

Vaccines Save Lives, So Why the Pushback and What to do About It?

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Ten Greatest Public Health Achievements United States, 1900-1999

- **Vaccination**
- Motor-vehicle safety
- Safer workplaces
- Control of infectious diseases
- Decline in deaths from coronary heart disease and stroke
- Safer and healthier foods
- Healthier mothers and babies
- Family planning
- Fluoridation of drinking water
- Recognition of tobacco use as a health hazard

MMWR 1999;48:241-243

Reduction in Vaccine-Preventable Diseases, United States

Disease	20th Century Annual Morbidity	2009 Reported Cases	Percent Decrease
Smallpox	29,005	0	100%
Diphtheria	21,053	0	100%
Measles	530,217	61	> 99%
Mumps	162,344	902	99%
Pertussis	200,752	13,506	93%
Polio (paralytic)	16,316	0	> 99%
Rubella	47,745	4	> 99%
Congenital Rubella Syndrome	152	1	99%
Tetanus	500	14	98%
<i>Haemophilus influenzae</i>	20,000	243	99%

MMWR 2010;58(51,52):1458-1460

JAMA 2007;258:2155-2163

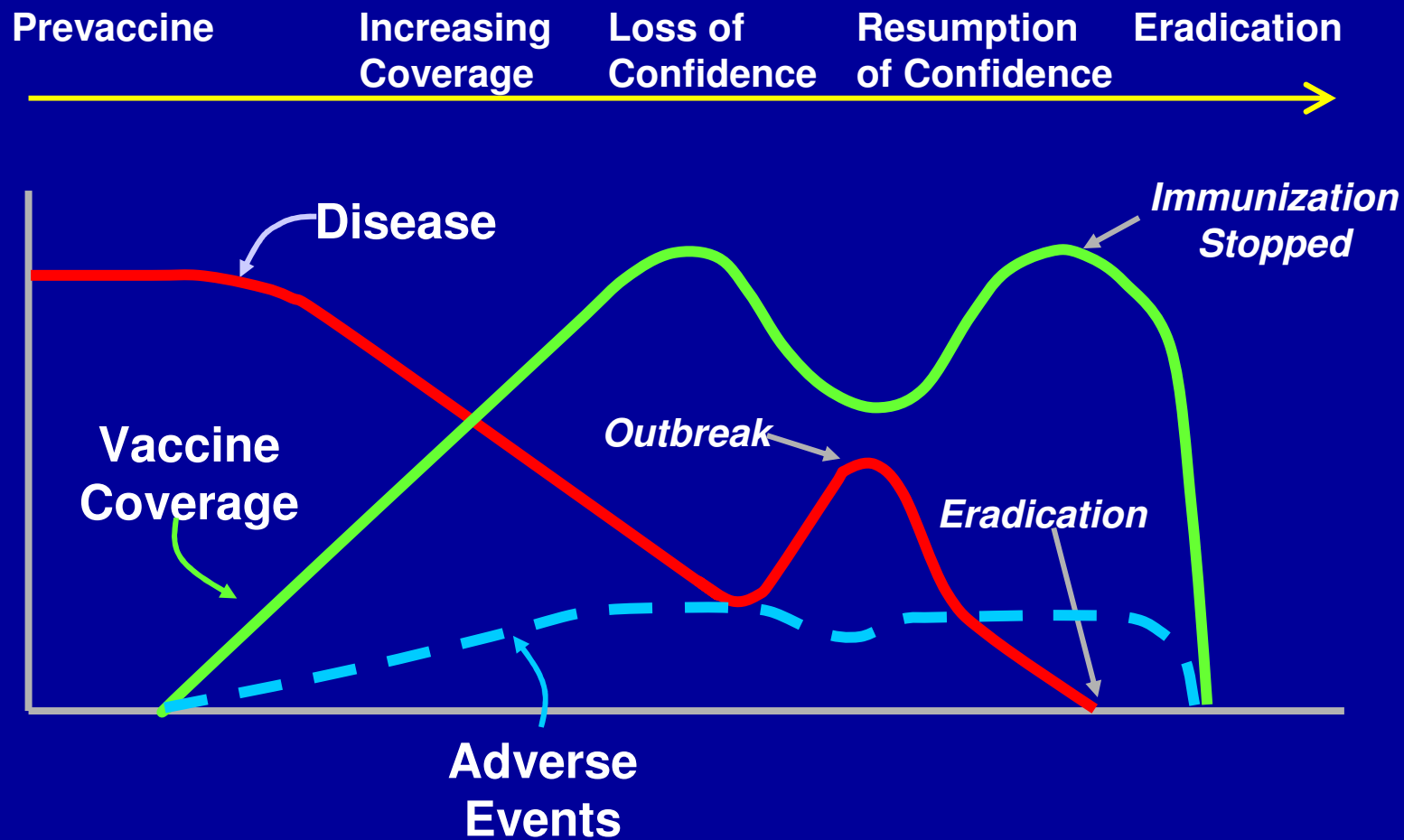
Vaccine Prevention in the 20th Century

- At the beginning of the 20th century
 - Infectious diseases were the most serious threat to human life and well-being
 - 160 out of every 1,000 children born at the turn of the century died of an infectious disease before the age of 5 years
- At the end of the 20th century (my experience)
 - 1989: 150 cases per year of Hib meningitis at CMC Dallas
 - 1 every 2-3 days
 - 1992: 1 case of Hib meningitis for entire year at CMC Dallas

Progression of an Immunization Program

- Decreased incidence of vaccine-preventable disease
- Decreased awareness of risks associated with disease
- Increased relative prominence of vaccine adverse events
 - Media attention
- Loss of public confidence

Progression of an Immunization Program



Risk Perception

