

# Common Vaccine Myths<sup>1</sup>

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Few medical topics stir up as much heated debate and controversy as the subject of vaccines. There are numerous questions and misconceptions about their safety and development. In this publication, five of the most common vaccine myths are discussed and dispelled.

## Myth 1: Vaccines cause autism.

Currently, the most common misconception about vaccines is that vaccines cause autism. To date, there has been only one small study of eight children published by Andrew Wakefield in 1998 that suggested a link between the MMR (Measles, Mumps, Rubella) vaccine and autism, but this link was disproven.

Additionally, several studies from around the world looked at thousands of children and found no evidence to support Wakefield's claims. The 1998 work contained so much falsified information that the paper was withdrawn from publication and Wakefield had his medical licensure revoked (American Academy of Pediatrics 2021).

## Myth 2: Vaccine development is not a trustworthy and transparent process.

Vaccine development is a lengthy and rigorous process involving many different researchers and agencies that examine efficacy and safety. It starts with a research and discovery stage where researchers from universities,

companies, and agencies find potential vaccines that have shown effectiveness in animal models. Next, in the pre-clinical stage, scientists from different universities, companies, or agencies test these findings again. Once the vaccine results can be replicated by different researchers and in different settings, then the potential vaccine is tested on people. The clinical stage of vaccine development must pass three phases to ensure the vaccine is safe. Phase 1 ensures the safety of the potential vaccine for a small number of healthy people. Phase 2 expands the testing to hundreds of people with varying degrees of health, and Phase 3 expands the testing to thousands of people. If the vaccine is shown to be safe, then a standard for safe and reliable manufacturing must be guaranteed. To obtain the FDA's approval, the vaccine must be proven safe and a manufacturing pipeline must be in place. Once a vaccine is initially approved, it is continuously monitored to ensure safety and efficacy (The College of Physicians of Philadelphia 2021).

## Myth 3: The vaccine schedule is too aggressive and begins too early in life.

There is no evidence that supports the concern that receiving several vaccines at one time and at a young age will overwhelm a healthy child's immune system (Edwards et al. 2016). It is important to start the childhood immunization schedule recommended by the CDC on time and complete all recommended doses to ensure a child is fully protected.

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For some vaccines, a single dose is not enough to provide sufficient immunity. Immunity from certain vaccines decreases over time, which means they require a “booster” dose several years after the initial vaccine series.

Many diseases remain a threat in the United States. Therefore, spacing out vaccine doses beyond the recommended window leaves children vulnerable to infection. Each vaccine has been individually researched to determine how and when the immune system reaches peak productivity to provide optimal protection.

## Myth 4: Vaccines contain unsafe additives like aluminum and mercury.

Adjuvants are substances that are added to some vaccines to boost their efficacy and stability. Aluminum is an example of an adjuvant. Aluminum is found in water, plants, soil, air, and throughout the food chain. The amount of aluminum in a vaccine is less than the amount of aluminum exposure through food sources, including breast milk and formula. Extensive studies have found no evidence of toxicity, and the aluminum added to vaccines is deemed completely safe (Geoghegan et al. 2020).

A form of mercury called ethylmercury (thimerosal) has been used as a component in vaccines. Although some forms of mercury like methylmercury are toxic, ethylmercury is a different compound and is safe. It is cleared from the system and does not accumulate in the body. Safety studies have not found any risks (including the risk of developing autism) associated with ethylmercury. In fact, since the 2001 **removal** of ethylmercury from vaccines, rates of autism have increased. Currently, none of the single-dose vaccines given to infants contains ethylmercury (Geoghegan et al. 2020).

## Myth 5: Vaccines can cause severe side effects.

Mild side effects like soreness are common and far less severe than the disease the vaccine is trying to prevent. Vaccines undergo a more extensive approval process than medical treatments to ensure that they are safe, and that the benefit in disease prevention always outweighs any risks and side effects. Once approved, vaccines continue to be tracked closely, and any adverse vaccine reactions are reported. Severe reactions like anaphylaxis, a life-threatening allergic reaction, are very rare and are estimated to occur 1.3 times per million vaccine doses (less than 0.001% of the

time). Vaccines contain multiple compounds and any of the ingredients may be responsible for triggering the rare allergic reaction. For example, the egg products contained in some vaccine formulations may elicit an allergic reaction that has nothing to do with the antigen itself (Palmiere et al. 2017).

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