Important questions to ask BEFORE we start:
1. What are the specific goals of the study?
2. Which variables should be measured and how?

Measured characteristics are **Variables**
Measured values are **Data**

**Types of studies**
1. **Comparative/Analytical Study**
   - compare two or more methods or groups
   - e.g. health care programs
2. **NonComparative/Descriptive Study**
   - learn about characteristics but not for comparison
   - e.g. defective parts in a manufacturing process
Study might be
1. **Observational** – records data without interfering with the course of events

2. **Experimental** – interventions occur and response recorded

Stronger conclusions can be made with latter researchers can control **Predictors or Explanatory Variables**.

Watch out for **Lurking Variables**

Note: the **Cause-Effect relationship**

Build a sense of caution in our work and statements we make

Comparative Studies have a baseline or **normal** to measure against sometimes a Control Group (i.e. no interventions).

Examples of Pre-Post Test Design
Observational Studies
1. Sample Survey - snapshot
2. Prospective
3. Retrospective
Latter – longitudinal

Sample Surveys
Based on populations and sampling units

Parameter is a numerical characteristic of a r.v.

Statistic estimates an unknown parameter e.g. % u/e adults in a sample (statistic) is used to estimate US u/e rate (parameter)

Census

Finite/infinite populations
**Sampling Errors**

Deviation from an estimate and a population parameter value

Can be driven down to zero by taking a Census (in theory)

**Non Sampling Errors**
Occur in Census
Leads to **Bias**

1. Measurement Bias
   - improper wording

2. Self-selection bias
   - e.g. have you ever taken drugs?
   - e.g. why did you take part in the survey?

3. Response Bias
   - untruthful/faulty response
   - cannot recall everything
Example: Literary Digest Poll

In the 1936 US Presidential election the Literary Digest magazine (now defunct) conducted a pre-election poll. The Republican Party candidate was Alfred E. Landon and the Democratic party candidate was Franklin D. Roosevelt. The magazine selected its sample mainly from telephone directories, lists of auto registrations, and the magazine’s subscribers. Questionnaire forms were sent to more than 2 million people, of whom about 250,000 responded. Based on this survey, the magazine predicted that Landon would win with a 57% majority. The final result was that Roosevelt won with a 62% majority. What caused this 19% reversal in the final result in spite of such a large sample?
Assignment: Design a Survey

Design a small survey on a particular area relevant to your professional practice. It might be a quiz, or a questionnaire.

Analyze your questions carefully, and comment on any biases you perceive are in the survey, possibilities for misinterpretation etc.

Administer it and collect the data.

Observe the data and comment on any interesting features of the dataset.

If you have time talk to a few of the respondents (your students) asking them how they interpreted/chose their answer on one or two items that highlighted interesting results.