

IMMU 369: Epidemics, Vaccines, and Prevention

When a large number of people become ill due to the same infectious agent, it is called an epidemic—or, if the disease spreads to affect even greater numbers globally, a pandemic. For example, the Bubonic Plague was active in the fourteenth century in Europe, killing almost one-third of the continent's population, while the 1918 flu killed an estimated 50 million people worldwide. More recently, the Ebola epidemic in West Africa showed that our global response to a potential pandemic is slow and lacking in early detection systems and global coordination. Vaccines, arguably one of the most important scientific breakthroughs of modern times, have allowed us to defend ourselves against rampant infections. The world community has managed to eradicate smallpox, and is close to eradicating polio. For both, the key tool was the implementation of routine vaccinations. This course will explore historic and current threats by infectious diseases with epidemic or pandemic potential as well as strategies to prevent and control outbreaks. The course will emphasize the important role of vaccines and will cover the immunological mechanisms on which successful vaccines are based. Vaccines currently in use and major challenges in novel vaccine development and implementation will be also discussed.

Learning Objectives

- List major historical epidemics and their impact on society
- Discuss how both genetic mutations and changes in the environment together with human social behavior can give rise to new infectious diseases
- Explain how vaccines can help prevent infections
- Compare different types of vaccine strategies and their underlying immunological mechanisms
- Assess the potential of a developmental vaccine candidate

Credits: 1

Class Type: Graduate Course

Program: Immunology and Microbiology

Availability Summer 2021