

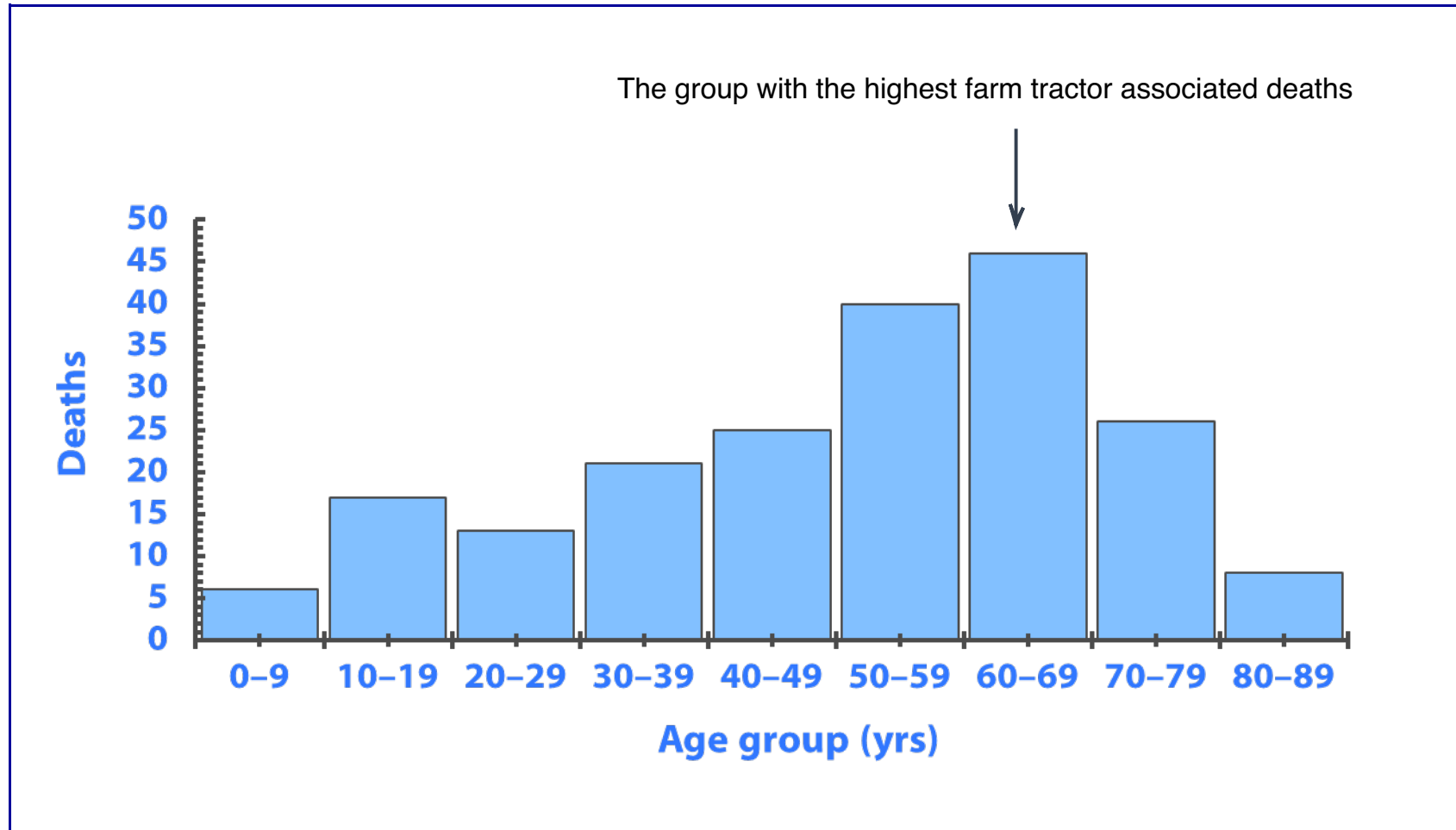
Fatalities Associated with Farm Tractors

In 1982, an epidemiologist studied the number of farm tractor-associated deaths in Georgia and described them in terms of time, place, and person by using death certificates and records from an existing surveillance system (All tractor related incidents between 1971-1981, N=166 cases).

