

# Stamping Out Disease: Celebrating Vaccine Successes

WITH ARTIFACTS FROM THE KURT LEKISCH, MD COLLECTION



Archaeological evidence from the Middle East and the Americas has revealed the presence of smallpox, malaria, and tuberculosis dating back more than 2,000 years.



The medieval physician could do little to aid the afflicted. Doctors wore a mask holding spices and vinegar to conceal the smell of death while attending patients.



## The Rise and Spread of Infectious Disease

Humans share the world with tiny organisms that cause disease. In small, isolated groups, nomadic hunters and gatherers carried these in their bodies without consequence. However, the rise of civilizations brought humans closer together, resulting in infectious diseases. Ever since, humans have struggled to understand disease origins and how to prevent them.



The Chinese observed that repeated exposure to disease created immunity. Scabs taken from a smallpox patient, with an instrument similar to this wood and ivory tool, were ground to powder and inhaled through the nose, a practice known as "variolation."



When European explorers arrived in the Americas in the 15th century, they introduced new diseases to the continents, resulting in mortality rates as high as 90% among indigenous people.



The triple blade fleam was another popular device for variolation procedures. Smallpox blisters were lanced, and pus was scratched into the skin of an uninfected person.



Lady Mary Worley Montague (1689-1762) survived a smallpox attack in 1715, but it left her disfigured. After witnessing a variolation procedure while traveling abroad, she enthusiastically promoted this technique upon her return to England.



Benjamin Franklin initially regarded variolation with suspicion. Though he later changed his mind and underwent the procedure, his 4-year-old son did not, and died of smallpox in 1736. Franklin lamented this for the rest of his life.



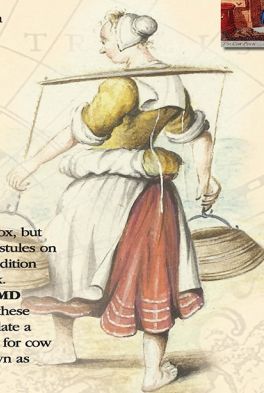
Hostility to vaccines quickly surfaced. This 1802 satirical cartoon by James Gillray shows young women developing bovine features after receiving a vaccination, a claim often made by opponents of the procedure.



In the Americas, the Spanish colonial government was more receptive to smallpox remedies. In 1808, Jaime Guirza, MD, conducted the first mass immunization of the Spanish colony against smallpox at the Alamo by order of the King of Spain.

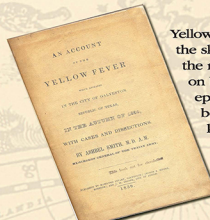


Milkmaids rarely contracted smallpox, but they often had pustules on their hands, a condition known as cowpox. Edward Jenner, MD (1749-1823), used these pustules to formulate a defense against smallpox. The Latin word for cow is "vacca," so the procedure became known as "vaccination."

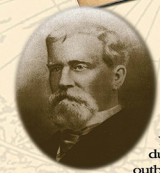


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Yellow fever causes the skin to turn a golden color, the result of jaundice, brought on by liver failure. Several epidemics rolled across Texas between 1839 and 1907, killing thousands. In 1839, Texas Medical Association member Ashbel Smith, MD, wrote about the epidemic but failed to discover its origins.



TMA member Richard M. Swearingen, MD, encountered yellow fever during an 1867 outbreak and could only recommend a quarantine to halt its spread.



Carlos Juan Finlay, MD (1833-1915), first proposed that mosquitos transmitted yellow fever to humans.



Thousands of U.S. soldiers were dying of yellow fever in Cuba after the outbreak of the Spanish-American War. U.S. Army surgeon Walter Reed, MD (1851-1902), affirmed that mosquitos were the culprit.



Clara Maas, a nurse serving in Cuba with the U.S. Medical Corps, volunteered for a yellow fever experiment, but died after being bitten by a mosquito. She was 25.



From 1881 to 1888, nearly 20,000 workers died during construction of the Panama Canal. Yellow fever and malaria epidemics were to blame.



As chief sanitation officer of Havana, William Crawford Gorgas, MD (1854-1920), brought his successful mosquito eradication programs to the Canal Zone, cleansing the region of yellow fever.

## The Golden Age of Microbiology

In the 19th and 20th centuries, with the help of microscopes, scientists discovered that bacteria, parasites, and viruses caused infectious disease. The race was now on to find a cure for conditions that had vexed humankind since the dawn of civilization.



French scientist Louis Pasteur (1822-1905) gained international fame for his research on germ theory and the development of a rabies vaccine.



In the late 19th and early 20th centuries, microscopes helped unlock the riddles behind the spread of diseases.



