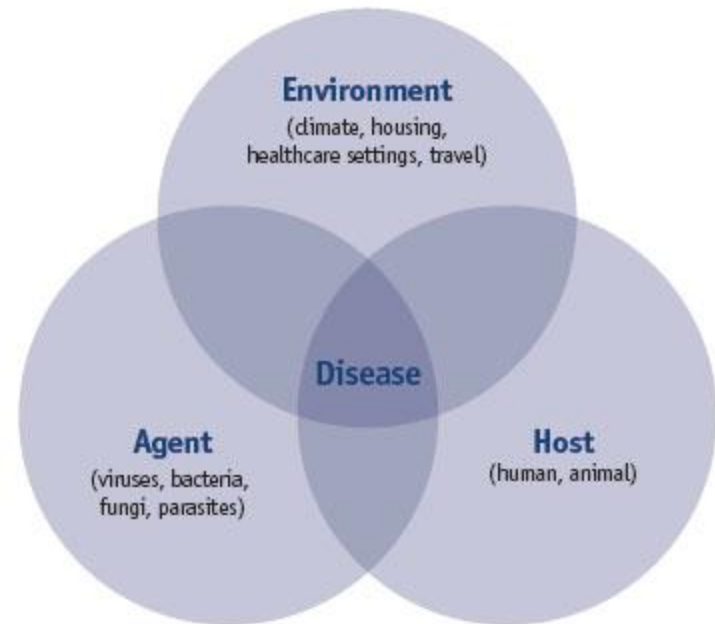


# Epidemiology

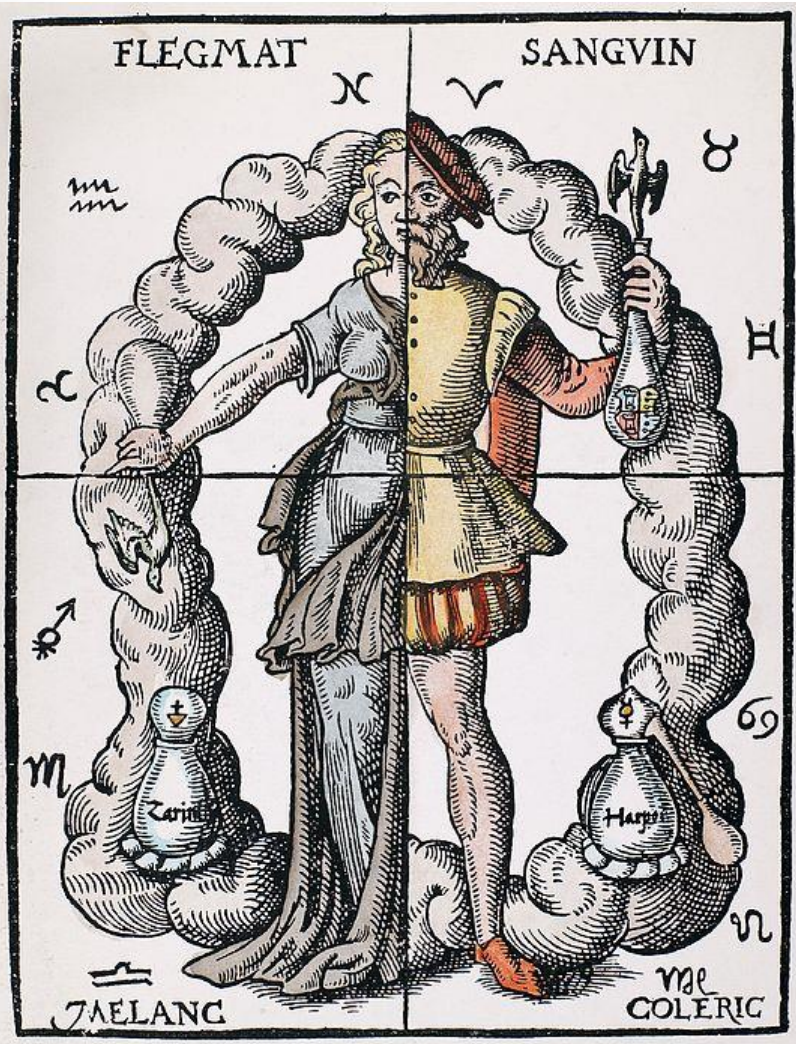
Explore Lab Science

# What is Epidemiology?

Epidemiology is the study of patterns, causes, and effects of disease in a defined population. It is essential for identifying the risk factors of a disease and, ultimately, to prevent outbreaks.



