Public Health in the Era of the Internet: Lessons Learned From Immunizations

Elizabeth Steiner Hayward MD
Adjunct Associate Professor of Family Medicine, OHSU
State Senator, Oregon District 17
What’s True About Immunizations

• One of top three public health advances in history
• Safe for the vast majority of people
• Some have track record of problems (e.g. DTP, original rotavirus)
The War on Science

- The world is flat
- Dr. Strangelove – Fluoridation
Problem Statements

• Much of science is counter-intuitive – the “show me” problem
• Information over-supply
• Information discrimination
• Science education deficits
• The power of fear – known vs. unknown
• Gap between public & scientific community’s perceptions
The Challenge

• The parable of the feather pillow
  • Removing bad information
  • Debunking myths
### Opinion Differences Between Public and Scientists

*% of U.S. adults and AAAS scientists saying each of the following*

<table>
<thead>
<tr>
<th>Biomedical sciences</th>
<th>U.S. adults</th>
<th>51 point gap</th>
<th>AAAS scientists</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safe to eat genetically modified foods</td>
<td>37%</td>
<td>88%</td>
<td></td>
</tr>
<tr>
<td>Favor use of animals in research</td>
<td>47%</td>
<td>89%</td>
<td></td>
</tr>
<tr>
<td>Safe to eat foods grown with pesticides</td>
<td>28%</td>
<td>68%</td>
<td></td>
</tr>
<tr>
<td>Humans have evolved over time</td>
<td>65%</td>
<td>98%</td>
<td></td>
</tr>
<tr>
<td>Childhood vaccines such as MMR should be required</td>
<td>68%</td>
<td>86%</td>
<td></td>
</tr>
</tbody>
</table>

| Climate, energy, space sciences                  |             |               |                 |
| Climate change is mostly due to human activity   | 50%         | 37 point gap  | 87%            |
| Growing world population will be a major problem | 59%         | 82%           |                 |
| Favor building more nuclear power plants         | 45%         | 20%           | 65%            |
| Favor more offshore drilling                     | 32%         | 52%           |                 |
| Astronauts essential for future of U.S. space program | 47%   | 59%           |                 |
| Favor increased use of bioengineered fuel        | 68%         | 78%           |                 |
| Favor increased use of fracking                  | 31%         | 39%           |                 |
| Space station has been a good investment for U.S. | 64%         | 68%           |                 |


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Scientists’ Perspective: Limited Public Knowledge About Science Is a Major Problem

% of AAAS scientists saying... is a major or minor problem for science in general

Public doesn’t know much about science

<table>
<thead>
<tr>
<th>Major problem</th>
<th>Minor problem</th>
</tr>
</thead>
<tbody>
<tr>
<td>84</td>
<td>14</td>
</tr>
</tbody>
</table>

AAAS scientists survey Sept 11-Oct 13, 2014. Q5d. Those saying this is not a problem or giving no answer are not shown.

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KINDERTGARTENER EXEMPTION RATES

EXEMPTION RATE
- < 1%
- 1% - 2%
- 2% - 4%
- ≥ 4%

Data not available

* Exemptions might not reflect a child's vaccination status. Children with an exemption who did not receive any vaccines are indistinguishable from those who have an exemption but are up-to-date for one or more vaccines.

MMR COVERAGE
- < 90%

Source: CDC, 2013-2014 school year

Not drawn to scale
### WHO ARE THE FAMILIES THAT DELAY AND REFUSE VACCINATIONS?

<table>
<thead>
<tr>
<th>Reason</th>
<th>Delay/Refuse (%)</th>
<th>Don't Delay/Refuse (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vaccines are necessary to protect the health of children</td>
<td>70%</td>
<td>96%</td>
</tr>
<tr>
<td>Fear their children could have serious side effects</td>
<td>63%</td>
<td>31%</td>
</tr>
<tr>
<td>Medical professionals in charge of vaccinations have their children's best interest at heart</td>
<td>77%</td>
<td>95%</td>
</tr>
<tr>
<td>Have concerns about autism</td>
<td>57%</td>
<td></td>
</tr>
<tr>
<td>Believe children get too many shots</td>
<td>78%</td>
<td></td>
</tr>
</tbody>
</table>

