

Childhood Immunizations

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Disclosures

- I have nothing to disclose.

Objectives

- By the end of this discussion, participants should:
- Become familiar with the history of the development of vaccines
- Have a better understanding of the impact of vaccines in the health of children
- Have more awareness of the misconceptions about the safety of vaccines
- Be aware of discussion strategies for a parent/caregiver with vaccine hesitancy

Birth of Vaccines

- Discovery that exposure to cowpox conferred protection to smallpox
- Evidence of practices hundreds of years ago
- 1774: Benjamin Jesty – inoculated his family with cowpox to prevent smallpox
- 1796: Edward Jenner developed and promoted the first smallpox vaccine using cowpox material

Both boys were exposed to the same source of smallpox on the same day



Source: The 1901 Atlas of Clinical Medicine, Surgery, and Pathology, photographs by Dr. Allan Warner

Types of Vaccines

- Live-attenuated vaccines
 - Use weakened version of virus
 - Conveys longer immunity/protection similar to that protection as having had infection
 - Lifelong immunity after just 1-2 doses
 - Not given to those with immunocompromise
 - Vaccines: MMR, Varicella, Rotavirus
- Inactivated vaccines and subunit or conjugate vaccines
 - Use killed versions or parts of virus or bacteria
 - Cannot cause illness
 - Need boosters more often
 - Vaccines: Polio (IPV), Influenza, Hepatitis B

Impact of Vaccines

- Eradication or dramatic decrease in the prevalence of many infections causing significant morbidity and mortality
- Decrease in medical costs for treatments and hospitalizations
- Decrease in time away from work for family members
- Decrease in time away from school for children

Global Impact of Vaccines

1988-2015



AFGHANISTAN
PAKISTAN

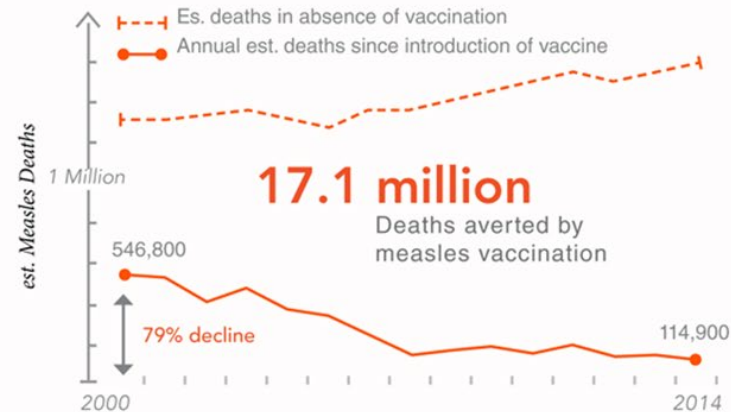
Only remaining polio endemic countries in the world, 2015



Region = WHO regions
Source: Global Polio Eradication Initiative
Figure: 3

2000-2014

Annual estimated measles deaths declined 79%,
from 546,800 to 114,900.



