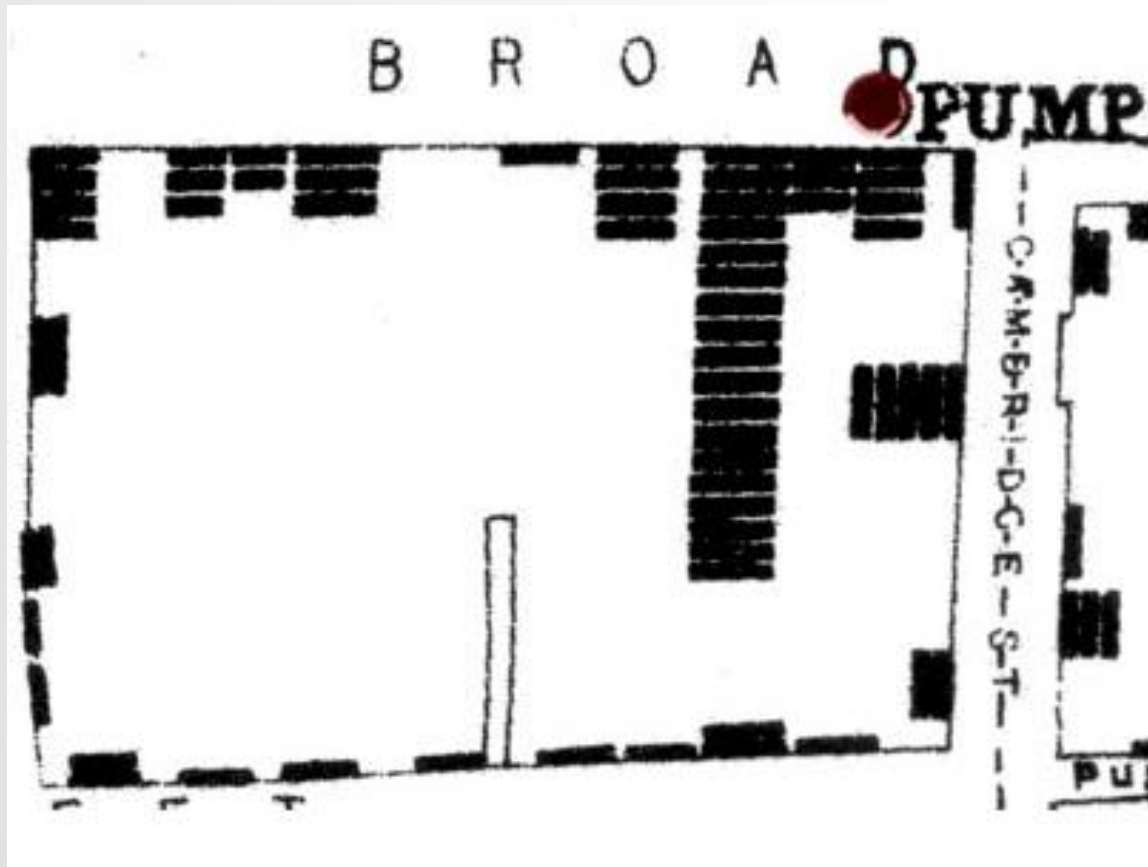


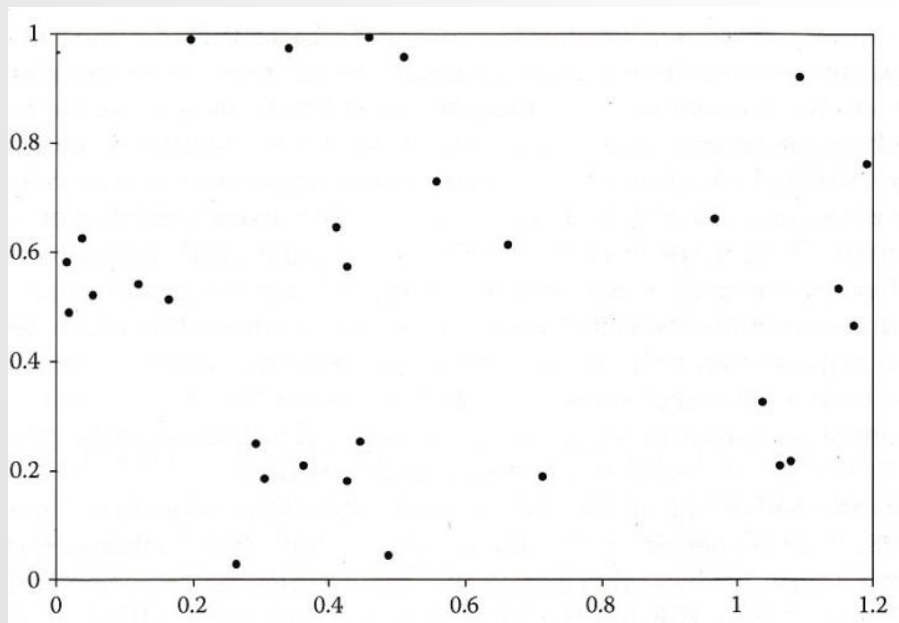


Introduction to Spatial Statistics

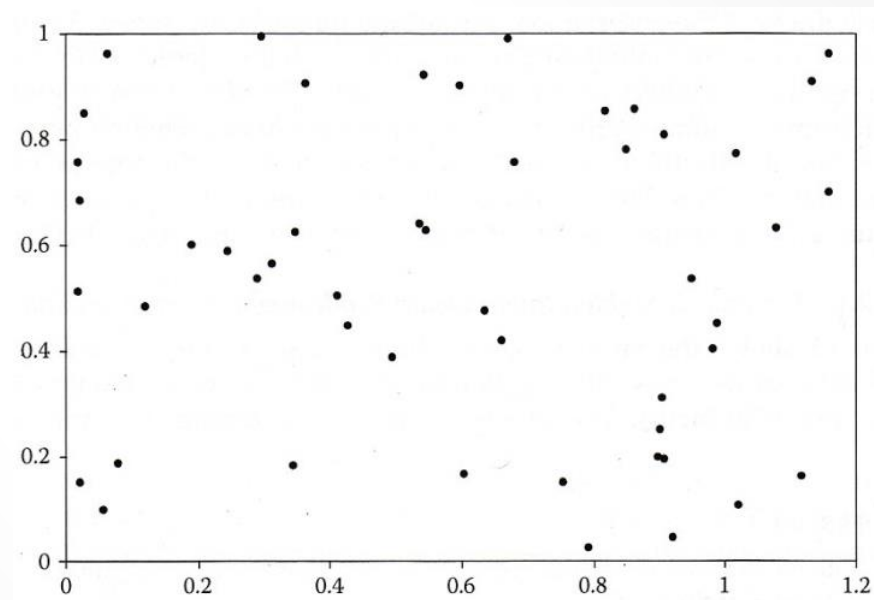


First Example of Spatial Analysis

- John Snow's maps of cholera in 1850s London
- Did he discover the association between water and cholera after drawing the map
- Did he draw the map in order to prove the association: *using a map for hypothesis testing*