He then generated a hypothesis for further study. Let's look at the descriptive epidemiology (Who, When and Where....)

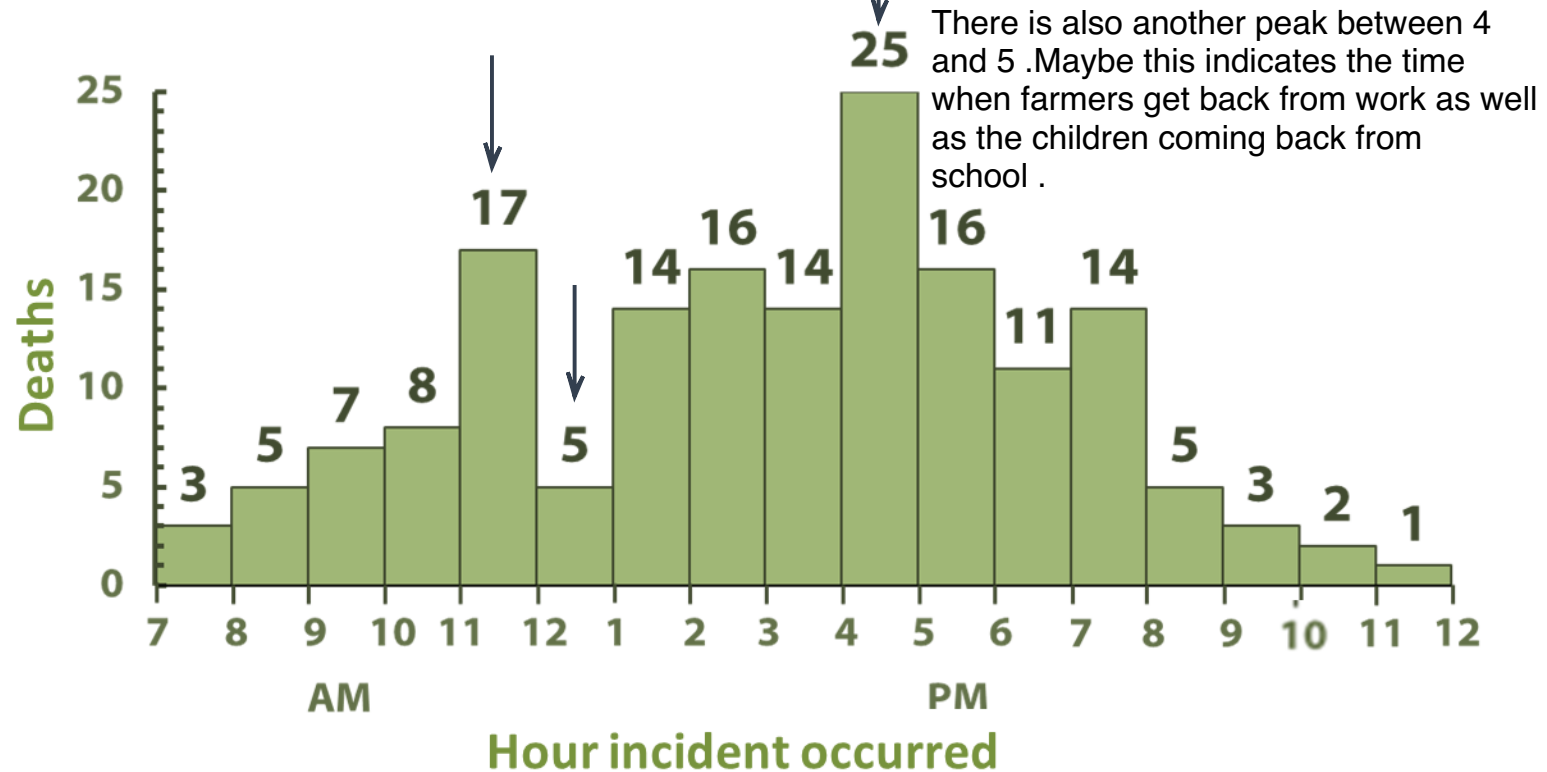


Fatalities Associated with Farm Tractors (person)



