

The Continued Need for Immunizations in 2016



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Ten Great Public Health Achievements United States, 1900-1999– MMWR 1999

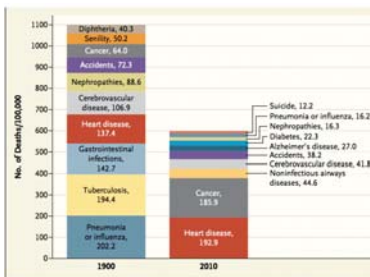
- Control of infectious diseases
- **Vaccination**
- Motor-vehicle safety
- Safer workplaces
- Decline in death from coronary heart disease and stroke
- Safer and healthier foods
- Healthier mothers and babies
- Family planning
- Fluoridation of drinking water
- Recognition of tobacco use as health hazard

2 www.cdc.gov/mmwr/



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Top Ten Causes of Death in the U.S., 1900 vs. 2010



Top 10 Causes of Death: 1900 vs. 2010.
Data are from the Centers for Disease Control and Prevention.

3 <http://all-that-is-interesting.com/top-10-causes-death-1900-2010>



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Common Questions about Vaccines

- How do vaccines protect us?
- Are they effective?
- Why do we need to keep vaccinating?
- Are they safe?
- What vaccines are recommended?

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HOW DO VACCINES WORK?

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How do vaccines work?

- Vaccines use a person's immune system to protect against disease.
- A weakened form of the disease germ (the vaccine) is injected into the body.
- The immune system responds and makes specialized cells and antibodies to fight the germ.

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How do vaccines work?

- The immune system keeps some of these cells and antibodies around long past vaccination.
- If the germ ever gets into the body, the immune system can rapidly call up these "memory" cells and respond to the germ quickly and more efficiently, inactivating it before it can cause disease.
- This memory persists for years, and often for life.

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ARE VACCINES EFFECTIVE?

(AND IF SO, WHY DO WE NEED TO STILL VACCINATE?)

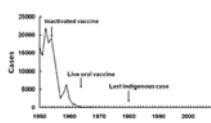
8

How successful have vaccines been?

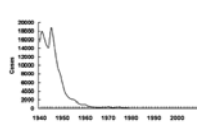
Measles - United States, 1950-2009



Polio - United States, 1950-2009



Diphtheria - United States, 1940-2009



Tetanus—United States, 1947-2009



9 <http://www.cdc.gov/vaccines/pubs/pinkbook>



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So why keep immunizing if the diseases are gone?

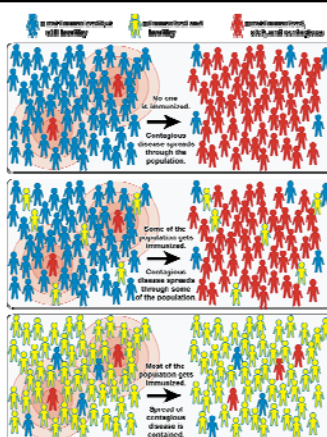
- While some diseases are becoming rare, it is because we are vaccinating against them. If we stop, then the diseases could start spreading again.
- Before long, we would see epidemics again as the number of individuals who are not protected rises.

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Herd Immunity



11 <http://www.niaid.nih.gov/topics/Pages/communityimmunity.aspx>

Are vaccines effective?

- No vaccine (or medicine) is 100% effective, but many provide excellent protection.
- Many give life-long protection (though some may need boosters to provide high levels of protection).
- Since the introduction of vaccines, diseases such as rubella have been eliminated from circulating in certain parts of the world.

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Why continue to immunize?

- ❑ Just because the disease rates are low in the U.S. doesn't mean we won't be exposed.
- ❑ Given how our world now moves and travels, disease is only an airplane ride away!
- ❑ Example: Pertussis (whooping cough) in Japan, 1974-1981

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Measles Mumps Rubella (MMR) Vaccine

- ❑ Provides protection against three viral illnesses.
- ❑ Recommended as a two-dose series, typically given at 12-15 months of age and 4-6 years.
- ❑ Two doses of MMR has been shown to be 98% effective against measles.
- ❑ Effectiveness against mumps is lower-estimated 88% (range 66-95%)

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Mumps

- ❑ Mumps is a viral illness that causes parotitis (swelling of the salivary glands).
- ❑ Transmission is airborne or direct contact with droplet nuclei or saliva.
- ❑ Starts with nonspecific symptoms, such as headache, low-grade fever, malaise and muscle aches.
- ❑ Complications include orchitis, pancreatitis, deafness and rarely, death.