Source: MMWR 2015; 64:1246-51
Figure: 4

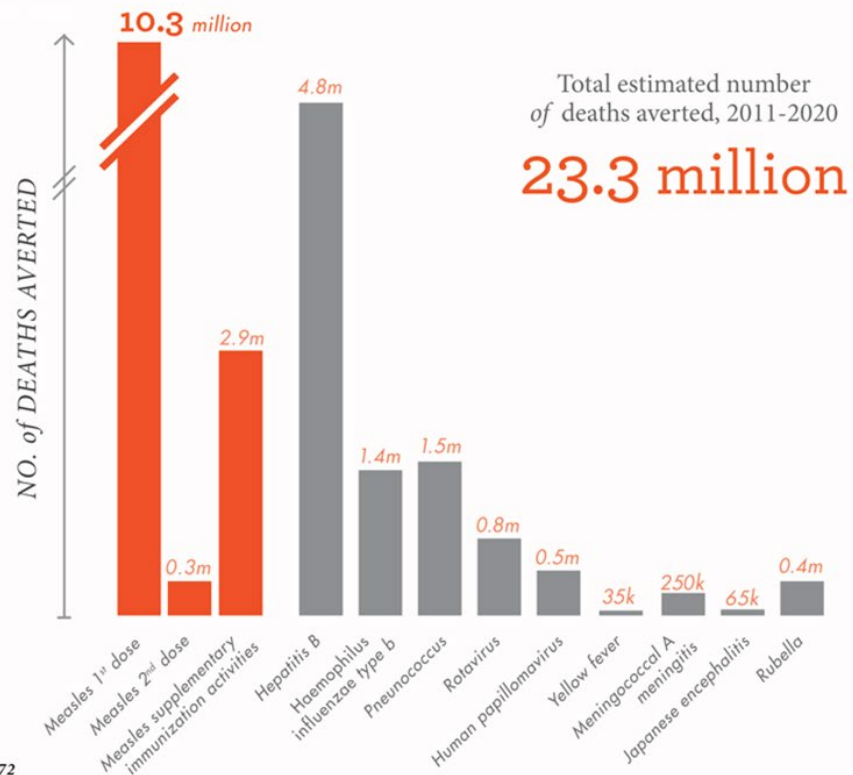
Graphic from CDC; The Global Impact of Vaccines in Reducing Vaccine-Preventable Disease Morbidity and Mortality

Global Impact of Vaccines

2011-2020

Estimated deaths averted with vaccines in low-income countries

Measles vaccine
Diseases with new or underutilized vaccines



Source: *Vaccine* 2013; 18;31 (Suppl 2): B61-72

Graphic from CDC; The Global Impact of Vaccines in Reducing Vaccine-Preventable Disease Morbidity and Mortality

Impact of Vaccines in the 20th & 21st Centuries

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

Disease	20 th Century Annual Morbidity*	2017 Reported Cases [†]	% Decrease
Smallpox	29,005	0	100%
Diphtheria	21,053	0	100%
Pertussis	200,752	18,975	91%
Tetanus	580	33	94%
Polio (paralytic)	16,316	0	100%
Measles	530,217	120	>99%
Mumps	162,344	6,109	96%
Rubella	47,745	7	>99%
CRS	152	5	97%
<i>Haemophilus influenzae</i>	20,000 (est.)	33 [§]	>99%

* JAMA. 2007;298(18):2155-2163

[†] CDC. National Notifiable Diseases Surveillance System. 2017 Annual Tables of Infectious Disease Data.

Comparison of Pre-Vaccine Era Estimated Annual Morbidity with Current Estimate: Vaccine-Preventable Diseases

Disease	Pre-Vaccine Era Annual Estimate	2016 Estimate (unless otherwise specified)	% Decrease
Hepatitis A	117,333*	4,000†	97%
Hepatitis B (acute)	66,232*	20,900†	68%
Pneumococcus (invasive) All ages	63,067*	30,400¶	52%
<5 years of age	16,069*	1,700¶	89%
Rotavirus (hospitalizations <3 years of age)	62,500‡	30,625§	51%
Varicella	4,085,120*	102,128††	98%

* JAMA. 2007;298(18):2155-2163

† CDC. Viral Hepatitis Surveillance – United States, 2016

¶ CDC. Unpublished. Active Bacterial Core surveillance. 2016

‡ CDC. MMWR. February 6, 2009 / 58(RR02); 1-25

§ New Vaccine Surveillance Network 2017 data (unpublished); U.S. rotavirus disease now has biennial pattern

†† CDC. Varicella Program 2017 data (unpublished)

Vaccine Myths

- Vaccines cause autism.
 - 1998: *Lancet* article by Dr. Andrew Wakefield
 - Falsely reported link with MMR and autism
 - Very small study
 - Falsified data
 - Retracted officially in 2010
 - Wakefield had financial interest, was guilty of ethical violations and lost medical license
 - Since that time, multiple large multicenter studies that have show NO LINK between vaccines and autism in children

