

COMMUNITY MEDICINE

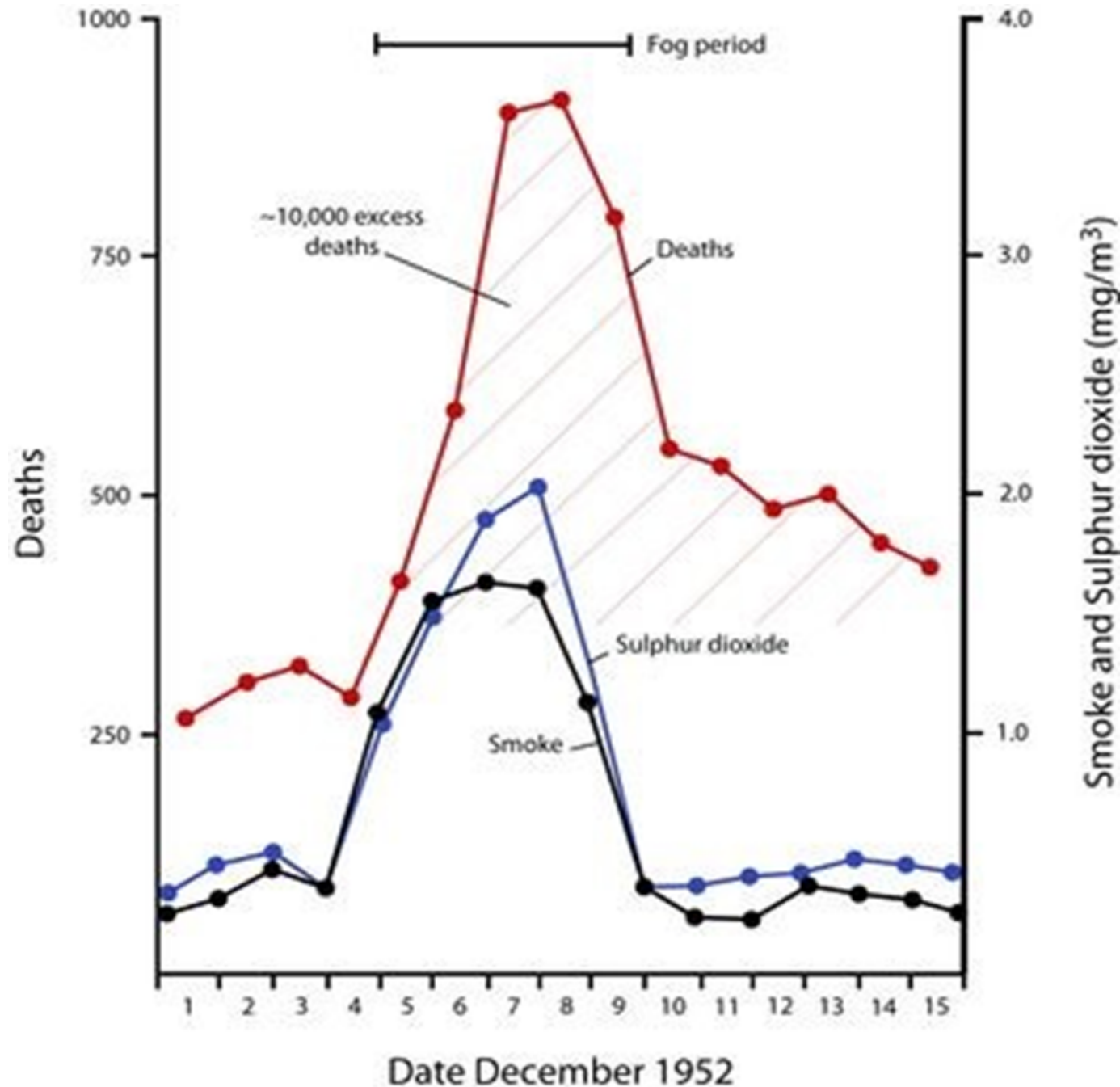
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London Smog Disaster, 1952

- Air pollution (fog and smoke) causes respiratory illnesses and death.
- London in the past was used to be called the fog city. That was because of the smog that was especially in Summer & Winter because of using coal.
- When fog and soot from coal burning created a dense smog in Winter, 1952, in London, the smog was around in very high concentration for five days from December 5–10.
- There was a substantial increase in mortality
- The death rate in London in the previous week was around 2,062
- In the week of the smog, 4,703 died (more than doubled)





This epidemic curve shows the relation between number of deaths in London in that week with the time. Because it is related to the air pollution they quoted the level of smoke in the atmosphere and sulphur dioxide which is part of air pollution and also quoted the number of deaths. (Between 5-10th December) We can see the sharp sudden increase in deaths that is correlated with the sharp sudden increase in air pollutants, that can give very strong evidence to make a hypothesis that smog was related to deaths that were monitored during that week.



