

# How Vaccines Work



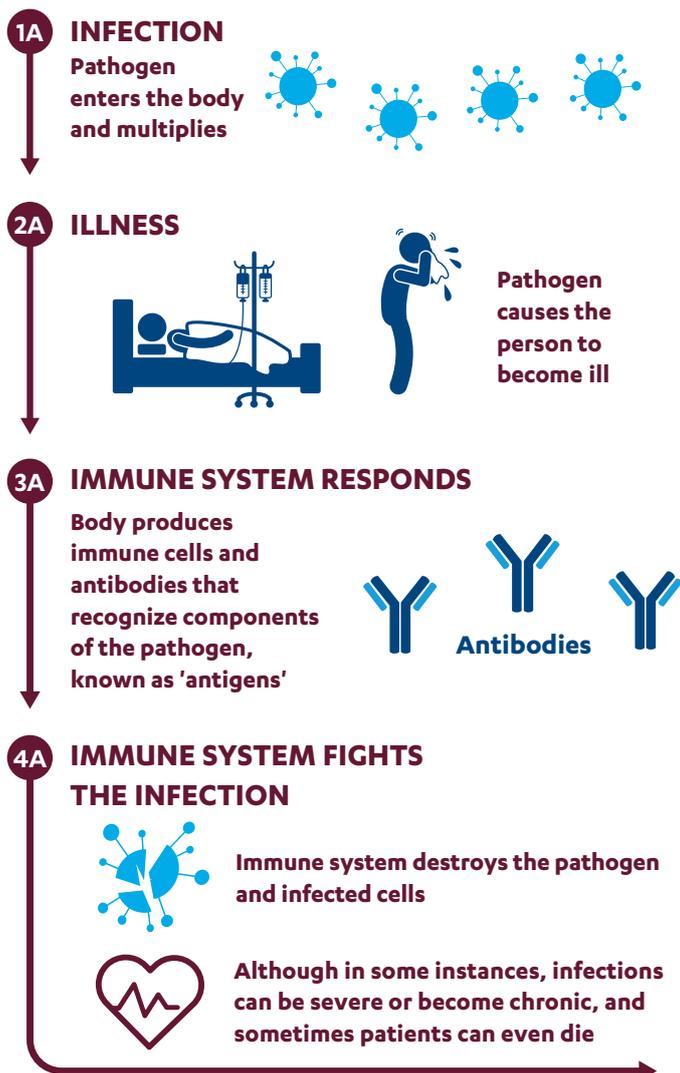
“ Through effective vaccination programs we have seen a great reduction in disease burden, with vaccines saving up to 3 million lives every year. It remains evermore important that we ensure the uptake of vaccination continues, to ensure many more lives are saved. ”



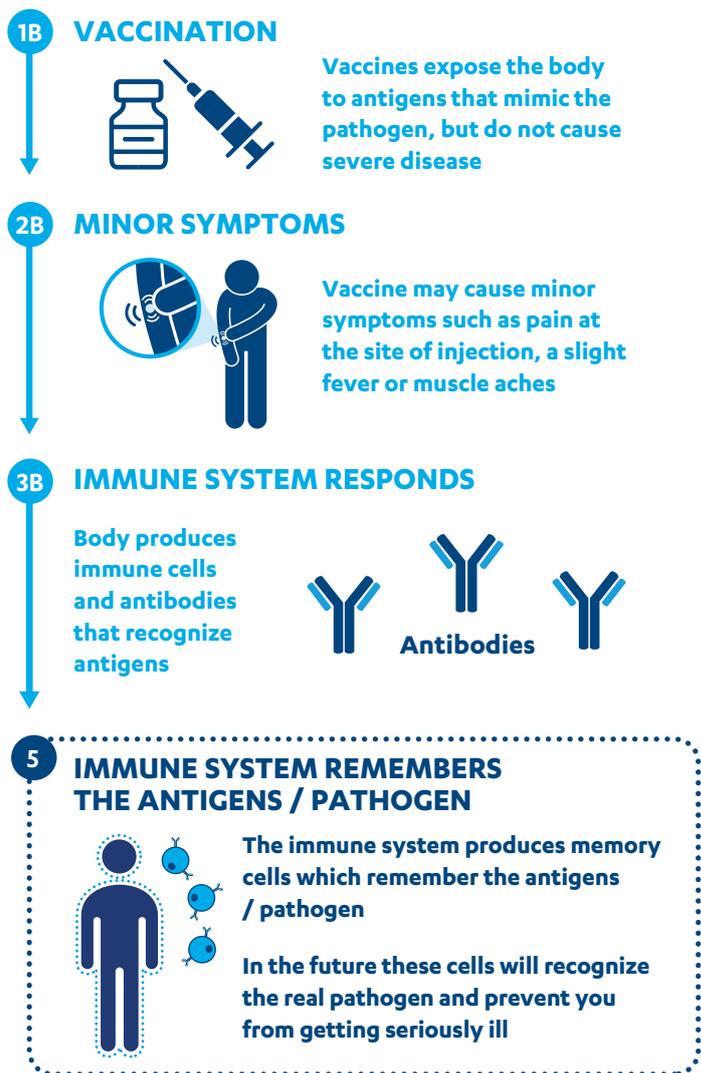
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Vaccination is one of the most successful public health interventions.<sup>1</sup> It allows the immune system to develop protection against certain illnesses by exposing the body to antigens (a substance foreign to the human body that induces an immune response) which mimic (components of) a pathogen (a bacterium, virus, or other disease-causing microorganism), but does not cause severe disease.<sup>2,3</sup>