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2015 Mumps Outbreak in Wisconsin

- ❑ There were 43 cases; all were laboratory confirmed by PCR.
- ❑ Affected eight counties and five university/college settings.
- ❑ Vast majority of cases were aged 18-25 years.
- ❑ Three individuals were hospitalized and two individuals developed orchitis.

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2015 Mumps Outbreak in Wisconsin

- ❑ The majority of cases (64%) had previously received two doses of MMR vaccine.
- ❑ Why is this happening?

≥2 Doses of MMR	29 (64%)
1 Dose of MMR	4 (9%)
0 Doses of MMR	4 (9%)
Unknown/Under Investigation	8 (18%)

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2015 Mumps Outbreak in Wisconsin

- ❑ To assess the effectiveness of the vaccine, one should compare the attack rate in those who **are** vaccinated with the rate in those who are **not** vaccinated.

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Outbreak Example

	Number of Individuals	Number of Cases	Attack Rate	Percentage
Vaccinated	950	29	3%	29/44 = 66%
Unvaccinated	50	15	30%	15/44 = 34%
Total	1000	44		

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2015 Mumps Outbreak in Wisconsin

- So while the absolute number of cases of mumps in individuals who are vaccinated is large, so is the number of exposed individuals who are vaccinated (and didn't get sick).
- From the 2006 U.S. outbreak, CDC has determined that while the majority of cases occurred in vaccinated individuals, the attack rate was much higher in unvaccinated individuals.

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ARE VACCINES SAFE?

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Are vaccines safe?

- All vaccines used in the United States are required to go through extensive safety testing before they are licensed by FDA.
- Once in use, they are continually monitored for safety and effectiveness.
- Any vaccine can cause a side effect, but for the most part, these are minor (like a sore arm) and go away in a few days.
- Careful screening ensures that vaccines continue to be given in a safe manner.

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Risk of Vaccination

- Serious reactions are extremely rare, and the risk of serious complications from a disease that could have been prevented is far greater.
- The choice to not be vaccinated is the choice to accept the risk of getting the disease, and transmitting that disease to others.

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Risk Comparison

139 Motor Vehicle Deaths
Per 1,000,000 people

99 Unintentional poisonings
Per 1,000,000 people

Less than 1 serious allergic reaction to MMR vaccine
Per 1,000,000 doses

1000 cases of encephalopathy after measles disease
Per 1,000,000 cases

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<http://www.cdc.gov/nchs/fastats/accidental-injury.htm>
<http://www.cdc.gov/vaccines/vac-gen/side-effects.htm#mmr>



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WHAT VACCINES ARE RECOMMENDED?

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Recommended Vaccines for Children

- Diphtheria
- Tetanus
- Pertussis (Whooping Cough)
- Polio
- *Streptococcus pneumoniae*
- *Haemophilus influenzae*
- Influenza
- Measles
- Mumps
- Rubella
- Varicella (Chickenpox)
- Hepatitis B
- Hepatitis A
- Meningococcal
- Human Papillomavirus

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2016 Recommended Adult Immunization Schedule

Figure 1. Recommended immunization schedule for adults aged 19 years or older, by vaccine and age group¹