Epidemiology and Polio Vaccine

Poliomyelitis is one of the deadliest infection for children.

In April, 1955, Dr. Thomas Francis, director of Poliomyelitis Vaccine Evaluation Center at the University of Michigan, announced that the two-year field trial of the Salk vaccine against polio was up to 90% effective



- “The results announced by Francis effectively marked the beginning of the end of polio as the most life-threatening and debilitating public health threat to the children of the United States” **and around the world. In the older days before the vaccine many children used to die, but many of them live and become adults with many health problems because they were infected with poliomyelitis when they were little children.**
- **In Jordan if we report one case of poliomyelitis this will be an epidemic, because the normally accepted level is zero cases.**

Scope of Epidemiology

Originally, Epidemiology was concerned with investigation & management of ***epidemics*** of communicable diseases **dealing with infectious diseases only.**

Lately, Epidemiology was extended to endemic communicable diseases and non-communicable diseases **(chronic)**

Recently, Epidemiology can be applied to ***all*** diseases and other health related events



History of Epidemiology

Seven land marks in the history of Epidemiology:

- 1) Hippocrates (460BC):** A Greek physician, he found from his observations and treatment for patients that **Environment & human behaviors affect health: “healthy mind in health body”**.
- 2) John Graunt (1662):** He was in London he used to **Quantify births, deaths and diseases** he started recording and quantifying. **(Statistician, He worked on health and medical issues ,founder of demography in London).**
- 3) James Lind (1747): Scottish Doctor,** used to go on long trips in ships with sailors, and he noticed that the sailors and the workers on the ship was suffering from scurvy (vitamin C deficiency). **He treated scurvy among sailors with fresh fruit (lemons)...first Clinical trial in history**
- 4) William Farr (1839):** Established application of vital statistics to **evaluate health problems...Founder of medical statistics** he worked more on evaluating health problems and relating them to vital statistics.



History...

- 5) **John Snow (1854): tested a hypothesis on the origin of a strong very bad epidemic of cholera in London,** he was able to solve the mystery of what was cholera & how did it reach to people & how to treat it.
- 6) **Alexander Louis (1872): French physician, Systematized application of numerical thinking** deal with the number of cases, diseases, births, deaths, and he made statistics for health issues **(quantitative reasoning and clinical trials).**
- 7) **Bradford Hill (1937): Suggested criteria for establishing causation.** If we apply this criteria to the relationship between a risk factor and a disease we can confidently say that this risk factor is a causative/ strong risk factor for a disease.



History...

- ✓ **Epidemiological thought emerged in 460 BC**
- ✓ **Epidemiology flourished as a scientific discipline in 1940s**



John Snow (1813–1858)

- An English physician and modern-day father of epidemiology
- He used scientific methods to identify the cause of the epidemic of cholera in London in 1854
- He believed that it was the water pump on Broad Street that was responsible for the disease
 - The removal of the pump handle ended the outbreak



Photo source of two color images: Sukon Kanchanaraksa

Photo source of portrait: <http://www.ph.ucla.edu/epi/snow/fatherofepidemiology.html>. Public Domain



History of epidemiology

John Snow conducted a series of investigations in London. Snow conducted his classical study in 1854 (**the first time to be done in a very systematic way**) when an epidemic of cholera developed in the golden square of London.

During the time of microscope development, snow conducted studies of cholera outbreak both to discover the cause of cholera and how to prevent its recurrences.

During that time Farr and Snow had major disagreement about the cause of cholera. Farr adhered to what was called the miasmatic theory of diseases, according to this theory, which was commonly held at that time, diseases were transmitted by a miasma or a cloud with bad smell that clung low on the earth surface.



