

**Introduction to Biostatistics (BIOS 4120)**  
**Breheny**

Assignment 4  
Due Tuesday, February 20

1. One investigator takes a sample of 100 men in a certain town. Another takes a sample of 1,000 men from the same town. Both investigators measure the heights of all the men that they sampled.
  - (a) Which investigator is likely to get a bigger mean?
  - (b) Which investigator is likely to get a bigger standard deviation?
2. In one study, the average systolic blood pressure (SBP) was 124 mmHg, with a standard deviation of 20 mmHg.
  - (a) One individual's SBP was 136 mmHg. What was his blood pressure in terms of standard deviations away from average?
  - (b) One individual's SBP was 2.2 standard deviations below average. What was it in mmHg?
3.  In class, we created a scatter plot of weight vs. height for adult women in the NHANES sample. The course web page also features a data set for adult men.
  - (a) Download the data set and create a scatter plot of weight vs. height for the adult men, and superimpose the regression line on top of the plot.
  - (b) Do there seem to be any noticeable outliers in this data?
  - (c) Suppose a man is 1 standard deviation above average in terms of height. How many standard deviations above average in terms of weight would you expect him to be?
  - (d) Suppose a man is 1 inch above average height. How many pounds above average weight would you expect him to be?
  - (e) Suppose a man is 1 pound above average weight. How many inches above average height would you expect him to be?
4. In one study, the correlation between the educational level of the husbands and wives in a certain town was about 0.5; both averaged 12 years of schooling, with an SD of 3 years.
  - (a) Predict the educational level of a woman whose husband has completed 18 years of schooling.
  - (b) Predict the educational level of a man whose wife has completed 15 years of schooling.
  - (c) From (a) and (b), it would seem that well-educated men marry women who are less well educated than themselves. But the women marry men with even less education. How is this possible?
5. Based on data from the March 1995 Current Population Survey, the correlation between the percentage of a state's residents that are foreign-born and the average income for that state is .52. This suggests a strong association indicating that the foreign-born have higher incomes than the native-born.
  - (a) Would you expect the association on the individual level to be stronger, weaker, or essentially the same?

(b) Can you conclude from this data that foreign-born persons make more money than native-born persons?

6. A deck of cards is shuffled, one card is dealt, and then the card is then returned to the deck. This process is repeated 10,000 times. About how many times will the card be a queen?