## HOW THE IMMUNE SYSTEM PROTECTS US FROM DISEASE<sup>2,3</sup>



## HOW VACCINES PROTECT US FROM DISEASE<sup>2,3</sup>





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## **HOW THE IMMUNE SYSTEM PROTECTS US FROM DISEASE<sup>2,3</sup>**

- 1A** When the body is infected with a harmful virus or bacterium (collectively called pathogens) for the first time, the immune system can take several days to recognize and respond to the infection. During this time, the pathogen is able to multiply in the body.
- 2A** As the pathogen multiplies, the infection can spread and cause the person to become seriously ill.
- 3A** To protect the body against the infection, the immune system recognizes parts of the pathogen, known as ‘antigens’, as foreign and produces immune cells and antibodies to protect the body against the disease.
- 4A** In most cases, the immune response is powerful enough to capture the pathogens and clear them from the body, so that you feel better in a matter of days or weeks. In other instances, infections can be severe or become chronic, and sometimes patients can even die.

**5 As a result of exposure to both natural infection and vaccines, memory cells are created. Memory cells ensure that the immune system recognizes the pathogen during a future (real) infection, and responds faster and more effectively. In this way, the immune system is primed to fight off the infection before you get seriously ill.<sup>2,3</sup>**

## **HOW VACCINES PROTECT US FROM DISEASE<sup>2,3</sup>**

- 1B** Vaccines enter the body and expose it to antigens which mimic (components of) the pathogen, but do not cause severe disease. This enables the body to be introduced to the pathogen, without making the person seriously ill.
- 2B** In most cases, vaccines only cause minor symptoms, such as pain at the site of injection, a slight fever or muscle aches. In very rare cases, vaccines cause more serious side effects, although the risk of this is minimal compared to the risk of serious illness posed by a natural infection.
- 3B** When a person is vaccinated, the immune system will recognize the antigens as foreign and mount an immune response against them by producing immune cells and antibodies, similar to a natural infection. Although, for some specific diseases e.g. influenza, the immune response triggered by a vaccine can be better than the response induced by natural infection.

**“ Vaccines. With the exception of safe water, no other modality, not even antibiotics, has had such a major effect on mortality reduction.<sup>4</sup> ”**



**WORLD HEALTH ORGANISATION**

**References** **1.** World Health Organization. 10 facts on immunization. Available at: <https://www.who.int/features/factfiles/immunization/en/>. Last accessed: May 2019. **2.** Understanding how vaccines work. Available at: <https://www.cdc.gov/vaccines/hcp/conversations/downloads/vacsafe-understand-color-office.pdf>. Last accessed: May 2019. **3.** Live Science. How Do Vaccines Work? Available at: <https://www.livescience.com/32617-how-do-vaccines-work.html>. Last accessed: May 2019. **4.** State of the world’s vaccines and immunization, 3<sup>rd</sup> ed. Geneva, WHO, 2009.