Fatalities Associated with Farm Tractors (time)

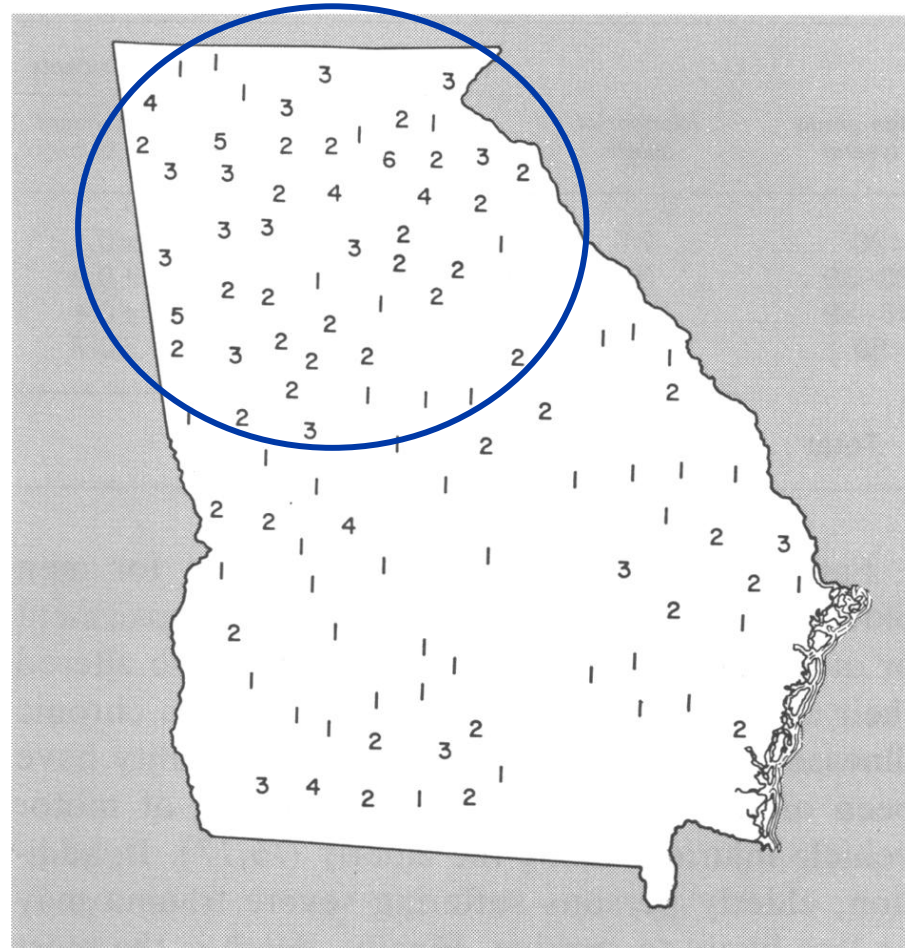
We have a peak between 11am and 12 pm , which probably indicates the time of the day before lunch when farmers are tired and hungry , followed by drop in the number of cases between 12 and 1 pm , when farmers probably were eating lunch .



Fatalities Associated with Farm Tractors (place)

We can see that more accidents are concentrated in the northern region of Georgia.

This might indicate more Farming in the north or more tractors are used or the Geography in the north is different , so it is harder to drive a tractor there .



