



Global Impact of Vaccine-Preventable Diseases and the Critical Importance of Vaccine Efficacy Today

Corinne McDaniels*

Department of Public Health, 850 Marina Bay Parkway, United States of America

DESCRIPTION

Vaccine-preventable diseases continue to pose significant threats to global health despite the availability of safe and effective vaccines. These diseases, which include measles, polio, hepatitis B, diphtheria, pertussis, tetanus and many others, can cause severe illness, disability and death, especially among vulnerable populations such as infants, the elderly and immunocompromised individuals. The introduction and widespread use of vaccines have drastically reduced the incidence of these diseases worldwide, proving their efficacy and reinforcing the importance of maintaining high vaccination coverage. However, disease outbreaks still occur when vaccination rates decline, highlighting the need for ongoing public health efforts and education.

The efficacy of a vaccine is a measure of how well it protects against a disease under controlled conditions, such as in clinical trials. High-efficacy vaccines not only prevent infection but can also reduce the severity of illness, lower the risk of transmission and prevent complications and long-term effects. For instance, the measles vaccine is about 97% effective when both doses are administered and its widespread use has led to the elimination of endemic measles in many parts of the world. Similarly, the polio vaccine has reduced global cases by over 99% since the launch of the Global Polio Eradication Initiative in 1988.

Vaccines work by stimulating the body's immune system to recognize and combat pathogens. They typically contain an inactivated or weakened form of the disease-causing microorganism, or a piece of it such as a protein or genetic material. Once introduced into the body, the immune system creates memory cells that "remember" the pathogen and can mount a strong and rapid response if exposed again in the future. This immune memory is what makes vaccines so powerful in preventing disease. When a high percentage of a population is vaccinated, herd immunity can be achieved, indirectly protecting individuals who cannot receive vaccines for medical reasons.

Despite the success of vaccines, vaccine-preventable diseases still result in hundreds of thousands of deaths annually, particularly in low-and middle-income countries where access to vaccines may be limited. Hepatitis B, for example, remains a major global health concern, causing around 820,000 deaths per year due to complications like liver cirrhosis and cancer. The hepatitis B vaccine is over 95% effective and provides long-lasting protection, yet millions remain unvaccinated. Similarly, pertussis (whooping cough) continues to cause illness and death in infants despite the availability of effective vaccines. These cases often occur in areas with poor vaccine coverage or among unvaccinated individuals.

One of the major challenges in controlling vaccine-preventable diseases is vaccine hesitancy-the reluctance or refusal to vaccinate despite the availability of vaccines. Hesitancy is influenced by various factors including misinformation, mistrust in health authorities, cultural beliefs and concerns about side effects. Public confidence in vaccines can also be undermined by outbreaks, even though these often result from low vaccination rates rather than vaccine failure. To combat hesitancy, clear and transparent communication about vaccine efficacy, safety and the risks of disease is essential. Healthcare providers play a critical role in educating patients and addressing concerns.

Monitoring and evaluating vaccine efficacy is an ongoing process. As new variants of pathogens emerge or immunity wanes over time, booster doses or updated vaccine formulations may be required. This has been evident with diseases like influenza, where the virus evolves rapidly and annual vaccination is necessary. The COVID-19 pandemic further demonstrated the need for flexible and adaptive vaccine strategies. Although COVID-19 vaccines were developed at unprecedented speed, their efficacy in preventing severe illness and death has been well-documented through real-world data. Booster doses were introduced as variants emerged and immunity declined, ensuring continued protection in the population.

Correspondence to: Corinne McDaniels, Department of Public Health, 850 Marina Bay Parkway, United States of America, E-mail: kyle.ri346@cd.ca.gov

Received: 30-Apr-2025, Manuscript No. JVV-25-29649; **Editor assigned:** 02-May-2025, Pre QC No. JVV-25-29649 (PQ); **Reviewed:** 16-May-2025, QC No. JVV-25-29649; **Revised:** 23-May-2025, Manuscript No. JVV-25-29649 (R); **Published:** 30-May-2025, DOI: 10.35248/2157-7560.25.16.561.

Citation: McDaniels C (2025) Global Impact of Vaccine-Preventable Diseases and the Critical Importance of Vaccine Efficacy Today. J Vaccines Vaccin. 16:561.

Copyright: © 2025 McDaniels C. This is an open access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution and reproduction in any medium, provided the original author and source are credited.

The continued development and distribution of effective vaccines are essential to prevent the resurgence of previously controlled diseases. Measles outbreaks in some countries, for example, have been linked directly to declining vaccination coverage. Because measles is highly contagious, even small reductions in vaccination rates can lead to large outbreaks. Ensuring high vaccine efficacy and coverage is crucial not just for individual protection, but for maintaining population-wide immunity and preventing health crises. In addition, diseases like diphtheria and rubella, once common, have become rare in many regions thanks to successful vaccination programs.

Technological advances in vaccine development have the potential to improve efficacy and make vaccines more accessible. New platforms like mRNA vaccines, viral vectors and protein subunits are being used to develop next-generation vaccines that are safer, more effective and easier to produce. These innovations are especially important for combating emerging infectious diseases and those for which traditional vaccine methods have been less successful. Enhanced surveillance systems, better data collection and improved logistics are also playing a role in ensuring that vaccines reach the people who need them most.

Global initiatives such as Gavi, the Vaccine Alliance and the World Health Organization's Expanded Programme on

Immunization (EPI) have played a critical role in improving vaccine access and coverage in resource-limited settings. These programs support vaccine procurement, distribution, training of health workers and public education. As a result, millions of children are now protected from diseases that once claimed countless lives. Continued investment in such programs is vital to sustaining progress and closing the gap in global vaccine coverage.

CONCLUSION

In conclusion, vaccine-preventable diseases continue to pose serious health risks, but their impact can be dramatically reduced through the use of safe and effective vaccines. Vaccine efficacy is central to achieving disease control, reducing mortality and maintaining global health security. Maintaining high vaccination rates, combating misinformation and investing in innovative vaccine technologies are all essential steps in ensuring that the world remains protected against preventable illnesses. The ongoing commitment to vaccination efforts worldwide will determine the future success in eliminating these diseases and safeguarding generations to come.