- Individuals differ in their perception of risk depending on personality, education, and life experience
- Voluntary risks are usually more acceptable than involuntary risks
- Many persons prefer the consequences of inaction rather than action

CDC, 1999

Vaccine Concerns: Not A New Phenomenon

“In 1736 I lost one of my Sons a fine Boy of 4 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 Parents, who omit that Operation on the Supposition that they should never forgive themselves if a Child died under; my Example showing that the regret may be same either way, and that therefore the safer should be chosen.”

Benjamin Franklin

Recommended Childhood Immunization Schedule, 1983

	0	1 mo	2 mos	4 mos	6 mos	12 mos	15 mos	18 mos	24 mos	4-6 yrs	14-16 yrs
Diphtheria, Tetanus, Pertussis			DTP	DTP	DTP			DTP	DTP		Td
Polio (trivalent)			OPV	OPV				OPV		OPV	
Measles, Mumps, Rubella							MMR				

Recommended Childhood Immunization Schedule 0-6 Years, 2011

Recommended Immunization Schedule for Persons Aged 0 Through 6 Years—United States • 2011

For those who fall behind or start late, see the catch-up schedule

Vaccine ▼	Age ►	Birth	1 month	2 months	4 months	6 months	12 months	15 months	18 months	19–23 months	2–3 years	4–6 years
Hepatitis B ¹	HepB		HepB			HepB						
Rotavirus ²				RV	RV	RV ²						
Diphtheria, Tetanus, Pertussis ³				DTaP	DTaP	DTaP	<i>see footnote³</i>	DTaP				DTaP
<i>Haemophilus influenzae</i> type b ⁴				Hib	Hib	Hib ⁴	Hib					
Pneumococcal ⁵				PCV	PCV	PCV	PCV				PPSV	
Inactivated Poliovirus ⁶				IPV	IPV	IPV						IPV
Influenza ⁷						Influenza (Yearly)						
Measles, Mumps, Rubella ⁸							MMR		<i>see footnote⁸</i>			MMR
Varicella ⁹							Varicella		<i>see footnote⁹</i>			Varicella
Hepatitis A ¹⁰							HepA (2 doses)				HepA Series	
Meningococcal ¹¹												MCV4