A. Is this clustered?

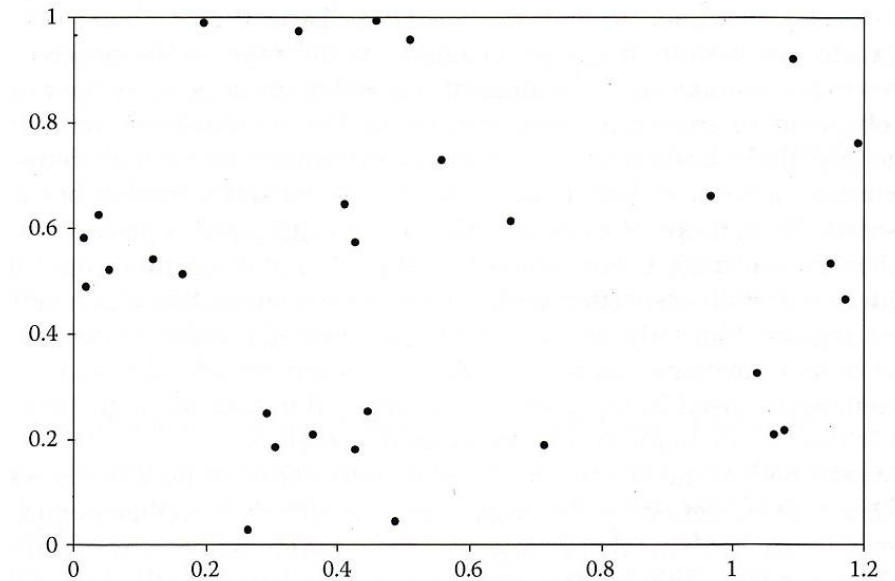


B. Is this clustered?

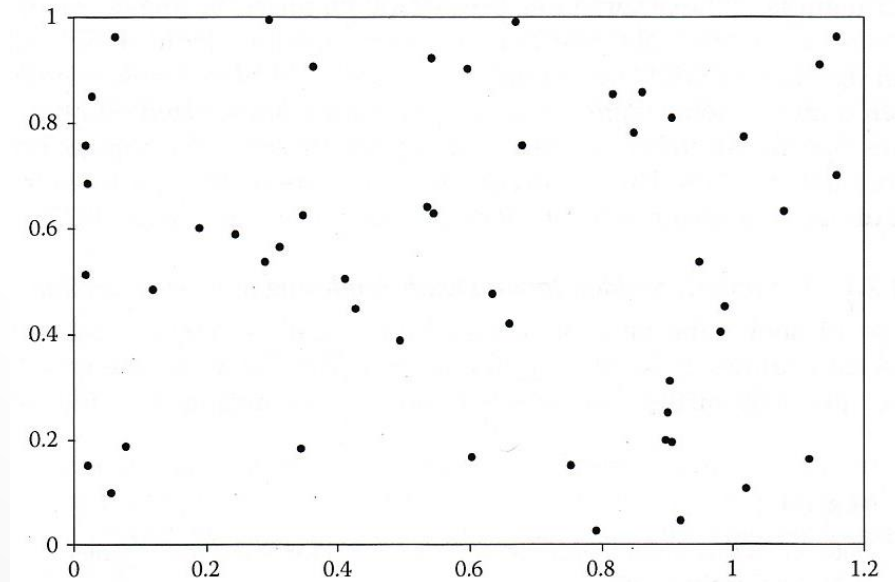
Clustered or Random?

- Clustered
 - points are in “groups”
 - pattern exists
- Random
 - points can be anywhere
 - no pattern

We must measure and test
--not just look and guess!



(a) 30 cases



(b) 50 cases

What is Spatial Statistics?

- ❑ methods for analyzing spatial distributions, patterns, processes, and relationships.
- ❑ a lot of different types of spatial statistics, but they are all designed to examine spatial patterns and processes
- ❑ like traditional non-spatial statistics, there are *Descriptive and Inferential Spatial Statistics* exist
- ❑ unlike traditional non-spatial statistical methods, they incorporate space (*proximity, area, connectivity, and/or other spatial relationships*) directly into their mathematics.

Jennie Murack, MIT Libraries (2015) & ESRI (2006)

Tobler's First Law of Geography

Everything is related to everything else. But near things are more related than distant things.

(Tobler 1969)

The field of spatial statistics is based on the non-independence of observations; that is, the research is based on the assumption that nearby units are in some way associated

(Tobler 1979)



Image source: <https://gisgeography.com>