Vaccine	19-21 years	22-24 years	25-29 years	30-39 years	40-49 years	50-59 years	60-69 years	70 years
Influenza ¹	1 dose annually							
Tetanus, diphtheria, pertussis (Td/Tdap) ¹	Substitute Tdap for 1st dose, then Td booster every 10 yrs							
Varicella ¹	2 doses							
Human papillomavirus (HPV) vaccine ¹	3 doses							
Human papillomavirus (HPV) vaccine ¹	3 doses							
Shingles ²								1 dose
Measles, mumps, rubella (MMR) ¹	1 or 2 doses depending on indication							
Pneumococcal 13-valent conjugate (PCV13) ¹								1 dose
Pneumococcal 23-valent polysaccharide (PPSV23) ¹				1 or 2 doses depending on indication				1 dose
Hepatitis A ¹				2 or 3 doses depending on vaccine				
Hepatitis B ¹				3 doses				
Hepatitis A and B (combined) (HepA/B) ¹				1 or more doses depending on indication				
Hepatitis A (HepA) ¹				2 or 3 doses depending on vaccine				
Hepatitis B (HepB) ¹				1 or 3 doses depending on indication				

27 <http://www.cdc.gov/vaccines/schedules/hcp/adult.html>



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Adult Immunization Schedule Recommendation Groupings

- Recommended for all persons who:**
 - Meet the age requirement
 - Lack documentation of vaccination, or
 - Lack evidence of past infection
- Recommended for persons with a risk factor (medical, occupational, lifestyle, or other indication)**
- No recommendation**

28 <http://www.cdc.gov/vaccines/schedules/hcp/adult.html>



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Vaccine Recommendations Based on Medical and Other Indications

Figure 2. Vaccines that might be indicated for adults aged 19 years or older based on medical and other indications¹

Vaccine	Indication	Recommendation
Influenza ¹	1 dose annually	
Tetanus, diphtheria, pertussis (Td/Tdap) ¹	Substitute Tdap for 1st dose, then Td booster every 10 yrs	
Varicella ¹	2 doses	
Human papillomavirus (HPV) vaccine ¹	3 doses through age 26 yrs	
Human papillomavirus (HPV) vaccine ¹	3 doses through age 26 yrs	
Shingles ²	1 dose	
Measles, mumps, rubella (MMR) ¹	1 or 2 doses depending on indication	
Pneumococcal 13-valent conjugate (PCV13) ¹	1 dose	
Pneumococcal polysaccharide (PPSV23) ¹	1, 2, or 3 doses depending on indication	
Hepatitis A ¹	2 or 3 doses depending on vaccine	
Hepatitis B ¹	3 doses	
Hepatitis A and B (combined) (HepA/B) ¹	1 or more doses depending on indication	
Hepatitis A (HepA) ¹	2 or 3 doses depending on vaccine	
Hepatitis B (HepB) ¹	1 dose	

29 <http://www.cdc.gov/vaccines/schedules/hcp/adult.html>



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Wisconsin Immunization Registry (WIR)

- Since 2000, collects immunization information for Wisconsin residents of all ages.
- Gathers information from vital records, public and private health care organizations, pharmacies, HMOs, Medicaid, WIC.
- As of February 2016, WIR contained 8,659,811 clients with 86,411,227 immunizations and had 5,508 active providers.

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WIR Forecasting Functionality

Current Age: 10 years, 9 months, 13 days

Select	Vaccine Group	Vaccine	Earliest Date	Recommended Date	Latest Date	Status
<input type="checkbox"/>	Influenza		09/01/2016	09/01/2016	01/03/2017	
<input checked="" type="checkbox"/>	Excludes/Tdap	Tdap	09/01/1986	09/01/1987	09/01/1988	
<input checked="" type="checkbox"/>	Excludes/Tdap	Preconceptional (P)	04/02/2014	04/02/2014	10/02/2014	
<input checked="" type="checkbox"/>	Tdap	Tdap	09/01/1983	09/01/1983	09/01/1984	
<input checked="" type="checkbox"/>	Excludes/Tdap	Excludes/Tdap				History of Disease Complete

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Your Immunization Record

- Wisconsin Immunization Registry (WIR) is a centralized repository of immunization information
- Located at <https://www.dhsWIR.org/>
- To find your record, you will need to enter first name, last name, date of birth and social security number (or medical record number or Medicaid ID)
- Includes what immunizations you have had and what is recommended

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Wisconsin Immunization Registry

HOME FORMS RENEWAL/REGISTRATION RELATED LINKS

Immunization Record Search

Families and individuals can use this screen to view and print their immunizations. First Name, Last Name, and Birth Date are required.

