Week 1 Reading Guide

## Chapter 1: Data, Types of Variables & Study Design

### Section 1.1

What is a summary statistic?

### Section 1.2.1: Observations, Variables & Data Matrices

What is a case / observational unit?

What is a variable?

What is data?

What is a data frame?

How is a data frame “tidy”?

### Section 1.2.2: Types of Variables

What are examples of numerical / quantitative variables?

What are examples of discrete variables?

What are examples of continuous variables?

What is an example of a variable recorded as a number which **is not** a numerical variable?

What are examples of categorical / qualitative variables?

What are the “levels” of a categorical variable?

What is an ordinal categorical variable?

Give an example of an ordinal variable using the county data:

What is a nominal categorical variable?

Give an example of a nominal variables using the county data:

**Note: Ordinal and nominal variables will be treated the same in this course. I recommend taking more statistics courses in the future to learn better methods of analysis for ordinal variables!**

### Section 1.2.3: Relationships Between Variables

What does it mean when we say there is an association between two variables?

What does it mean when we say two variables are independent?

### Section 1.2.4: Explanatory & Response Variables

What does it mean for a variable to be an “explanatory” variable?

What does it mean for a variable to be an “response” variable?

### Section 1.2.5: Observational Studies & Experiments

What is an experiment?

What is a randomized experiment?

What is a placebo and how is it used in a randomized experiment?

What is an observational study?

How is an observational study different from a randomized experiment?

What is a cohort and how is it used in an observational study?

#### Notes

In a data frame, rows correspond to:

In a data frame, columns correspond to:

True or False: A pair of variables can be both associated AND independent.

True or False: Given a pair of variables, one will always be the explanatory variable and one the response variable.

True or False: If a study does have an explanatory and a response variable, that means changes in the explanatory variable must **cause** changes in the response variable.

True or False: Observational studies can show a naturally occurring association between variables.