**FAMILIES OF UNVACCINATED CHILDREN ARE MORE LIKELY TO BE:**
- Wealthier on average, with annual incomes more than four times the poverty level
- Non-Hispanic white
- Married couples in English-speaking households
- Educated, with college degrees
- Covered by private health insurance

**SOURCE:** Public Health Reports
The spread of anti-vax sentiment in California

Share of public school kindergartners with personal belief exemptions to vaccination requirements

2000

2007

2013

Source: California Department of Public Health
Literature on Refusal

• Search for “vaccines”, “vaccinations”, or “Immunizations”, combine with search for “treatment refusal”, English language, under age 18, multiple databases = 130
• 1992 – 2005 = 45
• 2006 – present = 85
• Slope is increasing!
Common Reasons for Hesitancy

- Autism
- Pain
- Immune system dysfunction
- “Too many shots at once”
- Natural immunity better
- Lack of awareness of adverse effects of vaccine-preventable disease
- Possible to protect child without immunizations
Types of Interventions*

- Dialogue-based
- Incentive-based
- Reminder/Recall-based

*http://www.who.int/immunization/sage/meetings/2014/october/3_SAGE_WG_Strategies_add ressing_vaccine_hesitancy_2014.pdf  Note: many of the included studies evaluated populations somewhat unlike the U.S. population
Effective Interventions for Vaccine Uptake*

- Directly target unvaccinated or under-vaccinated populations;
- Aim to increase knowledge and awareness surrounding vaccination;
- Improve convenience and access to vaccination;
- Target specific populations such as the local community and HCW;

*http://www.who.int/immunization/sage/meetings/2014/october/3_SAGE_WG_Strategies_add ressing_vaccine_hesitancy_2014.pdf  Note: many of the included studies evaluated populations somewhat unlike the U.S. population
Effective Interventions for Vaccine Uptake*

• Mandate vaccinations or impose some type of sanction for non-vaccination;
• Employ reminder and follow-up; and
• Engage religious or other influential leaders to promote vaccination in the community.

*http://www.who.int/immunization/sage/meetings/2014/october/3_SAGE_WG_Strategies_addresing_vaccine_hesitancy_2014.pdf  Note: many of the included studies evaluated populations somewhat unlike the U.S. population
Effective Interventions for Psychological Shift*

- Education initiatives, especially associated with specific process
  - Hospital admission, medical procedure, etc
- Note: All effective interventions are targeted

*http://www.who.int/immunization/sage/meetings/2014/october/3_SAGE_WG_Strategies_addressing_vaccine_hesitancy_2014.pdf Note: many of the included studies evaluated populations somewhat unlike the U.S. population
Strategies to Address Hesitancy

• Public Policy
• Health Care Provider – Family
• Community Dialogue
Role of Policy

• Changing types of exemptions
  • Medical vs non-medical
  • Note: NOT ONE SINGLE WORLD RELIGION PROHIBITS IMMUNIZATIONS

• Changing “opt-out” requirements
  • How parents implement non-medical exemptions

• Incentives & disincentives
  • School & day-care attendance
  • Financial
  • Substantive non-financial
Role of Community Dialogue

• Religious and/or community leaders – particularly helpful in low trust populations
• Mass Marketing – evidence inconclusive
• Peer-to-Peer – PTA, children’s activities, etc
Peer Influence

• Studies suggest 90-95% of parents consult peer network re vaccines
• Can work both pro- and con-vaccines
• Developing peer networks
• Public-private partnerships (www.vaxnorthwest.org Immunity Community)
Change the Rhetoric

- Parents with vaccine hesitancy are not bad parents
- Empathy more successful than judgment or censure
- Tragedy of the Commons
What Has Oregon Done?

• SB 132 (2013) – Change process for non-medical exemptions
Role of Public Health

- Accurate, timely data on disease prevalence & immunization rates
- Facilitate dissemination of accurate information in multiple formats & contexts
- Partner with lay leaders for communication & education
  - Promote valid information
  - Debunk myths
Conclusion

• Houston, we have a problem
• We also have some solutions
• Multi-factorial problems require multi-modal solutions
Resources
