Vaccine Acceptance, Hesitancy and Refusal

Vaccines have prevented countless deaths. So why do some parents hesitate or refuse?

Robb Butler
Vaccine-preventable Diseases and Immunization
Measles in the WHO European Region, 1993, and 2007-2013

1993: 341,982

1993 to 2007: 98% reduction

2007:
- Bulgaria: 21,664
- France: 14,966
- Ukraine: 12,744
- Georgia: 7,830

2007 to 2010:
- Bulgaria: 7,892
- France: 30,529
- Ukraine: 35,088
- Georgia: 27,132

2010 to 2013:
- Bulgaria: 9168
- France: 31,652
- Ukraine: 31,685
- Georgia: 7,830

The data shows a significant reduction in measles cases in the WHO European Region from 1993 to 2013.
Rubella in the WHO European Region, 2000 and 2011-2013

2000: 621,039

2011: 9,464

2012: 29,601

2013: 39,367

Reduction: 98%

Romania: 4,805

Romania: 20,772

Poland: 38,585
Percentage of measles cases by age group, WHO European Region, 2013 (n=31 599)
Percentage of measles cases by age group, 2013

- **Georgia (n=7830)**
  - <1: 10%
  - 1-4: 14%
  - 5-9: 8%
  - 10-14: 7%
  - 15-19: 11%
  - 20-29: 31%
  - ≥30: 20%

- **Italy (n=2216)**
  - <1: 1%
  - 1-4: 9%
  - 5-9: 6%
  - 10-14: 8%
  - 15-19: 16%
  - 20-29: 31%
  - ≥30: 28%

- **The Netherlands (n=2499)**
  - <1: 2%
  - 1-4: 16%
  - 5-9: 31%
  - 10-14: 33%
  - 15-19: 11%
  - 20-29: 3%
  - ≥30: 4%

- **Turkey (n=7393)**
  - <1: 29%
  - 1-4: 26%
  - 5-9: 17%
  - 10-14: 5%
  - 15-19: 4%
  - 20-29: 13%
  - ≥30: 6%

- **United Kingdom (n=1900)**
  - <1: 9%
  - 1-4: 17%
  - 5-9: 13%
  - 10-14: 26%
  - 15-19: 16%
  - 20-29: 10%
  - ≥30: 10%

- **Romania (n=1074)**
  - <1: 28%
  - 1-4: 39%
  - 5-9: 15%
  - 10-14: 4%
  - 15-19: 2%
  - 20-29: 5%
  - ≥30: 6%

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Specific Risk Groups (measles outbreaks in under-vaccinated groups, 2005-2013)

Roma and Sinti communities
- Croatia
- Bosnia & Herzegovina
- Bulgaria
- Greece
- Italy
- Poland
- Romania
- Spain

Followers of Anthroposophy
- Austria
- Germany
- Netherlands
- Switzerland
- Sweden

Orthodox Protestant communities
- Netherlands

Traveller communities
- Ireland
- Norway
- Spain
- United Kingdom

Ultra-Orthodox Jewish communities
- Israel
- Belgium
- United Kingdom
Main public settings for measles outbreaks, 2005-2014

Health-care settings
- Bulgaria
- Croatia
- France
- Greece
- Italy
- Netherlands
- Spain
- Switzerland

Educational facilities
- Austria
- France
- Germany
- Italy
- Spain
- Switzerland
- UK
Susceptible populations?
Vaccination Status of measles cases by age group, WHO European Region, 2013 (n=31,565)
<table>
<thead>
<tr>
<th>Pro-vaccine</th>
<th>Vaccine-hesitant</th>
<th>Anti-vaccine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acceptors</td>
<td></td>
<td>Rejectors</td>
</tr>
<tr>
<td>Agree with or do not question vaccines</td>
<td>Are unsure about, delay, or choose only some vaccines</td>
<td>Completely reject vaccines</td>
</tr>
<tr>
<td>Children fully immunized</td>
<td>Children under-immunized</td>
<td>Children un-immunized</td>
</tr>
<tr>
<td>High trust in provider</td>
<td>Desire a trustworthy provider</td>
<td>Low trust in provider</td>
</tr>
<tr>
<td>Interest in vaccine information from child’s provider</td>
<td>Interest in vaccine information from child’s provider</td>
<td>No interest in vaccine information</td>
</tr>
<tr>
<td>70%</td>
<td>30%</td>
<td>&lt;1%</td>
</tr>
</tbody>
</table>
Can you identify your audience?
Improving our diagnostics: Tailoring Immunization programmes

