with outbreaks 4.7%

Counties without outbreaks 1.3%

p = .001


Only Religious Exemptions Permitted

Personal Belief Exemptions Permitted

Omer et al., JAMA, 2006 Data Updated
Nonmedical Exemptions by Ease of Exemption, 1991 - 2007

Easy Exemption Policy

Medium Exemption Policy

Difficult Exemption Policy

Omer et al., JAMA, 2006 Data Updated
Mean (95% CI) Rates of Nonmedical Exemptions by Type & Ease of Exemption, 2006–2011

Omer et al., NEJM, 2012
# Associations between State Exemption Policies and Pertussis Incidence, 1986-2004

<table>
<thead>
<tr>
<th>Type of exemption</th>
<th>Unadjusted IRR (95% CI)</th>
<th>Adjusted IRR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Only Religious Exemption</td>
<td>Reference</td>
<td>Reference</td>
</tr>
<tr>
<td>Personal Belief Exemption</td>
<td>2.06 (1.77-2.40)</td>
<td>1.48 (1.03-2.13)</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Exemption ease</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Difficult</td>
<td>Reference</td>
<td>Reference</td>
</tr>
<tr>
<td>Medium</td>
<td>1.27 (1.06-1.51)</td>
<td>1.35 (0.96-1.91)</td>
</tr>
<tr>
<td>Easy</td>
<td>1.90 (1.60-2.28)</td>
<td>1.53 (1.10-2.14)</td>
</tr>
</tbody>
</table>

Adjusting for allowing parental signature for school immunization forms, proportion inside urbanized area, income (11 categories), and education (7 categories)

Omer et al, JAMA, 2006
Within State Variations in Implementing Exemptions

- Wide variability in how schools interpret and enforce exemptions
- Easier processes for granting exemptions associated with higher rates of exemptions
- Schools often do not discuss risks and benefits with parents considering an exemption

Salmon et al, Pediatrics, 2004
School Personnel KABs Associated with Children Having Exemption

- Training of school personnel
- Perceived Susceptibility and Severity of Disease
- Perceived Safety and Efficacy of Vaccination
- Who Benefits from Vaccination (Individual and Community)
- Vaccine Misconceptions
  - Children get more immunizations than are good for them
  - Concerned immune system weakened by too many vaccines
- Confidence in local and state health departments
- Use of alternative medicine

Relative Locations of Pertussis Space-time Clusters & Exemptions Spatial Clusters (Omer et al, AJE, 2008)

Overlap of Exemptions Clusters with Pertussis Clusters

- Unadjusted OR 3.0 (2.5 – 3.6)
- Adjusted OR 3.4 (2.8 – 4.1)
WA State Counties’ School Exemption Rates 2004

Source: WA State Department of Health
WA State Counties’ School Entry Exemption Rates, 2005-2006

Statewide Total: 5.1%

- <2.0%
- 2.0-2.9%
- 3.0-3.9%
- 4.0-4.9%
- >5.0%

WA State Dept. of Health
WA State Counties’ School Entry Exemption Rates 2006-2007

Statewide Total: 6.0%

<2.0%  2.0-2.9%  3.0-3.9%  4.0-4.9%  >5.0%
WA State Counties’ School Entry Exemption Rates 2012-2013

Statewide Total: 4.5%
Why Do Parents Claim Exemptions?
<table>
<thead>
<tr>
<th>Disease</th>
<th>Pre-vaccine Era*</th>
<th>2011</th>
<th>% change</th>
</tr>
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<tbody>
<tr>
<td>Smallpox</td>
<td>29,005</td>
<td>0</td>
<td>100%</td>
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<td>21,053</td>
<td>0</td>
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<tr>
<td>Measles</td>
<td>530,217</td>
<td>212</td>
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<td>Mumps</td>
<td>162,344</td>
<td>370</td>
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<td>Pertussis</td>
<td>200,752</td>
<td>15,216</td>
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<td>Polio (paralytic)</td>
<td>16,316</td>
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<td>Rubella</td>
<td>47,745</td>
<td>4</td>
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<tr>
<td>Cong. Rubella Synd.</td>
<td>152</td>
<td>0</td>
<td>100%</td>
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<tr>
<td>Tetanus</td>
<td>580</td>
<td>9</td>
<td>98%</td>
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<tr>
<td>H. <em>Influenzae</em> type b and unknown ( &lt; 5 yrs)</td>
<td>20,000</td>
<td>8</td>
<td>&gt;99%</td>
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<td><strong>Total</strong></td>
<td><strong>1,064,854</strong></td>
<td><strong>15,607</strong></td>
<td><strong>99%</strong></td>
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* Estimated because no national reporting existed in the prevaccine era
Comparison of Maximum and Current Reported Morbidity, Selected Vaccine-Preventable Diseases & Vaccine Adverse Events, United States, 2011