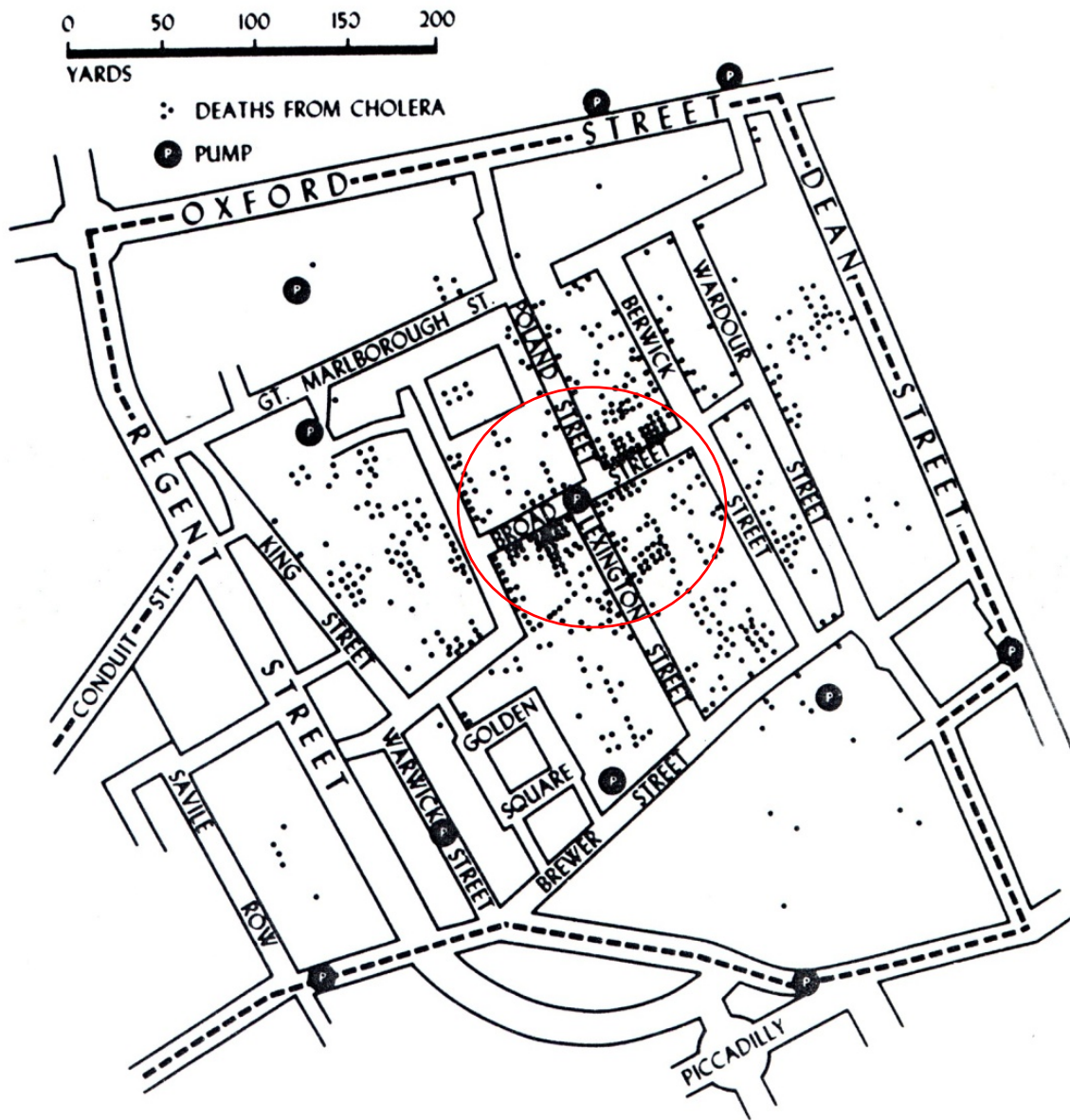


Figure 5-4 John Snow's Map of Cholera Deaths in the Soho District of London, 1848. *Source:* Adapted from *Health Care Delivery: Spatial Perspectives* by G. Shannon and G.E.A. Dever, p. 3, McGraw-Hill Book Company, 1974, and from *Some Aspects of Medical Geography* by L.D. Stamp, p. 16. Oxford University Press, 1964.

He get the map of London, he pointed the place of every case that is infected with the disease (so he will know where they live, where they work , where they took the water from) because he had the observation that cholera is related to water, but no body believed him even scientists.

The dots indicates the cases with cholera (even if they were died).