1. Identifying and prioritizing susceptible populations
2. Identifying those at risk according to their behaviour
3. Diagnosing the demand- and supply-side barriers and enablers to vaccination
4. Prescribing evidence-informed responses

In use by more than 5 Member States by end 2014

Caregiver Behaviours
The Determinants of Vaccine Acceptance:

- Access to and Availability of Vaccination
- Characteristics and Appeal of Vaccination Points
- Vaccine Attributes
- Institutional Norms for Vaccination

Caregivers’ Use of Childhood Vaccination Services

- Knowledge of VPD, Vaccines and Immunisation
- Support from Health Workers
- Social Norms and Support for Vaccination

Supportive Ability Factors

Environmental Opportunity Factors

VPD Perceptions
- Vaccine Perceptions
- Medical Decision-Making
- Risk-Benefit Analysis
- Beliefs
- Self-efficacy
- Intention to Vaccinate

Personal Motivation Factors

A Guide to Tailoring Immunization Programmes (TIP) WHO/Europe, 2013
Know who you are communicating to, what they need to overcome, what may motivate them, how they are best reached and by whom......
TOUGH DECISIONS AHEAD
Vaccine properties

**Antigen**

**Growth medium residuals**

**Inactivator**

**Adjuvant**

**Preservative**

**Stabiliser**

Diphtheria and Tetanus and Acellular Pertussis Vaccine Adsorbed

**Tripedia®**

**DESCRIPTION**

Tripedia®, Diphtheria and Tetanus Toxoids and Acellular Pertussis Vaccine Adsorbed (DTaP), for intramuscular use, is a sterile preparation of diphtheria and tetanus toxoids adsorbed, with acellular pertussis vaccine in an isotonic sodium chloride solution containing sodium phosphate to control pH. After shaking, the vaccine is a homogeneous white suspension. Tripedia vaccine is distributed by Sanofi Pasteur Inc.

_Corynebacterium diphtheriae_ cultures are grown in a peptone-based medium containing a modified Mueller and Miller medium. _Clostridium tetani_ cultures are grown in a peptone-based medium containing a modified Mueller and Miller medium. The meat used in this medium is US sourced. Both toxins are detoxified with formaldehyde. The detoxified materials are then separately purified by serial ammonium sulfate fractionation and diafiltration.

The acellular pertussis vaccine components are isolated from culture fluids of Phase 1 _Bordetella pertussis_ grown in a modified Stainer-Scholte medium. After purification by salt precipitation, ultracentrifugation, and ultrafiltration, preparations containing varying amounts of both pertussis toxin (PT) and filamentous hemagglutinin (FHA) are combined to obtain a 1:1 ratio and treated with.

The diphtheria and tetanus toxoids are combined with acellular pertussis concentrate, and diluted to a final volume using sterile phosphate-buffered physiological saline.

Each 0.5 mL dose is formulated to contain 6.7 LF of diphtheria toxoid and 5 LF of tetanus toxoid (both toxoids induce at least 2 units of antitoxin per mL in the guinea pig potency test), and 46.8 μg of pertussis antigens. This is represented in the final vaccine as approximately 23.4 μg of inactivated PT and 23.4 μg of FHA. The inactivated acellular pertussis component contributes not more than 50 endotoxin units to the endotoxin content of 1 mL of DTaP. The potency of the pertussis components is evaluated by measuring the antibody response to PT and FHA in immunized mice using an ELISA system. The vaccine contains (≤0.3 μg mercury/dose) from the manufacturing process. Each 0.5 mL dose also contains, by assay, not more than 0.170 mg of aluminum and not more than 100 μg (0.02%) of residual formaldehyde. The vaccine contains polysorbate 80 (Tween-80), which are used in the production of the pertussis concentrate.
VAXHILDA! WHAT ARE YOU BREWING? IS IT AN EVIL Potion?!

