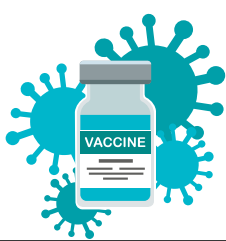


VACCINES



Vaccine^{1,2}

A vaccine is a biologically derived substance designed to produce a protective immune response when administered to humans.



Vaccination^{1,2}

Vaccination is the act of introducing a vaccine into the body. The desired outcome is to produce immunity against a specific infection or disease.

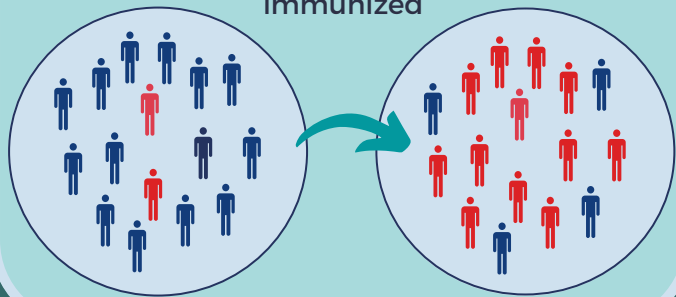


Immunization^{1,2}

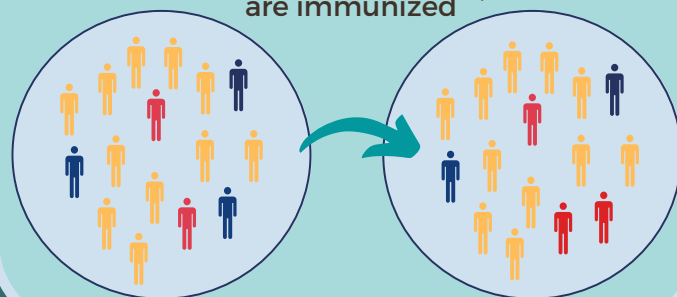
Immunization is the process by which the vaccination confers protection to the individual.

Herd immunity occurs when a large proportion of a population becomes immune to a certain infectious disease, restricting the further spread of the disease in those who are unprotected. This immunity can occur through vaccination or prior illness. The proportion of a population who must be immune to achieve herd immunity varies by disease.^{1,2}

Disease spreads rapidly when no one is immunized^{1,2}



The disease spreads slower when most people are immunized^{1,2}



Susceptible



Infected



Immunized

Vaccine Efficacy^{1,2}

The extent to which the vaccine prevents disease, and possibly also transmission, under ideal and controlled conditions when comparing a vaccinated group with a placebo group.

- Measured through **randomized control trials**.
- Participants are chosen or given specific instructions to reduce the risk.
- In clinical trials, the conditions for vaccine immunity are carefully designed and do not represent real human interactions.

Vaccine Effectiveness^{1,2}

The extent to which the vaccine provides beneficial results under real-world conditions.

- Measured through **observational studies**.
- Represents how the vaccine will perform in the real world when different variables are at play, such as age, underlying chronic conditions and vaccine storage and administration.
- The effectiveness percentage can be lower than efficacy due to real-world unpredictability.

1. CDC. Immunization basics [Internet]. Centers for Disease Control and Prevention. Centers for Disease Control and Prevention; 2021 [cited 2023Feb24]. Available from: <https://www.cdc.gov/vaccines/vac-gen/imz-basics.htm>

2. Edited by Kenrad E. Nelson, Carolyn Masters Williams. (2014). Infectious disease epidemiology: theory and practice. Burlington, MA : Jones & Bartlett Learning