# Hippocrates



The four humors.

The Greek physician **Hippocrates** is believed to be the first epidemiologist. He was the first to link environmental exposures to disease. He didn't have it quite right though - he believed that sickness was caused by an "imbalance of **humors**:" blood, yellow bile, black bile, and phlegm. To treat sickness he believed you must add or remove a humor, one of the treatments being blood letting.

# Epidemic vs Endemic

Hippocrates was the first to make the distinction between **epidemic** and **endemic** diseases. The former being newly established disease in a population and the latter being disease that is always present at some capacity in a population.

For example, Zika is currently considered an epidemic. While STDs can be considered endemic in certain parts of the world.



# Girolamo Fracastoro

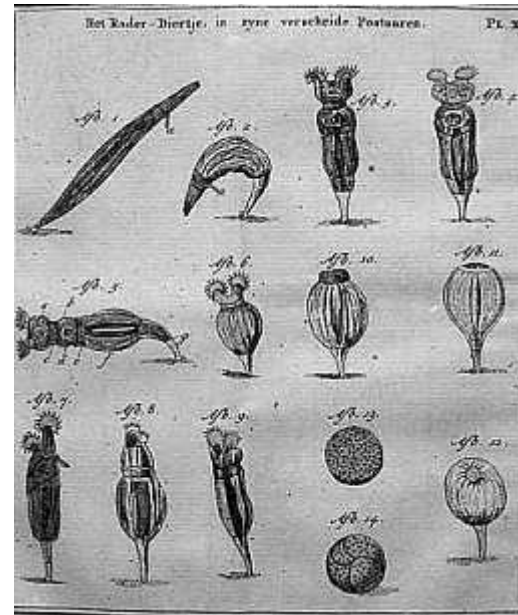
In the 16<sup>th</sup> century an Italian doctor by the name of **Girolamo Fracastoro** hypothesized that it was actually small, living particles that cause disease, not humorism.

He wrote a book promoting personal and environmental hygiene as a way to prevent disease and introduced the idea of non-living things, such as clothing, harboring infectious agents.



# Germ Theory

The **Germ Theory** suggested by Fracastoro wasn't proven until a powerful enough microscope was invented to provide visible evidence of the living particles, or microbes. In 1675, **Anton van Leeuwenhoek** was the first to observe single cell organisms using one of his handmade microscopes. He called them animalcules and described them in drawings.



# Ignaz Semmelweis



More evidence for germ theory came in 1846 when a Hungarian doctor named **Ignaz Semmelweis** began working in a maternity ward. A great number of women were dying of childbed fever and he began collecting data to determine the cause. He noticed that more women died in the hands of doctors than in the hands of midwives.



# Childbed Fever

He discovered that doctors coming to assist births were coming directly from autopsies, without washing their hands first. He ordered the doctors to wash their hands with chlorinated water before assisting in births, which ended up reducing the incidence of childbed fever deaths.

Interestingly, Semmelweis knew nothing about germs. In fact, he believed that it was the odor of the corpses left on their hands that was causing the sickness.