Epidemiological contributions to medical science and humanity

Doll & Bradford-Hill smoking and carcinoma of the lung:
preliminary report, BMJ 1950;II:739-48

- **Patients with lung cancer more likely to have smoked**
- **85-90% of cases are due to tobacco”**

Breast cancer screening (Swedish two country trial)

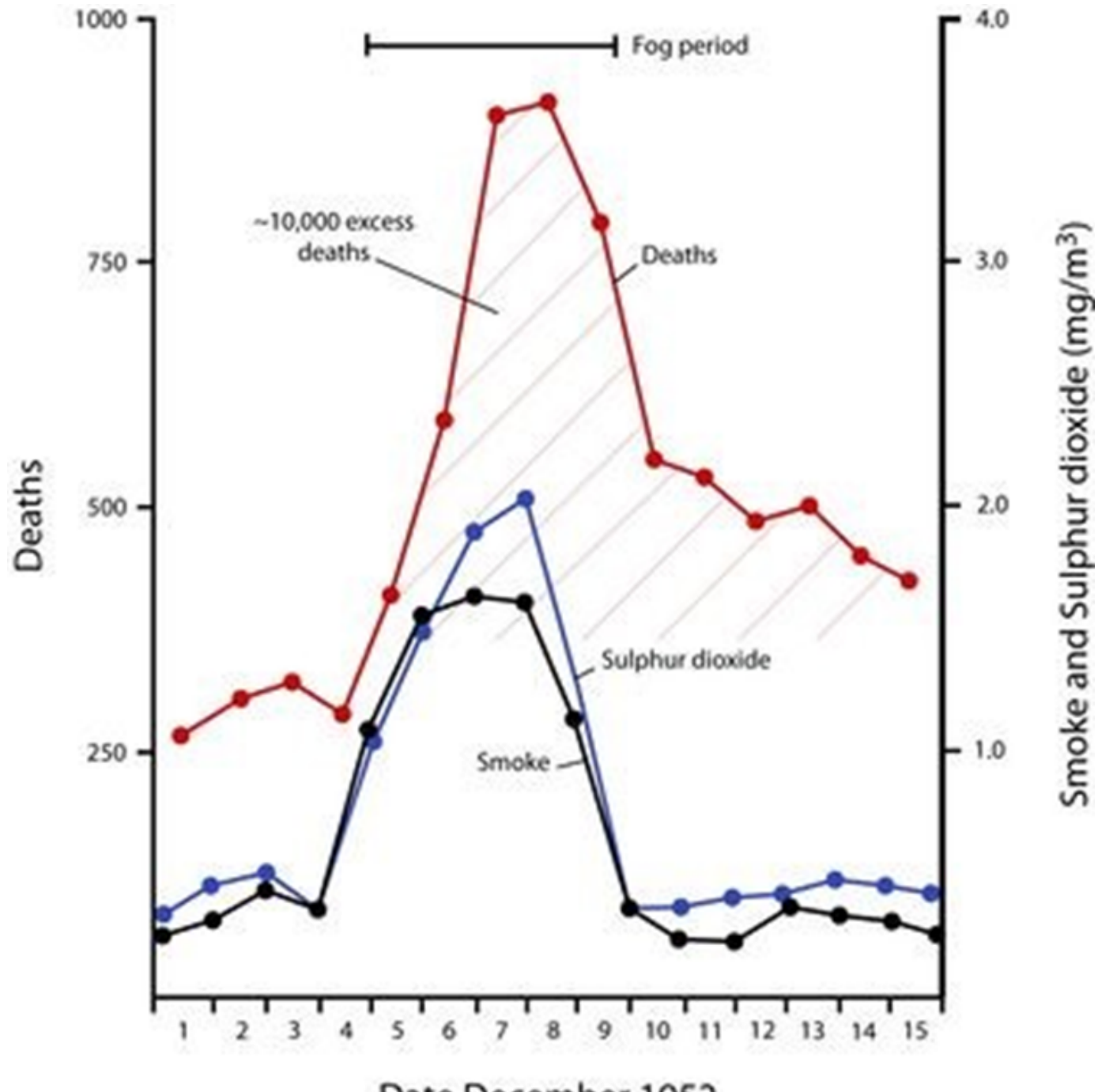
- Screening with mammography was started in 1977 in the counties of Kopparberg and Ostergotland.
- The results at 29-year follow-up: A substantial and significant reduction in breast cancer mortality was associated with an invitation to screening (31% lower mortality rate in women diagnosed via mammography).
- At 29 years of follow-up, the number of women needed to undergo screening for 7 years to prevent one breast cancer death was 414

