



Delayed, Selective and “Alternative” Immunization Schedules

RACHEL HERLIHY, MD, MPH
DIRECTOR, IMMUNIZATION SECTION
COLORADO DEPARTMENT OF PUBLIC
HEALTH & ENVIRONMENT





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The Cow-Pock—or—the Wonderful Effects of the New Inoculation!—vide the Publications of y^e Anti-Vaccine Society Print
(color engraving) published June 12, 1802 by H. Humphrey, St. James's Street.

Overview

- What are “Alternative” Immunization Schedules?
- How common are they?
- Where did they come from?
- What are parents’ concerns with the CDC/AAP/AAFP schedule?
- Strategies for talking to parents





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What percentage of parents vaccinate their children according to schedule?

- A. 98%
- B. 90%
- C. 74%
- D. 62%

2011 National Immunization Survey, Children 19-35 months





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The Data

NIS Data

- ~90% vaccinate according to schedule, the other 10%:
 - Delayed vaccination
 - Intentional, use of delayed schedule
 - Illness at time of appointment
 - Unintentional
 - Selective vaccination
 - Intentional, use of selective schedule
 - Intentional, focus on one or few vaccines:
 - Flu vaccine, HPV, Varicella
 - Unintentional
- ~1% refuse all vaccines



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Kennedy et al., Health Affairs June 2011

- 2010 HealthStyles survey data, N=376, mailed cross-sectional survey
- Majority of parents reported they had already (83%) or planned to (11%) fully vaccinate their children
- 5% intended to selectively vaccinate
- 2% reported children would receive no vaccines (NIS reports <1%)



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Dempsey et al., Pediatrics, October 3, 2011

- Online cross sectional survey, N= 748
- 13% of parents of children 6 months to 6 years of age reported following an alternative schedule
- 2% reported refusing all vaccines
- 30% of alternative vaccinators had initially followed recommended schedule
- 28% of on-schedule vaccinators thought delaying doses was "safer" approach
- 22% of on-schedule vaccinators disagreed that best schedule was the one recommended by experts




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There are a lot of fence sitters on this issue!




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What are "alternative" immunization schedules and where did they come from?





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Meet Doctor Bob








- "Dr. Bob", as he likes to be called by his little patients, earned his medical degree at Georgetown University School of Medicine in 1995. He did his pediatric internship and residency at Children's Hospital Los Angeles, finishing in 1998.
- Dr. Bob enjoys surfing the California waves, mountain biking, playing bass guitar with his teenage son guitarist, and trying to keep up with his three children.



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More Doctor Bob



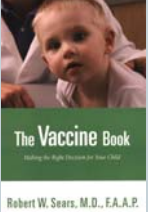
Meet the Sears Family



Dr. Bill Dr. Jim Dr. Bob Dr. Peter Martha

In 2007 Dr. Bob wrote a book



<http://www.askdrsears.com/topics/vaccines>



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Dr. Bob's Schedules



- **Selective- decline focus**
 - Includes: DTaP, Rota, PCV, Hib, HPV, Hep B (teen)
 - × To cover "severe, common diseases"
 - Excludes: Polio, MMR, Flu, Varicella, Hep A, MCV
- **Alternative- delay focus**
 - No more than 2 at a time
 - Extra visits at 3, 5, 7, 21 month, 2.5 years, 3.5 years, 12 years and 2 months
 - MMR at 4 years?, Hep B at 2.5 years
 - To "minimize the theoretical risks of vaccines"
 - The "best of both worlds of disease prevention and safe vaccination"



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The Problems with Dr. Bob's Schedule



- He made it up, all by himself
- 2010 study in Pediatrics found no benefit of delayed schedule
- Parental fear trumps science
- Fails to acknowledge good science
 - Thimerosal
 - Aluminum
- Fails to distinguish good science from bad science or non-science
 - × Pro/Con lists elevate feelings/beliefs/hunches to the level of science
- States his intention is to give options to concerned parents, to convert non-vaccinators to at least partial vaccinators
- Unfortunately his book sounds many anti-vaccine messages and misinforms his audience on a number of issues
- Converts probable vaccinators to partial vaccinators or non-vaccinators?



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What are parents most concerned about?

- A. Too many vaccines too soon, overwhelmed immune system
- B. Vaccines cause developmental disabilities like autism
- C. Vaccines aren't necessary, disease don't occur in U.S.
- D. Vaccines cause my child pain



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Kennedy et al., Health Affairs June 2011

- Children Age 6 or younger
- Concerns reported by parents:
 - Pain- 38%
 - Too many in one visit- 36%
 - Too many during first 2 years of life- 34%
 - Fever- 32%
 - Learning disabilities, autism- 30%
 - Unsafe ingredients- 26%



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Freed et al. Pediatrics, March 2009

- Online cross-sectional survey, N=2,521
- 11.5% of surveyed parents had refused at least one vaccine:
 - HPV 56.4%, Varicella 32.3%, MCV 31.8%, MMR 17.7%
 - HPV: too new, low risk, moral concern
 - Varicella: prefer child to get disease
 - MCV: too new
 - MMR: adverse events



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Too many too soon?