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Reported Vaccine Adverse Events**
0 9,318 100%

* Estimated because no national reporting existed in the prevaccine era
** Reported to VAERS – may or may not be due to vaccination
Evolution of Immunization Program and Prominence of Vaccine Safety

1. Prevaccine
2. Increasing Coverage
3. Loss of Confidence
4. Resumption of Confidence
5. Eradication

Incidence

Prevaccine
Increasing Coverage
Loss of Confidence
Resumption of Confidence
Eradication

Maturity

Vaccination
Eradication

Outbreak
Adverse Events

Chen
Why Do Parents Claim Exemptions?

- Perceived Susceptibility and Severity of Disease
- Perceived Safety and Effectiveness of Vaccination
- Trust in Health Care Providers and the Gov’t

Non-Medical Exemptions and Legal Issues

- States are not required to offer non-medical exemptions
- If states offer non-medical exemptions
  - Can create administrative requirements
  - May not be able to focus on nature of religion
Arkansas

- State Permits Religious Exemption (7/02)
  - "immunization conflicts with the religious tenets and practices of a recognized church or religious denomination of which the parent . . . is an adherent or member."
  - Must provide copy of religious doctrine and details of religious organization
- Parent requests exemption for Hepatitis B
- State rejects exemption request
- Parent files lawsuit – goes to US District Court
US District Court

- Arkansas religious exemption violates
  - Establishment and Free Exercise Clauses of the 1st Amendment
  - Equal Protection Clause of the 14th Amendment
- Eliminated Religious Exemption
- Severed from School Requirement and Medical Exemption
- Judge suggests legislative relief

Lemon v. Kurtzman, 403 U.S. 602
Arkansas Reaction

- Momentum gaining for broadly written PE
- Johns Hopkins Letter to Fay Boozman
- AR Medical Society requests our assistance
Model Legislation for Non-Medical Exemption

- **Parent**
  - Furnish signed, personal statement explaining reasons for exemption request
  - Documentation from licensed physician or DOH that parent has received individual educational counseling
- **State**
  - Weighs strength of parent conviction with risks of granting exemption:
    - Vaccination Rates
    - Community vulnerability to disease outbreaks
    - Prevalence of VPDs

Salmon et al, AJPH 2005
Model Legislation for Non-Medical Exemption (cont)

- State may reject exemption request based on this balance
- Appeals process for exemptions that have been declined
- If exemption granted, must be annually renewed
Arkansas Non-Medical Exemption

- DOH rejects authority to deny exemption request
- Includes assessment of impact of change in law
## Impact of Philosophical Exemption in Arkansas

<table>
<thead>
<tr>
<th>Exemption Type</th>
<th>2001-02</th>
<th>2002-03</th>
<th>2003-04</th>
<th>2004-2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical</td>
<td>110</td>
<td>139</td>
<td>64</td>
<td>62</td>
</tr>
<tr>
<td>Religious</td>
<td>419</td>
<td>512</td>
<td>297</td>
<td>362</td>
</tr>
<tr>
<td>Phil.</td>
<td>0</td>
<td>0</td>
<td>403</td>
<td>721</td>
</tr>
<tr>
<td>Total</td>
<td>529</td>
<td>651</td>
<td>764</td>
<td>1145</td>
</tr>
</tbody>
</table>

Thompson et al, AJPM, 2007
Impact of Philosophical Exemption in Arkansas

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>529</td>
<td>651</td>
<td>764</td>
<td>1145</td>
</tr>
<tr>
<td>% Increase from Previous Year</td>
<td>23%</td>
<td>17%</td>
<td>50%</td>
<td></td>
</tr>
<tr>
<td>Absolute Increase from Previous Year</td>
<td>122</td>
<td>113</td>
<td>381</td>
<td></td>
</tr>
</tbody>
</table>

Absolute or % Increase?

Thompson et al, AJPM, 2007
Texas Requires HPV Vaccine

- All 6th grade girls in 2008
- Passed by Governor Order
  - No public comment
FACT: THE PUSH FOR MANDATORY HPV VACCINES WAS BANKROLLED BY DRUG COMPANIES. TEXAS GOV. RICK PERRY ACCEPTED THOUSANDS FROM MERCK.
Texas Requires HPV Vaccine

• All 6\textsuperscript{th} grade girls in 2008
• Passed by Governor Order
  ▪ No public comment
• State legislature repealed
School law issues moving forward

• How to balance parental autonomy with public health goal of preventing disease?

• Can states with high exemption rates and easy exemptions lower rates through administrative requirements?

• What to do with new vaccines as they become available?
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