* First Name * Last Name

* Birth Date MM/YYYY

Please supply either the Social Security Number, Medicaid ID, or Health Care Member ID:

* SSN - OF -

* Medicaid ID - OF -

* Health Care Member ID

Click one of the links below to see the Wisconsin Immunization Registry Parent Brochure:

- WIR Parent Brochure
- Folho de WIR para Pais de Família
- WIR para Crianças e Jovens

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Client Information

Client Name: Jesse, John

Client Address: 1234 Main St, Madison, WI 53701-1234

Client Date of Birth: 09/01/1983

Client Social Security Number: 123-45-6789

Client Status: Active

Client Immunization History

Vaccine Group	Vaccine	Earliest Date	Recommended Date	Latest Date	Status
Influenza		09/01/2016	09/01/2016	01/03/2017	
Excludes/Tdap	Tdap	09/01/1986	09/01/1987	09/01/1988	
Excludes/Tdap	Preconceptional (P)	04/02/2014	04/02/2014	10/02/2014	
Tdap	Tdap	09/01/1983	09/01/1983	09/01/1984	
Excludes/Tdap	Excludes/Tdap				History of Disease Complete

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Timing of Vaccination

Timing of vaccination is critical.

For example, to prevent head injuries from riding a bike, when is the best time to put on a bike helmet?

- Before you get on your bike
- When you are riding your bike
- After you have crashed

35 Example courtesy of Dr. Jon Temte



COMMON MISCONCEPTIONS ABOUT VACCINES

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Do vaccines cause autism?

- ❑ There is **no** link between vaccines and autism.
- ❑ A 2011 Institute of Medicine (IOM) report on 8 vaccines given to children and adults found that with rare exceptions, these vaccines are very safe.
- ❑ 2013 CDC study showed that vaccines do not cause Autism Spectrum Disorder (ASD).
- ❑ Numerous studies have also determined vaccine ingredients (such as thimerosal) do not cause autism.

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Do children receive too many vaccines?

- ❑ From the moment babies are born, they are exposed to numerous bacteria and viruses on a daily basis. When they have a cold, they can be exposed to up to 50 antigens.
- ❑ A child who receives all the recommended vaccines may be exposed to up to 315 antigens by age two.
- ❑ This is not considered an appreciable burden on the immune system (1994 IOM report).

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Can I get the flu from the flu vaccine?

- ❑ No, the flu vaccine cannot cause the flu. The vaccines either contain inactivated virus (influenza shot), or a weakened version (nasal spray) and cannot cause influenza.
- ❑ Side effects of the vaccine may occur, but are usually mild and self-limited.

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Should pregnant women be vaccinated?

- ❑ Yes! Women who are pregnant are at higher risk of complications from influenza and are recommended to receive influenza vaccine.
- ❑ Additionally, Tdap (tetanus, diphtheria and pertussis) vaccine is recommended during each pregnancy (ideally between 27-36 weeks' gestation) to provide the newborn protection against pertussis.

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Should pregnant women be vaccinated?

- ❑ Vaccination of mothers is important for the infant as they must rely on protection from the mother until they are old enough to be vaccinated.
 - For influenza, an infant may be vaccinated starting at 6 months of age.
 - Pertussis series begins at 2 months of age, with significant protection after 3 doses (approximately 6 months of age).

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Summary

- ❑ Vaccines have contributed tremendously to the health of our nation.
- ❑ Vaccines are a safe and effective way to prevent disease.
- ❑ High rates of vaccination are needed to keep ourselves and our communities healthy.

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References

- ❑ Centers for Disease Control and Prevention. <http://www.cdc.gov/vaccines/>
- ❑ The History of Vaccines, College of Physicians of Philadelphia
<http://www.historyofvaccines.org>
- ❑ Institute of Medicine
<http://www.cdc.gov/vaccinesafety/research/iomreports/index.html>
- ❑ Wisconsin Immunization Registry (WIR). Available at: <https://www.dhfs.wisconsin.gov/wir>

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