Year	Number of Vaccines	Possible Number of Shots by Age 2	Possible Number of Shots at a Single Visit
1900	1	1	1
1960	5	8	2
1980	7	5	2
2000	11	20	5





Offit et al., Pediatrics, January 2002
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Safety Concerns

- **Thimerosal**
 - Has been removed from nearly all childhood vaccines (2001)
 - Ethyl-mercury ≠ methyl-mercury
 - MMR never contained thimerosal
 - Thompson et al., NEJM 2007
 - Cohort study of 1,047 children
 - Follow-up with neuropsych testing at 7-10 years
 - No causal association
 - Johns Hopkins Institute for Vaccine Safety: <http://www.vaccinesafety.edu/cc-thim.htm>
- **Aluminum**
 - 70 year history of use
 - Known adverse events: local reactions at injection site
 - Animal studies have been used to establish conservative vaccine threshold with 30x uncertainly factor = 2 mg/kg/day
 - By 6 months, cumulative:
 - Vaccine dose = 4 mg
 - Breast milk = 10 mg
 - Formula = 40 mg
 - Soy formula = 120 mg

1. Gill et al. Pediatrics, December 2003.
2. Aluminum in Vaccines: What you should know: <http://www.chen.edu/export/download/pdf/cv/2008/02/20080227Aluminum.pdf>





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Talking to parents

Parents – Some Things We Know

- Overall confidence in safety of recommended vaccines is high
- Mothers are usual decision-makers when it comes to their children's health
- Mothers consistently list doctor visits and immunizations as among the most important things you can do to keep your children healthy
- Physicians remain the most credible source for immunization information – and they value stories and personal recommendations from doctors




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Parents Have a Different Perspective

Scientists and Health Experts	Public, Patients, Parents
<ul style="list-style-type: none"> • See probabilities as providing helpful context 	<ul style="list-style-type: none"> • See probabilities as having personal meaning • Concept of risk compression
<ul style="list-style-type: none"> • (Temporal) Association doesn't mean causation 	<ul style="list-style-type: none"> • (Temporal) Association strongly suggests causation – especially if it fits with personal beliefs
<ul style="list-style-type: none"> • Comfortable with data, empirical evidence, and guidance from expert committees and reviews 	<ul style="list-style-type: none"> • Data, research, and recommendations must align with personal beliefs or experiences • "Locus of control" beliefs often matter • Stories, examples, and anecdotes that resonate often most impactful



So you're saying there's a chance?



Adapted from 2012 NFID Clinical Vaccinology Course, Dr. Glen Nowak, NCIRD, CDC

Regret Avoidance



- Trying to avoid or minimize “regret” is often a key decision making factor.
- Inaction may feel safer than action, perception that inaction leaves risk up to chance, God, etc

Adapted from 2012 NFID Clinical Vaccinology Course, Dr. Glen Nowak, NCIRD, CDC
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Understanding Parent’s Beliefs/Intentions

Delayers/Hesitant (10%)	Refusers (1%)
Concerned about number of shots	Concerned about any shots
Values vaccines (just need to wait a bit)	Do not value vaccines
Believe in “partnership” with provider, working together for what is best for my child	Believe role is to challenge mainstream practice/beliefs

Adapted from 2012 NFID Clinical Vaccinology Course, Dr. Glen Nowak, NCIRD, CDC
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Messages to Parents



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Honesty: Vaccines are not perfect,
Science is not perfect



- No vaccine is 100% safe
- No vaccine is 100% effective
- All vaccines have possible side effects, most mild, rarely severe (See VIS for each)
- However, the risk of disease far outweighs the risk of vaccine
- Science is always evolving and sometimes new risks are identified
- However, science is the most reliable guide we have for making informed medical decisions. Feelings, hunches, and beliefs are never as reliable as the scientific method



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Risk to others



- Your child is healthy
- If your child contracts chickenpox there is a very good chance that your child will recover uneventfully
- However, if your contagious child comes in contact with a child with leukemia or with a newborn, that child would be at very high risk for severe infection and even death
- Keep in mind that many infections, including chicken pox, can be transmitted before symptoms occur



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Strategies



- Take time to listen
- Solicit and welcome questions
- Keep the conversation going
- Science vs. anecdote- depends on the parent
 - "I believe in immunizations. I am fully immunized and I immunize my children."
- Acknowledge benefits and risks
 - "I believe vaccinating is a safer option than not vaccinating."
- Respect parent's authority- partnership
- Acknowledge the stress and pain associated with shots
 - Crying is normal
 - Calm parent will help calm child
 - Use favorite blanket or toy
 - Touch child, soothe, talk softly, smile, make eye contact
 - Cuddle or breastfeed, pacifiers
- Explain risks and responsibilities if they choose to not vaccinate
 - Summer 2012 Olympics and measles
- Follow up after the vaccinations



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What behavioral interventions may help reduce the pain from vaccinations?



