

Vaccines across the life span

NEWBORN BABIES



The body's immune system begins developing before birth. In the period during and soon after birth, when the functions of the immune system are still maturing, newborns are protected against many, but not all, serious infections by antibodies from their mother. This protection usually lasts for about four months.

BABIES AND CHILDREN



As the early protection provided by the mother's antibodies fades away, a child's innate and adaptive immune systems start to mature and develop a memory of infections. They are more vulnerable to some infections at this age as their immune system is still maturing. However, their protection against pathogens grows throughout this time.

Children also have protection from early vaccinations. The current immunisation programs are designed to balance the ability of the child's immune system to respond to the vaccine against the risk of the child getting the infection.

ADULTS



Adults require booster doses of some vaccines, such as tetanus, to maintain adequate levels of immunity throughout their life. Additional vaccines may be required in adulthood if the person plans on travelling overseas.

Not every person has a normally-functioning immune system, and some have primary or secondary immune deficiencies. A primary immune deficiency is one a person is born with, and a secondary immune deficiency is one that a person acquires from a disease or treatment, such as chemotherapy. Some people may be **immunosuppressed** from a disease or treatment, such as people receiving treatment for autoimmune diseases or cancer. These people may not be able to produce a strong immune response following vaccination and may rely on herd immunity to be protected from acquiring diseases.

PREGNANCY



Maternal antibodies cross the placenta into the baby's circulation before birth and are also present in the mother's breast milk. If the mother has been vaccinated or has recovered from infection during pregnancy, the amount of antibodies transmitted to the baby can be sufficient to ensure complete protection. On the other hand, if the mother's infection (particularly with the pathogen that causes whooping cough) or immunisation occurred a long time ago, the antibody levels and protection may be lower.

Some vaccines, including inactivated vaccines, are considered safe to be given during pregnancy. The rates of side effects among pregnant women are similar to those in the general population. No link has been established between vaccination with inactivated vaccines in pregnancy and birth defects. The use of inactivated vaccines in pregnancy is particularly desirable for infections such as influenza and whooping cough that affect pregnant women or their babies more severely than the general population. This is because vaccination during pregnancy protects the mother against infection and provides protection to the baby as a result of the transfer of maternal antibodies.

Live attenuated vaccines, such as the MMR vaccine, are not recommended during pregnancy, as the live viruses could theoretically be transmitted from pregnant mothers to their baby. However, there is no evidence of increased birth defects in children whose mothers inadvertently received live attenuated vaccines while pregnant.

OLDER ADULTS



Older adults, particularly people over 65, will experience a progressive decline in immunity as they get older. This means that they are more susceptible to infection and less responsive to vaccines.

Infection due to influenza, varicella-zoster viruses (causing chickenpox and shingles), SARS-CoV-2 (causing COVID-19) and *Streptococcus pneumoniae* can cause severe illness in older adults. Most of these diseases also lead to increased risk of death in older adults.

Special vaccines designed to work better with the immune system of older adults are made in two main ways:

1. Developing new types of adjuvants to stimulate the immune response more effectively
2. Increasing the amount of antigen included in the vaccine

MATERNAL ANTIBODIES

Maternal antibodies are antibodies produced by a mother and transferred to the fetus.