London Smog Disaster, 1952

- Air pollution causes respiratory illnesses and death.
- When fog and soot from coal burning created a dense smog in Winter, 1952, in London, the smog was around 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



-This is the epidemic curve that was prepared to study the reason for those deaths .
-They plotted the number of deaths with the increasing levels of smoke and Sulphur dioxide in the air in London during that week .Also , they plotted the excess number of deaths during the same week .
-The connection was very clear , a sudden sharp increase in the number of deaths was associated with sudden increase in smog that resulted from Sulphur dioxide and Smoke interaction during that week .



Epidemiology and Polio Vaccine

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“.



Scope of Epidemiology

Originally, Epidemiology was concerned with investigation & management of *epidemics* of communicable diseases

Infectious

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:

He had observations about humans' health and diseases , and came up with this conclusion.

1) **Hippocrates (460BC): Environment & human behaviors affect health: “healthy mind in health body”.**

2) **John Graunt (1662): Quantified births, deaths and diseases (Statistician, founder of demography in London).**

1) **James Lind (1747): Scottish Doctor, treated scurvy among sailors with fresh fruit (lemons)...first Clinical trial in history**

Scurvy is caused because of vitamin C deficiency .this information was not known yet at the time of Lind, but by his critical clinical observations of those who had scurvy and comparing them with those who had not , he found that those with scurvy got better after eating fresh fruit....so we can see that epidemiological ways were able to solve the problems , even when there was no scientific basis of the disease cause.

2) **William Farr (1839): Established application of vital statistics to evaluate health problems...Founder of medical statistics.**



History...

5) John Snow (1854): tested a hypothesis on the origin of an epidemic of cholera in London.

1) Alexander Louis (1872): French physician, Systematized application of numerical thinking (quantitative reasoning and clinical trials). He did more analysis to statistics related to health

2) Bradford Hill (1937): Suggested criteria for establishing causation. Here , the new era of epidemiology started

Criteria to apply to the relationship between a risk factor and a disease in order to establish the connection between them and may indicate causality.

