Day 2, Session 1: Graphs

Brian Williamson

EPI/BIOST Bootcamp 2016

26 September 2016

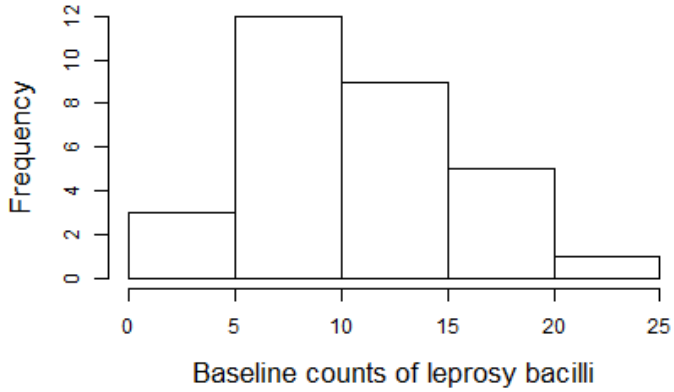
Graphs

- Why do we use graphs?
  - Describe relationships in the data
  - Visualize functions
-

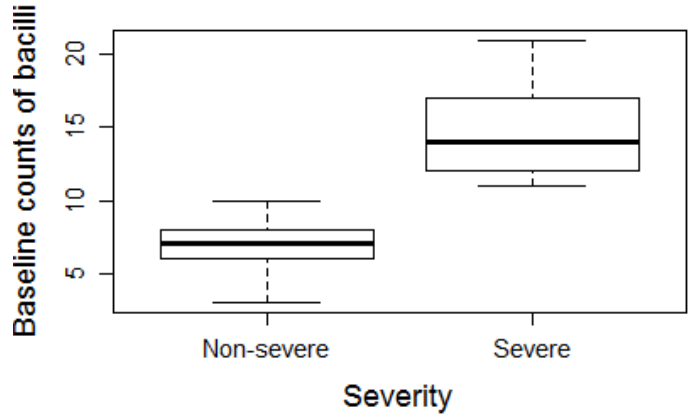
Example data analysis

- Data on 30 patients with leprosy
- Counts of leprosy bacilli measured at baseline and at a further time point
- Three treatments and an indicator of severity of the leprosy

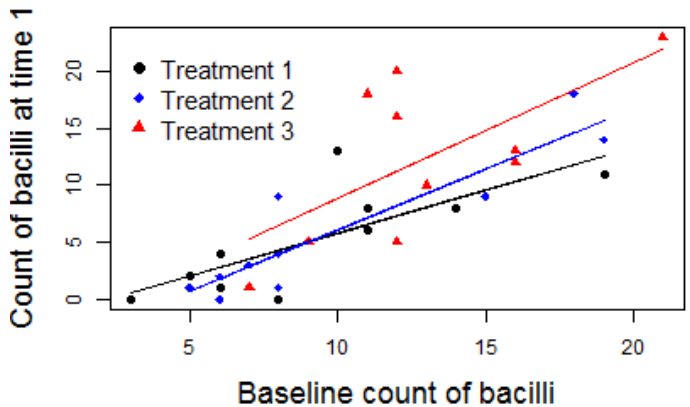
Common types of graphs in data analysis



(a) Histogram



(b) Boxplot



(c) Scatterplot

What do graphs tell us?

- Histograms: summaries of one-dimensional distributions
  - Counts or frequencies of each occurrence
- Boxplots: summaries of two-dimensional distributions
  - measures of center (typically median)
  - measures of spread (typically inter-quartile range)
- Scatterplots: summaries of two-dimensional distributions
  - Can visualize the whole data
  - Trends in two or more dimensions by using different colors/shapes for strata

Linear trends

- A common way to describe data (think linear regression!)
- Lines are easy to compute
  - Only need a point and a slope
  - Two common forms of linear equations

Slope-intercept form

- $y = mx + b$
- Slope: m
  - Rate of change, i.e. how does y change with each one unit change in x?
  - Example: speed, the distance traveled with each unit change in time
- Intercept: b
  - The point where the line crosses the $y-$axis

Slope-intercept form: determining a line

Point-slope form

Exercise: slopes and intercepts

Solution: slopes and intercepts

Creating a graph using an equation

Reading an equation from a graph

Quadratics

Exercise: quadratics

Solution: quadratics

Shifting graphs

Exercise: shifting graphs

Solution: shifting graphs