2.2) Causality and Experiments

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Reference

Tables, Graphics, and Figures from

Computational and Inferential Thinking: The Foundations of Data Science

Adhikari & DeNero (2019): Ch 2. Causality and Experiments

https://www.inferentialthinking.com/chapters/02/ca and-experiments.html

How Cholera is Contracted and Spread?

London in the 1850's

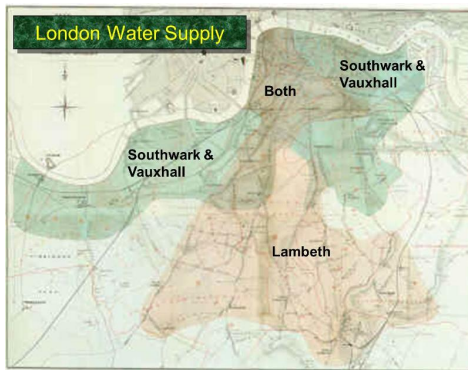"miasmas": invisible poisonous particles from decaying matter (bad smells)

John Snow: Vomiting and Diarrhea

- Deaths clustered around the Broad Street pump (BSP)
- Scattered deaths in houses several blocks away from the BSP: children who drank from the BSP on their way to school

Snow's Original Map

Snow's "Natural Experiment"

Supply Area	Number of houses	Cholera deaths	Deaths per 10,000 houses
S&V	40,046	1,263	315
Lambeth	26,107	98	37
Rest of London	256,423	1,422	59

Coffee and Lung Cancer

Observational Studies in the 1960's:

- coffee drinkers had higher rates of lung cancer than those who did not drink coffee

$$\uparrow \text{coffee} \leftrightarrow \uparrow \text{lung cancer}$$

Confounding Factor: smoking

PROGRESA increased School Enrollment

Mexican villages in the 1990's

Randomized Controlled Trial (RCT) implies no confounding factors

Money to poor families if their children went to school regularly

	Control	Treatment
Boys	73%	77%
Girls	67%	75%

Banerjee & Duflo (2012). Poor Economics.