Vaccine Myths

- Giving multiple vaccines at one time overwhelm the immune system.
 - From birth, babies are exposed to trillions of antigens/bacteria
 - Vaccines are a very small part of what contributes to the immune system development
 - Even though there are more vaccines, today's vaccines have less antigen exposure than earlier vaccines

Vaccine Myths

- A delayed or alternative vaccine schedule will result in better immunity and is safer.
 - Delays protection for children
 - Results in more office visits
 - More cost
 - More time
 - More injections (individual vs. combination shots)
 - More anxiety for children
 - No evidence that delaying/alternative schedule has any benefit or decreases risk for adverse reactions

Vaccine Myths

- Thimerosal causes autism.
 - Form of mercury in thimerosal is different than the form found to be toxic
 - Is no longer used in most childhood vaccines
 - Only used in a few influenza vaccines products (multidose vials)
 - No studies have shown link of thimerosal with autism in children
 - Since removed from vaccines, there has been no decrease in incidence of autism
- Other preservatives are harmful
 - Most are present in other everyday items
 - Keeps vaccines safe and effective

Other Hot Topics

- Getting “sick” after receiving the influenza vaccine
- Mandated vaccines violates civil rights
- Use of aborted fetal cells in vaccine production
- Natural infection is usually safer and results in better immunity

Approach to Vaccine Hesitant Parents

- Presumptive approach
 - Expectation that vaccines will be given on recommended schedule
 - Collaborative decision
- Take the time to answer questions
 - Many will agree if given chance to voice concerns and ask questions
- Discuss benefits vs. risks
 - Risk for complications from infection is much higher than the risk of side effects of the vaccines
 - Protects the child and those who are high risk who are at home or school

Resources

- BMJ “BMJ: Wakefield Paper Alleging Link between MMR Vaccine and Autism Fraudulent” <https://www.historyofvaccines.org/content/blog/bmj-wakefield-paper-alleging-link-between-mmr-vaccine-and-autism-fraudulent> 6 Jan 2011
- Center for Disease Control. “The Global Impact of Vaccines in Reducing Vaccine-Preventable Disease Morbidity and Mortality” https://www.cdc.gov/globalhealth/infographics/immunization/global_impact_of_vaccines.htm
- Center for Disease Control “Impact of Vaccines in the 20th & 21st Centuries” <https://www.cdc.gov/vaccines/pubs/pinkbook/downloads/appendices/e/impact.pdf>
- Center for Disease Control “Vaccine Information Sheets” <https://www.cdc.gov/vaccines/hcp/vis/current-vis.html>
- VEC’s “Too Many Vaccines? What you should know” <http://media.chop.edu/data/files/pdfs/vaccine-education-center-too-many-vaccines.pdf>
- FAQs about Multiple Vaccinations and the Immune System www.cdc.gov/vaccinesafety/Vaccines/multiplevaccines.html
- “The Problem With Dr. Bob’s Alternative Vaccine Schedule” by Paul Offit, MD and Charlotte Moser <http://pediatrics.aappublications.org/content/pediatrics/123/1/e164.full.pdf>
- AAP’s “The Childhood Immunization Schedule: Why Is It Like That?” www.aap.org/en-us/advocacy-and-policy/Documents/Vaccineschedule.pdf

Resources

- CDC's Studies on Thimerosal in Vaccines www.cdc.gov/vaccinesafety/pdf/cdcstudiesonvaccinesandautism.pdf
- VEC's "Vaccine Ingredients: What you should know"
<http://media.chop.edu/data/files/pdfs/vaccine-education-center-vaccine-ingredients.pdf>
- IAC's "Adjuvants and Ingredients" web section www.immunize.org/concerns/adjuvants.asp

Questions???

Thank you for your participation!