

# The history of vaccinations and how smallpox was eradicated

29 May 2015, by Amanda Z. Naprawa

It was called the "most dreadful scourge of the human species." It killed at least one-third of the people it infected. It decimated entire populations, striking old and young, rich and poor alike.

"It" is smallpox, a horrifying, deadly, and disfiguring disease caused by the variola virus. Early symptoms include high fever and fatigue, followed by a characteristic pus-filled rash, particularly on the face, arms, and legs. Smallpox is spread primarily through airborne respiratory droplets or saliva. Because the contagious period starts before symptoms begin and lasts until the last blister scab falls off, the disease spread easily from person to person. If it did not kill you, it often left disfiguring and tell-tale deep pockmarks on the skin. (Readers who have strong stomachs can view images of smallpox [here](#).)

Smallpox was one of the most terrifying diseases in history. Today, however, we do not live in fear of it because smallpox no longer exists in the wild. That's right. In 1979, after an intensive and very effective worldwide vaccination campaign, [smallpox was declared eradicated](#). This means that the [smallpox virus](#) is no longer circulating anywhere in the world. Let me repeat. Smallpox, which once killed millions of people and left thousands disfigured, no longer exists in the wild. It might show up in a forgotten government storage fridge, but that is not the point. The point is, it doesn't exist naturally in the population.

## From milkmaids to mass vaccination

The amazing story of how this terrible disease was eradicated cannot be told without giving credit to a British physician and scientist named Edward Jenner. Dr. Jenner, like many others, had long heard that milkmaids who were infected with a bovine disease called cowpox were later protected against smallpox infection. In 1796, Jenner decided to test this theory. With permission, he took matter from a fresh cowpox lesion on the

hand of a young dairymaid named Sarah Nelms and rubbed it into a cut on the hand of a healthy young boy (the gardener's son) named James Phipps. While Phipps did report a loss of appetite and fever, he recovered within a week. Sometime later, Dr. Jenner took matter from a fresh smallpox lesion and again rubbed it into a cut on James Phipps' hand. Young James did not become ill, proving to Jenner that the "inoculation" worked. A few years later, Jenner referred to the process as "vaccination" from the word "vaca," which means cow in Latin.

Dr. Jenner's theory was viewed with skepticism at first. But over time, it took hold in the medical community. Only four years later, in 1800, most of England had been vaccinated as well as vast swaths of Europe. Jenner's vaccine was eventually brought to America. Thomas Jefferson was vaccinated and became a swift proponent of the vaccine. In the early 20th century, following a smallpox outbreak, the town of Cambridge, Mass., mandated that all residents be vaccinated against smallpox. In what has become one of the key public health cases in American history, the Supreme Court held that the compulsory vaccination law was constitutional under the state's "police powers."

## Numbers can't lie

Even today, despite the obvious success of the vaccine, some people argue that smallpox was eradicated not by the vaccine but as a result of better hygiene or medical treatment. While improved hygiene and sanitation have improved public health in some aspects, cleanliness alone cannot prevent the spread of an infectious disease like smallpox. This disease spreads through droplets in the air and in saliva, not through dirt on the floor or because of unsanitary conditions. This is why even in industrialized, wealthy nations, smallpox continued to be a serious threat until the vaccine. And likewise, if cleanliness were the reason smallpox was conquered, then it would not

have disappeared from the developing world, where poor hygiene and medical treatment remain realities.

But the best evidence that the vaccine for smallpox led to the eradication of the disease is found in the numbers. Between 1900 and 1949, prior to routine use of the [smallpox vaccine](#) in the U.S., there were approximately 29,000 cases of smallpox annually in the U.S. After the mass vaccination program, there were zero cases of wild smallpox in the United States (and the entire planet, too). Isn't that simply astonishing? Once nearly 30,000 Americans suffered from [smallpox](#) every year and now, not a single person anywhere in the world gets the disease. What a remarkable testament to the power of vaccination.

Provided by University of California - Berkeley

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