Diphtheria is a deadly bacterial disease of the nose and throat. Emil von Behring's research in the 1890s played a crucial role in the creation of a vaccine.



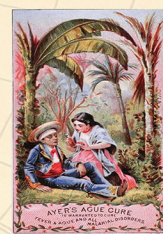
Syringe containing the diphtheria vaccine



It was commonly believed that "bad air" caused tuberculosis until German researcher Robert Koch, MD, proved in 1882 that germs were to blame.



The International Tuberculosis Congress was held in Paris, Oct. 2-7, 1905.



Malaria was another disease that thrived in warmer climates across the globe. Patients tried patent medicines like Ayer's Ague Cure, but they had no effect.



French Army surgeon Charles Louis Alphonse Laveran, MD, identified a malarial parasite in 1880. British Army surgeon Ronald Ross, MD, later proved it was spread to humans via the mosquito. Both were awarded the Nobel Prize for their work.



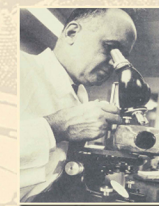
Prior to the discovery of a tuberculosis vaccine, patients were sent to facilities such as the Albert Baldwin Sanatorium, El Paso, with the hope fresh air and rest would alleviate their symptoms.

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Microbiologist Maurice Ralph Hilleman developed 14 of the principal vaccines recommended for children and is credited with saving more lives than any other scientist of the 20th century.



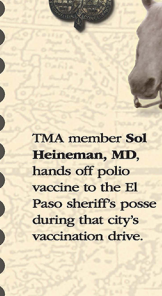
Vaccines save lives. In this undated photo, a baby has received the smallpox vaccination, though his mother was disfigured by the disease.



Polio is a viral infection that causes paralysis and death. President Franklin D. Roosevelt was stricken in 1921. Through The March of Dimes, 21,680,000 dimes were sent to the White House in support of scientific research in 1938.



TMA member Sol Heineman, MD, hands off polio vaccine to the El Paso sheriff's posse during that city's vaccination drive.



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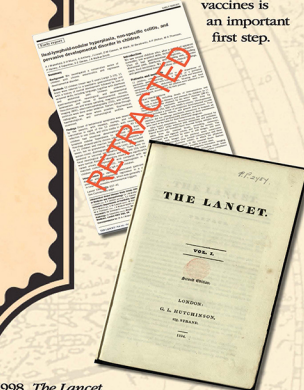
## Immunology: A Brave New World

In the 20th century, scientists discovered that antibiotics like penicillin and sulfa effectively fight bacterial infections, but vaccines remain the only way to prevent disease. Today more than 25 vaccines have been developed, and scientists are working on immunity triggers through DNA manipulation and other gene-altering techniques to prevent disease.



Malaria is a disease spread by mosquitoes. It can be fatal, and most victims are children. The vaccine RTS,S shows promising potential to prevent infection in many developing nations of Africa.

"Vaccine hesitancy" refers to a delay in acceptance or refusal to vaccinate. Addressing concerns and misinformation about vaccines is an important first step.



In 1998, *The Lancet* published an assertion by Andrew Wakefield, MD, that autism was connected to vaccines. Subsequent research has debunked this claim. The piece was officially retracted in 2010, and Dr. Wakefield lost his medical license.



TMA member Laurance Nickey, MD, led the polio vaccination drive that reached more than 75% of El Pasoans in 1963.



Measles causes fevers, inflammation, oral pustules, and body rashes. It is highly contagious, and no known cure exists. It is one of the leading vaccine-preventable disease causes of death.



A vaccine against polio was developed in 1955 by Jonas Salk, MD (1914-95). A global immunization drive followed. Today only three countries have reported cases: Pakistan, Afghanistan, and Nigeria. No cure for polio exists; it can only be prevented.



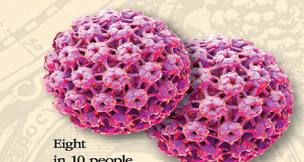
More than 3 million people die each year from vaccine-preventable diseases - half of these deaths are in children under age 5.



In 2004, TMA launched Be Wise - Immunize™ to reduce preventable diseases and promote the importance, safety, and efficacy of vaccinations. Since then, the program has administered 360,000 vaccinations to Texans of all ages.



The worst flu pandemic struck in 1918, killing 30 million people worldwide. Today, flu vaccines are available. They were developed in the 1940s by growing viral strains in eggs, and now prevent 40,000 deaths per year in the U.S.



Eight in 10 people will contract the human papillomavirus (HPV) in their lifetime, yet only two shots of the HPV vaccine can eliminate threat of obstetrical, genitourinary, and head and neck cancers that are caused by the virus.