

## Types of Vaccine

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# Introduction

- There are several different types of vaccines.
- Each type is designed to teach your immune system how to fight off certain kinds of germs — and the serious diseases they cause.

When scientists create vaccines, they consider:

- How your immune system responds to the germ
- Who needs to be vaccinated against the germ
- The best technology or approach to create the vaccine

- Based on a number of these factors, scientists decide which type of vaccine they will make.
- There are 4 main types of vaccines:
  1. Live-attenuated vaccines
  2. Inactivated vaccines
  3. Subunit, recombinant, polysaccharide, and conjugate vaccines
  4. Toxoid vaccines

# Live-attenuated Vaccines

- Live vaccines use a weakened (or attenuated) form of the germ that causes a disease.
- Because these vaccines are so similar to the natural infection that they help prevent, they create a strong and long-lasting immune response. Just 1 or 2 doses of most live vaccines can give you a lifetime of protection against a germ and the disease it causes.
- But live vaccines also have some limitations.

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- For example:
- Because they contain a small amount of the weakened live virus, some people should talk to their health care provider before receiving them, such as people with weakened immune systems, long-term health problems, or people who've had an organ transplant.
- They need to be kept cool, so they don't travel well. That means they can't be used in countries with limited access to refrigerators.

Live vaccines are used to protect against:

- Measles, mumps, rubella (MMR combined vaccine)
- Rotavirus
- Smallpox
- Chickenpox
- Yellow fever

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# Inactivated Vaccines

- Inactivated vaccines use the killed version of the germ that causes a disease.
- Inactivated vaccines usually don't provide immunity (protection) that's as strong as live vaccines.
- So you may need several doses over time (booster shots) in order to get ongoing immunity against diseases.

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Inactivated vaccines are used to protect against:

- Hepatitis A
- Flu (shot only)
- Polio (shot only)
- Rabies

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# Subunit, recombinant, polysaccharide, and conjugate vaccines

- Subunit, recombinant, polysaccharide, and conjugate vaccines use specific pieces of the germ — like its protein, sugar, or capsid (a casing around the germ).
- Because these vaccines use only specific pieces of the germ, they give a very strong immune response that's targeted to key parts of the germ.

- They can also be used on almost everyone who needs them, including people with weakened immune systems and long-term health problems.
- One limitation of these vaccines is that you may need booster shots to get ongoing protection against diseases.

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These vaccines are used to protect against:

- Hib (*Haemophilus influenzae* type b) disease
- Hepatitis B
- HPV (Human papillomavirus)
- Whooping cough (part of the DTaP combined vaccine)
- Pneumococcal disease
- Meningococcal disease
- Shingles

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# Toxoid vaccines

- Toxoid vaccines use a toxin (harmful product) made by the germ that causes a disease.
- They create immunity to the parts of the germ that cause a disease instead of the germ itself.
- That means the immune response is targeted to the toxin instead of the whole germ.

Toxoid vaccines are used to protect against:

- Diphtheria
- Tetanus

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# References

- World Health Organization. Smallpox Eradication. Official Records of the World Health Organization No. 95. Geneva, World Health Organization, 1959, pp 572–588.
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- World Health Organization, Global Vaccine Action Plan 2011-2020. Archived 2014-04-14 at the Wayback Machine Geneva, 2012.