 Range of recommended ages for all children

 Range of recommended ages for certain high-risk groups

Recommended Childhood Immunization Schedule 7-18 Years, 2011

Recommended Immunization Schedule for Persons Aged 7 Through 18 Years—United States • 2011

For those who fall behind or start late, see the schedule below and the catch-up schedule

Vaccine ▼	Age ►	7–10 years	11–12 years	13–18 years	
Tetanus, Diphtheria, Pertussis ¹			Tdap	Tdap	Range of recommended ages for all children
Human Papillomavirus ²	see footnote ²		HPV (3 doses)(females)	HPV series	
Meningococcal ³		MCV4	MCV4	MCV4	
Influenza ⁴		Influenza (Yearly)			Range of recommended ages for catch-up immunization
Pneumococcal ⁵		Pneumococcal			
Hepatitis A ⁶		HepA Series			Range of recommended ages for certain high-risk groups
Hepatitis B ⁷		Hep B Series			
Inactivated Poliovirus ⁸		IPV Series			
Measles, Mumps, Rubella ⁹		MMR Series			
Varicella ¹⁰		Varicella Series			

Immunogenic Proteins and Polysaccharides in Vaccines

1900		1960		1980		2000		2011	
Vaccine	Prot.	Vaccine	Prot.	Vaccine	Prot.	Vaccine	Prot.	Vaccine	Prot.
Smallpox	~ 200	Smallpox	~ 200	Diphtheria	1	Diphtheria	1	Diphtheria	1
		Diphtheria	1	Tetanus	1	Tetanus	1	Tetanus	1
		Tetanus	1	WC Pertussis	~ 3000	AC Pertussis	2-5	AC Pertussis	2-5
		WC Pertussis	~ 3000	Polio	15	Polio	15	Polio	15
		Polio	15	Measles	10	Measles	10	Measles	10
				Mumps	9	Mumps	9	Mumps	9
				Rubella	5	Rubella	5	Rubella	5
						Hib conj.	2	Hib conj.	2
						Varicella	69	Varicella	69
						Pneumo conj.	8	Pneumo conj.	8
						Hepatitis B	1	Hep A and B	5
								Rotavirus	15
								Influenza	8
1	~ 200	5	~ 3217	7	~ 3041	11	123-126	14	150-153

Are Infants Too Young to be Vaccinated?

- From birth, infants are challenged by bacteria in the environment (colonizing bacteria on intestines, skin, and throat; bacteria inhaled on dust)
- Vigorous sIgA responses within the first week of life keeps colonizing bacteria from invading

Dr. Bob's Alternative Vaccine Schedule

2 months	DTaP, Rotavirus
3 months*	Pc, HIB
4 months	DTaP, Rotavirus
5 months*	Pc, HIB
6 months	DTaP, Rotavirus
7 months*	Pc, HIB
9 months	Polio, Flu (2 doses [†])
12 months	Mumps, Polio
15 months	Pc, HIB
18 months	DTaP, Chickenpox

Aluminum

- “The alternative schedule suggests only one aluminum containing vaccine at a time in infant years. By spreading out the shots, you spread out the exposure so infants can process the aluminum without it reaching toxic levels.”

Robert Sears, *The Vaccine Book*, p. 239

Aluminum

- Aluminum is the third most abundant element on the earth's surface, and the most abundant metal
- As a consequence, aluminum is in the air we breathe, the food we eat, and the water we drink

Aluminum in Food

- Aluminum is found in breast milk and infant formulas
- By 6 months of age:

Vaccines	4 mg
Breast milk	10 mg
Infant formula	30 mg
Soy formula	120 mg

Harm in Alternative Schedule

- Not science- or evidence-based
- More likely to induce needle phobia
- Increase time during which children are susceptible to vaccine-preventable diseases
- Responsibility to the waiting room
- No benefit

Take-Home Points

- Vaccines save hundreds of thousands of lives every year
- Scientific evidence has proven vaccines are safe
- Despite proof, parents are more anxious than ever
- We must speak plainly, directly, and passionately, emphasizing:
 - The need to vaccinate each and every child
 - The safety of vaccines