IS IT A POWERFUL PORTENT OF DEATH?!

IS IT A MIXTURE OF MASS DESTRUCTION?!

IS IT A CONCOCTION OF CHAOS?!

OH MY!

HAHAHAHA HEEEEHEHE CACKLE CACKLE CACKLE

POOF!

NO! NO! AGH! HAH!

YOU FOOL! IT'S MY GREATEST CREATION... A VACCINE!
My little boy, Sir, died when he was only two months old, just after he had been vaccinated!

How very sad! Had he been baptized?

Yes, Sir! But it was the vaccination that carried him off, Sir!

Punch, 19 September 1891
With vaccines, we are building our boat and sailing it at the same time.

David Heymann, WHO
Vaccine opponents
So what *has* changed?

• Innovation in communication methods

  The INTERNET

• Vaccine opponents now have ability to use cyber interaction to share views

• A Google search leads to vaccine-critical sites in about 1 of 5 hits on immunization (Betsch, *Eurosurveillance*, 2011)
Influence Vaccine Critical Websites on Perceiving Vaccine Risk

Accessing vaccine critical websites for 5 to 10 minutes
- ↑ perception of risk of vaccination
- ↓ perception of risk of omitting vaccination and changes intention to vaccinate.

Table 1. Changes in risk perception and intention as a function of search environment and focus of information search

<table>
<thead>
<tr>
<th>Search focus</th>
<th>Changes in ...</th>
<th>Vaccine-critical</th>
<th>Control</th>
<th>Both</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
</tr>
<tr>
<td>Vaccinating is risky</td>
<td>risk of vaccinating</td>
<td>0.400</td>
<td>(1.476)</td>
<td>-0.444</td>
</tr>
<tr>
<td></td>
<td>risk of not vaccinating</td>
<td>-0.467</td>
<td>(1.008)</td>
<td>0.056</td>
</tr>
<tr>
<td></td>
<td>mean intention</td>
<td>-0.283</td>
<td>(0.811)</td>
<td>-0.014</td>
</tr>
<tr>
<td>Not vaccinating is risky</td>
<td>risk of vaccinating</td>
<td>0.529</td>
<td>(1.637)</td>
<td>-0.500</td>
</tr>
<tr>
<td></td>
<td>risk of not vaccinating</td>
<td>-0.294</td>
<td>(1.060)</td>
<td>0.104</td>
</tr>
<tr>
<td></td>
<td>mean intention</td>
<td>-0.059</td>
<td>(0.364)</td>
<td>0.172</td>
</tr>
<tr>
<td>No specified direction</td>
<td>risk of vaccinating</td>
<td>0.525</td>
<td>(1.754)</td>
<td>-0.143</td>
</tr>
<tr>
<td></td>
<td>risk of not vaccinating</td>
<td>-0.325</td>
<td>(0.944)</td>
<td>-0.086</td>
</tr>
<tr>
<td></td>
<td>mean intention</td>
<td>-0.231</td>
<td>(0.523)</td>
<td>0.107</td>
</tr>
</tbody>
</table>

Betsch C et al J Health Psychology 2010 15:446-455
Today, anecdote often wins over fact

Sensationalist emotional stories have impact
СМЕРТЕЛЬНА ВАКЦИНА
МОЗ грає в "індійську рулетку".
Ст. 26
Avoid:
Consider

- Promoting informed consent
  - Providing written information, preferably before the visit
  - Quantifying risks