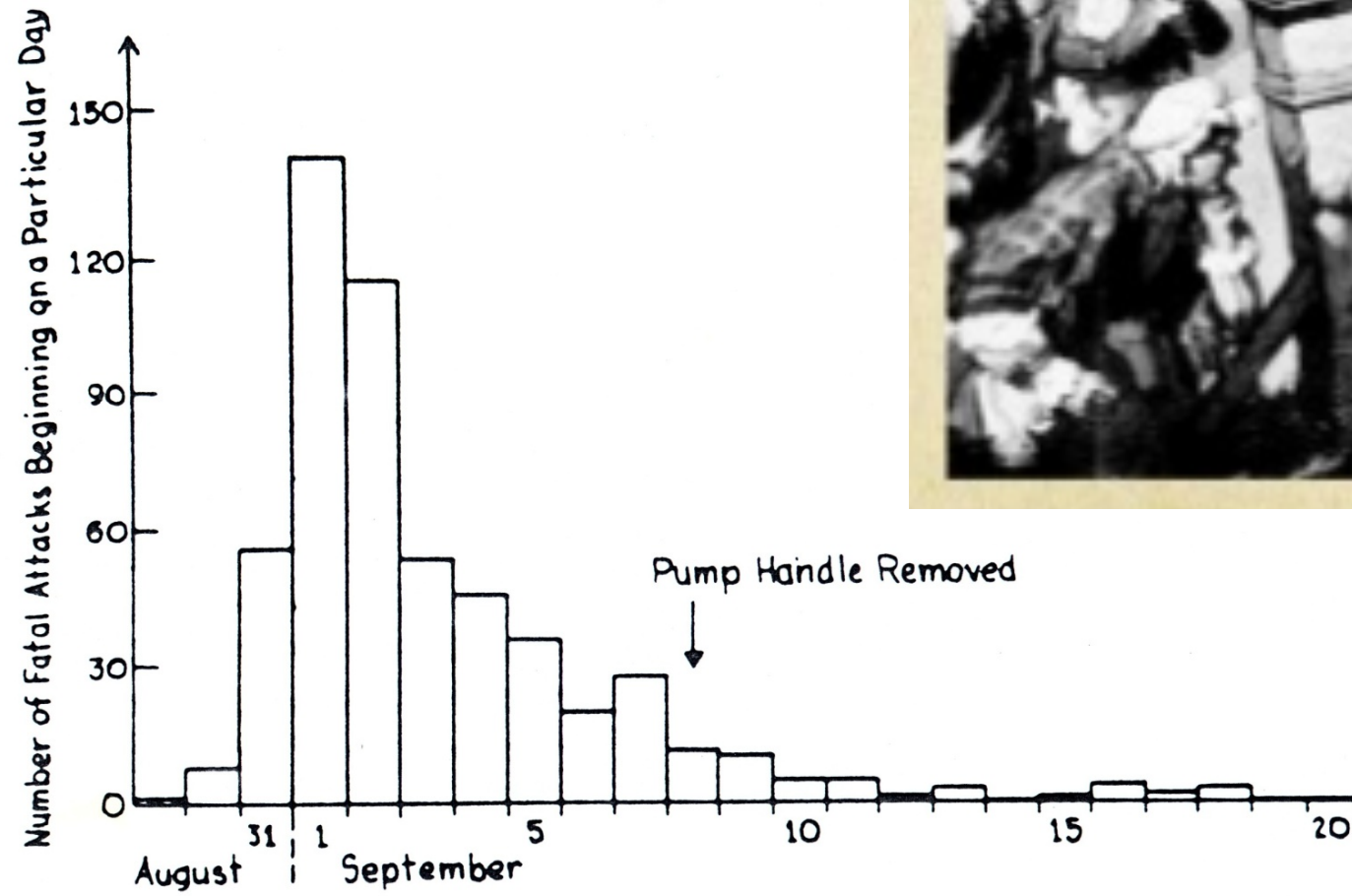
The large black circles indicates the water pumps that the people were used to get water from.

He found that most of the cases are accumulating around the pump in **BROAD STREET** , so he believed more strongly that there is something in the water that they were drinking cause them to get cholera. (At that time the microscope wasn't discovered yet, so nobody knows about microorganisms).

People was thinking that diseases are caused by a **miasma**: something like a cloud near the surface of earth contains something, it smells bad & found in bad areas and when people come in contact with this miasma they get diseases.

History of epidemiology

- However, Snow did not agree, he believed that cholera is transmitted through contaminated water. He began his investigation by determining where in this area in London persons with cholera lived and worked. He then used this information to map for distribution of diseases.
- Snow believed that water was the source of infection for cholera. He marked the location and searched the relationship between cases and water sources (water pumps).
- He found most cases clustered around the Broad Street pump.
- So, he decided to break the pump handle, which stopped the outbreak.
- He found that cholera was transmitted through contaminated water. This was a major achievement in epidemiology.



Snow's Epidemic Curve



CHOLERA AND WATER.

BOARD OF WORKS

FOR THE LIMEHOUSE DISTRICT,
Comprising Limehouse, Ratcliff, Shadwell,
and Wapping.

The INHABITANTS of the District within
which CHOLERA IS PREVAILING, are
earnestly advised

**NOT TO DRINK ANY WATER
WHICH HAS NOT
PREVIOUSLY BEEN BOILED.**

Fresh Water ought to be Boiled every
Morning for the day's use, and what
remains of it ought to be thrown away
at night. The Water ought not to stand
where any kind of dirt can get into it,
and great care ought to be given to see
that Water Butts and Cisterns are free
from dirt.

BY ORDER,

THOS. W. RATCLIFF,
CLERK OF THE BOARD.

Board Office, Water Works Street,
London, 1849.



Advising people that when you take water from the pump **BOIL IT**, after that keep it covered to keep it clean, and if you have any water remaining from night the next day discard it (get rid of it), bring new water, boil it again and start using it.

👉👉 This is to prevent contamination of water.





This is the broken pump



We are
finished!!!