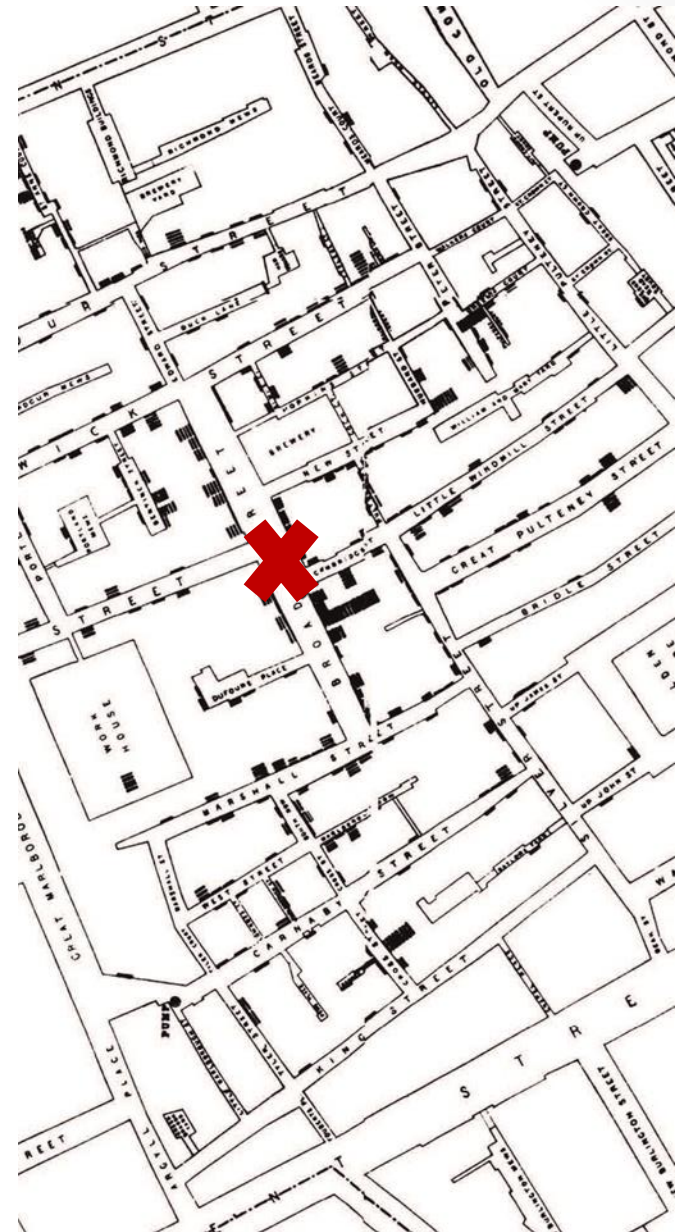


Semmelweis washing his hands with chlorinated water.



# John Snow

**Dr. John Snow** is famous for his investigations of a 19<sup>th</sup> century cholera outbreak in London. He **hypothesized** that the Broad Street water pump was the **source** of the disease. He removed the handle from the pump and had the water chlorinated and found that there were no new cases of cholera in that area. Snow has since become known as the **Father of Modern Epidemiology**.



Map of Broad Street

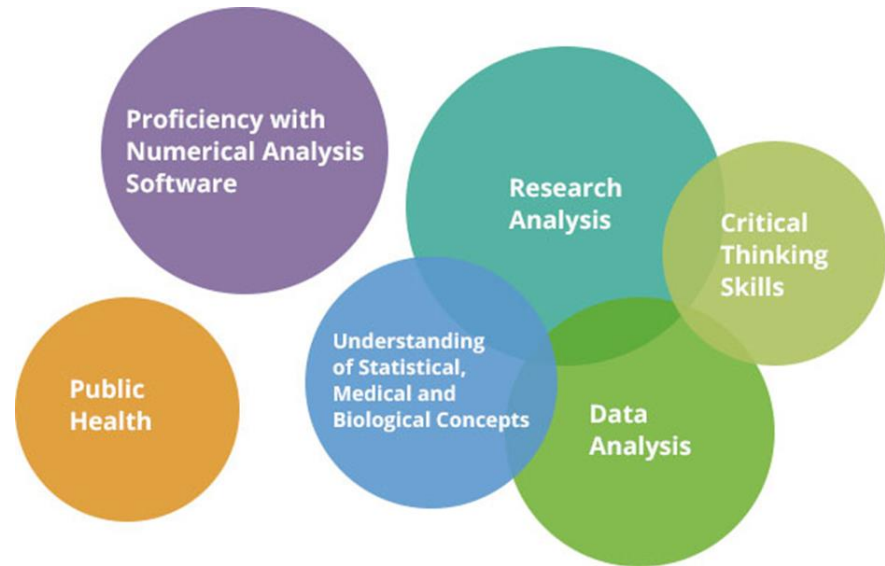
# Public Health

Semmelweis and Snow's discoveries were the beginning of **Public Health**. Although, at the time, nobody took Semmelweis seriously, handwashing has become an important tool for maintaining public health. And Snow's discovery about water quality helped shape public health policies all over the world.



# Careers in Epidemiology

Epidemiology is a growing field! As you are wondering what to do after high school graduation, you should consider pursuing a career in epidemiology or public health. As an epidemiologist, you would learn how to design clinical research studies, collect and analyze data, master statistical analysis, and ultimately design public health policies to prevent the spread of disease.



Popular skills for an epidemiologist

Median annual salary at \$89,479

# Careers in Epidemiology

To become an epidemiologist, you would need to first obtain a bachelor's degree, ideally in a biological science or in public health. Then you would need to complete a master's program in Epidemiology.

There are several different types of epidemiologists, and you could specialize based on your personal interests and skills.





# References

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