- A. Breastfeeding/sweet-tasting solutions
- B. Sucking on a pacifier
- C. Distraction
- D. Topical local anesthetics,
- E. Firm pressure with the alcohol wipe
- F. All of the above



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Resources

- New CDC Resource for Providers: Talking With Parents About Vaccines For Infants
 - Based on research with parents and developed in collaboration with AAP and AAFP
 - Provides materials for physicians and parents, including talking to parents about vaccines, vaccine-preventable diseases, and vaccine safety
 - Resources for "high information seeking parents"
 - Can be found at: www.cdc.gov/vaccines/conversation



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CDC Materials

If You Choose Not to Vaccinate Your Child, Understand the Risks and Responsibilities

From measles to whooping cough, there are serious risks that you can avoid by getting your child vaccinated. Please take time to consider your child's best interests and those of the community.

Why You Should Vaccinate or Understand the Risks and Responsibilities

When an outbreak of a vaccine-preventable disease occurs, you may be asked to help pay for the cost of medical care.

Talking with Parents about Vaccines for Infants

Strategies for Health Care Professionals

Parents are often concerned about their child's health and safety. It's important to have a conversation with them about the benefits of vaccination and the risks of not vaccinating.

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Parent Resources

IMMUNIZE FOR GOOD

FACT OR FICTION

FACT: Vaccines by your child's third birthday can prevent 99% of deaths, disabilities, and hospitalizations.

IMMUNIZE FOR GOOD

RESOURCE CENTER

Find helpful information on immunization, including where to get your child vaccinated, how to pay for vaccines, and more.

<http://www.immunizeforgood.com/>

More Resources

Immunization Action Coalition

Working to ensure that every child in every community is protected by the power of vaccines.

After the Shots


What to do if your child has discomfort

When your child has a fever, it's important to know when to call the doctor and when to seek emergency care.

<http://www.immunize.org/>



Thanks!

Rachel.Herlihy@state.co.us




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Extra Slides

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Comparison of 20th Century Annual Morbidity and Current Morbidity: Vaccine-Preventable Diseases

Disease	20 th Century Annual Morbidity [†]	2011 Reported Cases ^{††}	Percent Decrease
Smallpox	29,005	0	100%
Diphtheria	21,053	0	100%
Measles	530,217	212	> 99%
Mumps	162,344	370	> 99%
Pertussis	200,752	15,216	92%
Polio (paralytic)	16,316	0	100%
Rubella	47,745	4	> 99%
Congenital Rubella Syndrome	152	0	100%
Tetanus	580	9	98%
<i>Haemophilus influenzae</i>	20,000	8*	> 99%

†Source: JAMA. 2007;298(18):2155-2163.
 ††Source: CDC. MMWR January 6, 2012;60(5):11762-11773. (provisional 2011 data)
 * *Haemophilus influenzae* type b (Hib) < 5 years of age. An additional 14 cases of Hib are estimated to have occurred among the 237 reports of Hi (< 5 years of age) with unknown serotype.

Email from Sandra Roush - CDC 1/18/12

Preliminary Conclusions

- **The routine childhood immunization program in one birth cohort prevents about**
 - 20 million cases
 - 42,000 deaths
- **It is cost saving**
 - saves about \$13.6 billion in direct costs
 - saves about \$68.9 billion from societal perspective

From: Zhou F., Presented at 45th National Immunization Conference 10

Table 71-2. Approximate Basic Reproduction Numbers (in Developed Countries) and Implied Crude Herd Immunity Thresholds (H, Calculated as $1 - 1/R_0$) for Common Vaccine-Preventable Diseases.^{1,2}

Infection	Basic Reproduction Number (R ₀)	Crude Herd Immunity Threshold, H (%)
Diphtheria	6-7	85
Influenza ³	1.4-4	30-75
Measles ⁴	12-18	92-94
Mumps	4-7	75-86
Pertussis	12-17	92-94
Polio ⁵	2-15	50-93
Rubella	6-7	83-85
Smallpox	5-7	80-85
Tetanus	Not applicable	Not applicable
Tuberculosis ⁶	?	?
Varicella ⁷	8-10 ⁷	?



From: Fine PEM, et al. Community Immunity in Plotkin SA, Orenstein WA, Offit PA. Vaccines 5th edition. Elsevier, 2008, pp. 1573-1592

¹It should be emphasized that the values given in this table are approximate, and that they do not precisely reflect the tremendous range and diversity among populations. Nor do they reflect the full immunologic complexity underlying the epidemiology and persistence of these infections. See text for further discussion.
²% of influenza viruses probably varies greatly between subtypes.
³Hard immune thresholds as low as 55% have been published.
⁴Complicated by uncertainties over immunity to infection and variation related to hygiene standards.
⁵Inactivated immunity, not defined.
⁶Immunity not sterile, herd immunity threshold not defined.

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Vaccine Adverse Events

- <http://www.cdc.gov/vaccines/vac-gen/side-effects.htm>

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