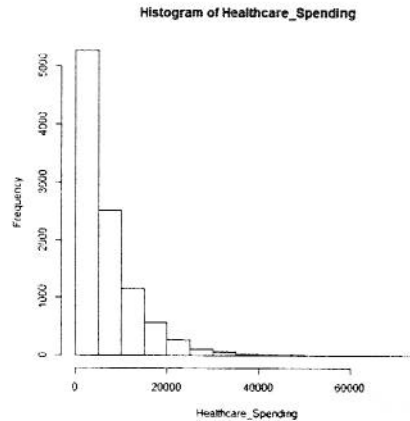


Name: Key

Consider the example where the average healthcare spending by an American is \$6,815. It is expected that many will spend a small amount and less will spend a lot on healthcare. Think about it this way – you probably haven't spent anywhere close to this amount since most college students are relatively young and healthy people but there are a lot of very sick people out there that spend much, much more than this to continue living. An approximate histogram of what a sample would look like is below:



Standard Three: Quiz Three – Measures of Center

When referring to the healthcare spending data what would be an appropriate measure of center to report? Can you think of an inappropriate measure of center for this data and, if so, why is the appropriate one better?

Here the median would be appropriate because it is not as affected by "extreme" values unlike the mean which in this case would be inflated by the observations in the long, right tail.

Standard Four: Quiz Three – Measures of Dispersion

When referring to the healthcare spending data what would be an appropriate measure of dispersion to report? Can you think of an inappropriate measure of dispersion for this data and, if so, why is the appropriate one better?

Here the IQR would be appropriate because it is robust to outliers. The variance, standard deviation and especially the range are affected by outliers and may yield misleading results.

Name: Key

Below are sample data of receiving yards per game from USC wide receiver Pharoah Cooper's 2014 Season (sports-reference.com). Use these data to calculate the following numerical summaries.

$$X = \{27, 40, 45, 47, 58, 83, 95, 127, 170, 233\} \quad n=10$$

$$\text{Position of the } p\text{th percentile} = \frac{P}{100}(n+1)$$

- If this number is whole the percentile is in that location of the ordered data
- If this number is a decimal:
 - If the decimal is .5 the percentile is the avg
 - i.e. 3.5 \rightarrow percentile = the average of the 3rd and 4th data points
 - If the decimal is anything else you do the following:
 - i.e. 3.75 \rightarrow take the remainder, in this case .75
percentile = $(1-.75)*(\# \text{ in } 3^{\text{rd}} \text{ position}) + .75*(\# \text{ in } 4^{\text{th}} \text{ position})$

Standard Eight – Quiz Three: Numerical Summaries – Percentile and Quartiles

First Quartile: $.25(10+1) = 2.75$
 $(1-.75)40 + (.75)45 = 43.75$

[42.5 or 45 okay]

Median: $.5(10+1) = 5.5$
 $(1-.5)58 + (.5)83 = 70.5$

Third Quartile: $.75(10+1) = 8.25$
 $(1-.25)127 + (.25)170 = 137.75$

[148.5 or 127 okay]

IQR: $137.75 - 43.75 = 94$