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



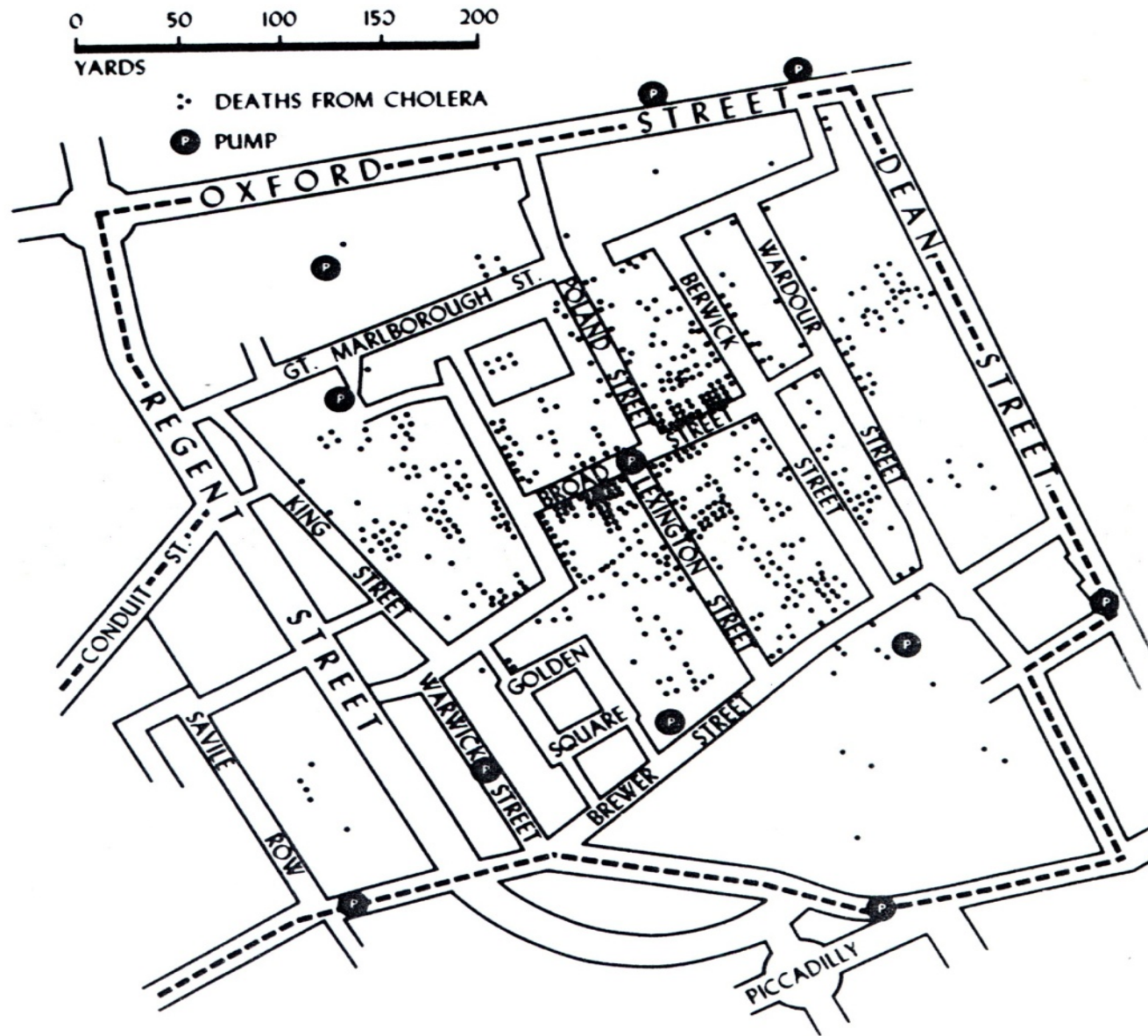
History of epidemiology

John Snow conducted a series of investigations in London. Snow conducted his classical study in 1854 when an epidemic of cholera developed in the golden square of London. The year is important ...

Even before the microscope was used .

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. This is the definition of the miasmatic theory



John Snow, from his previous experience as a physician and seeing lots of Cholera patients over the past years, developed an idea of water being the cause of the disease. However, he did not know how Cholera could be transmitted by water and nobody believed him.

-In order to start his study, he brought this map of the area in London where most of the cases have accumulated and started to plot the Cholera cases on the map, so each black dot represents a case.

-Since he was suspicious about water being the cause of the disease, he also plotted all the water pumps that people take water from (black circles with P in the middle)

