

Achievements of Science in Improving Public Health

Science is responsible for virtually all of the improvements in public health since the 18th century. Major achievements include:

1. The development of the germ theory of disease which led to many advances for the prevention and cure of disease.
2. The discovery of the cause of cholera and the means to stop cholera epidemics in London by Dr. John Snow in the mid 19th century. Cholera epidemics were rampant in England and many other places throughout the world at that time and for hundreds of years before then. Dr. John Snow was a physician in London. He studied the patterns of where people lived and their behaviors, searching for a possible cause of the epidemics. He noticed that people who were getting their water from the Broad Street pump were getting sick much more often than those who got their water from some other areas. He convinced authorities to remove the handle from that pump (despite strong opposition and resistance by some members of the public) and within a relatively brief period of time, new cases stopped developing. He also studied other parts of London and noticed that there were two water supply systems that pulled water from the Thames River. One pulled water from a sewage-contaminated portion of the river and the other pulled water from upstream of the sewage contamination point. Those using water from the contaminated part of the river had much higher rates of cholera than the others. Knowing this, measures were taken to address this problem and the health and lives of thousands were spared. You can find more information about John Snow's story in this article: Tulchinsky TH. John Snow, Cholera, the Broad Street Pump; Waterborne Diseases Then and Now. *Case Studies in Public Health*. 2018;77-99. doi:10.1016/B978-0-12-804571-8.00017-2
3. Dr. Snow's demonstration of the effectiveness of water purification for reducing certain contagious diseases led to a major movement to adopt sanitation and water purification in towns and cities throughout the United States as well as England and in many other places throughout the world. This has improved human lifespan more than any other public health advance, especially due to the reduction in the deaths of children. Diseases such as cholera, typhoid, and dysentery killed a large number of children, as well as adults. Water purification and sanitation reduced those deaths enormously. Indeed, the adoption of sanitation of water by chlorination, and major improvements in the cleanliness of cities in the early 20th century, accounts for a greater increase in life span than the development of antibiotics and is one of the most notable achievements of public health. Because Dr. John Snow's discovery of the cause of cholera at the Broad Street well in London launched this movement, to this day, the pump handle from that well is often used as a symbol of Public Health.

4. But the greatest achievement in public health is considered by many to be the complete elimination of smallpox from the world by VACCINATION. Three hundred million people died from smallpox in the 20th century prior to 1978. No one has died from smallpox in the last 40 years because of vaccines. A courageous, creative, and incredibly dedicated and hard-working group of public health and medical practitioners starting in the late 1950s and continuing until 1977 scoured the globe finding every smallpox outbreak and vaccinating people to terminate those outbreaks. They persisted despite encountering resistance to vaccination and many who believed it should be their right to resist vaccination. If that right had been respected, some of you who are here today, might not be here because you or your parents died from smallpox. It was due to the courage of those workers and VACCINATION that we no longer have to worry about dying or disfigurement from smallpox.
5. There are many, many other examples of the contributions of science to improving public health including the development of vaccines for polio and many other diseases, especially diseases that devastate and kill children. A child in my first grade class had to use crutches because his legs had been completely paralyzed by polio. I was fortunate that I did not contract that disease and instead I was part of the population of children who first benefited from the polio vaccine. I and many others have benefitted greatly from many vaccines that science has developed. While no vaccine is perfect and all vaccines have some side effects, the benefit of those vaccines are enormously greater than the slight risks that are involved.
6. Now is not the time to abandon science or to neglect its power and value in our efforts to serve the mission of the Health Department. We must continuously strive to *prevent disease, promote healthy lifestyles and protect the health of everyone in Wood County*. To best serve this mission we need to be courageous in these efforts and do what is deemed most effective based on the best available scientific evidence.