- For the very worried:
  - Extra resources
  - Extra time
  - Compromise

- Respect firm decisions

- Maintain the relationship
<table>
<thead>
<tr>
<th>LEVEL OF CONCERN</th>
<th>SIGNS</th>
<th>SUGGESTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very worried</td>
<td>Child has had no vaccines</td>
<td>Avoid alienating</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Maintain relationship</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Offer more information/discussion</td>
</tr>
<tr>
<td>Quite worried</td>
<td>Some vaccines</td>
<td>Provide information</td>
</tr>
<tr>
<td></td>
<td>Showing strong reluctance</td>
<td>Give more time</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Adverse events clinic</td>
</tr>
<tr>
<td>Fence sitter</td>
<td>Expresses concerns about a vaccine</td>
<td>Discuss issues and vaccinate</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Written materials and return visit</td>
</tr>
<tr>
<td>Fleeting concerns</td>
<td>Child is usually vaccinated</td>
<td>Provide information and vaccinate</td>
</tr>
</tbody>
</table>
“Give people a fact or an idea and you enlighten their minds; give them a story and you touch their souls.”

-Hassidic proverb
Storytelling as a communication strategy

- Shares experiences and engages listener
- Perceived similarities and a sense of camaraderie
- Resonates as a fellow parent
- Imparts values and makes meaning of experiences
- Allows listener to receive knowledge from storyteller’s experience
- Historical significance
- Addresses behavior
- Different from case studies
- Reduces resistance to behaviour change

Houston TK et al. *Annals of Internal Medicine*. 2011;154:77-84
“Anti-vaccine groups…have shared the heartbreak when they learned that their children were autistic and tied vaccines to it. People, logical or not, do not forget this kind of emotional prowess.”

“The power of anecdotal experiences supplemented by visual imagery should not be underestimated.”

Parikh RK. Pediatrics. 2008;121(3):621-622
4-step Framework for Communicating Science: Making the CASE for Vaccines

**Corroborate:** Acknowledge the parents’ concern and find some point on which you can agree. Set the tone for a respectful, successful talk.

**About Me:** Describe what you have done to build your knowledge base and expertise

**Science:** Describe what the science says

**Explain/Advise:** Give your advice to patient, based on the science
I heard on tv that vaccines cause autism

**Corroborate:** There’s certainly been a lot of coverage on television about vaccines and autism so I can understand why you have questions

**About Me:** I always want to make sure I’m up to date on the latest information so that I can do what’s best for my patients, so I’ve researched this thoroughly. In fact, I just returned from a professional conference…

**Science:** The scientific evidence does not support a causal link. The MOH, National health Institute, Vaccine Regulatory Board (etc)….all reviewed the data and all reached the same conclusion. Dozens of studies have been done. None show a link. In fact, the latest autism science indicates…

**Explain:** Vaccines are critical to maintaining health and wellbeing. They prevent diseases that cause real harm. Choosing not to vaccinate does not protect children for autism, but does leave them open to diseases. Kids need these vaccines.
I want to spread out the shots so they won’t overwhelm my child’s immune system.

**Corroborate:** Kids today certainly get more shots than kids did years ago.

**About Me:** Our practice follows the national schedule because it is carefully designed to protect children at the time they are most vulnerable to disease. I recently returned from a meeting, or I served on a committee, that reviewed the schedule.

**Science:** Although kids get more shots today, they actually receive fewer antigens than when they got fewer shots, because technology has enabled us to make vaccines that have only the part of the cell that induces immune response. Plus, the immunological challenge from a vaccine is nothing compared to what kids fight off every day. An ear infection is a bigger immunological challenge. “Drop in the ocean”

**Explain:** We want all the kids in our practice to be immunized so that they have the greatest chance for a long, healthy life. My own children are fully vaccinated.
High level advocacy

Visits to priority countries

MR elimination roundtables

European Immunization Week (EIW)

Participation by all member states each year

Focus on healthcare workers

Healthcare worker job aids

Adaption of TIP and application in HCW community

Regular production & dissemination of epi/lab analyses, information, and resources for HCWs & medical associations

European Immunization Week

Prevent Protect Immunize