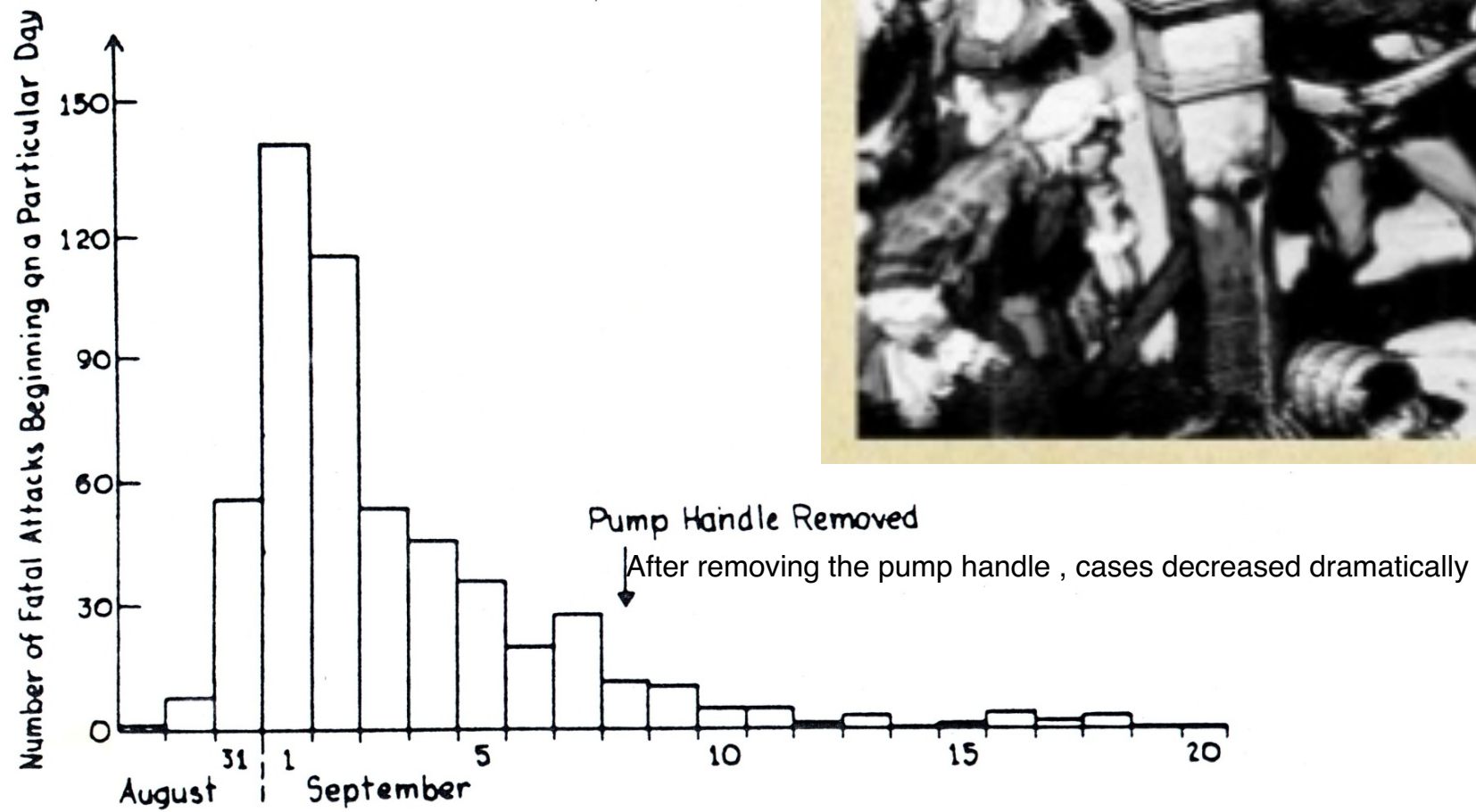
-when he looked at the distribution of the cases and the water pumps, he discovered that most of the cases were clustered around the water pump in BROAD STREET, so he became more confident that there was something in that water but could not know what would that be, as they did not know about microorganisms because there was no microscopes.

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.



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



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.

Printed by Wm. Wood, 15, Abchurch Lane, London, E.C. 4.

Scientist as well as the authorities believed him and they made an announcement that we can see in this slide , for people in that area , and told people not to drink any water that was not previously boiled and to cover water when it is not used as well as to discard any remained water at the end of the day.



John Snow



مضخة الماء القديمة .



John Snow is the father of epidemiology

مكان لتكريم جون سنو و انجازاته.



