

# Reading Scientific Literature

As public health students, we have a wide variety of backgrounds. Your MPH courses may be the first time that you are asked to read scientific literature.

*If you don't understand something (i.e. statistical method, disease terminology, study design) **don't panic!** You are in graduate school to **learn**. If you don't understand something, make a note of what is confusing and why and ask your professor or look it up.*

## Key Ideas

### What is a review article?

AKA Meta-analysis

A review article or literature review is a systematic look at a selection of articles on the same topic. Review articles can be organized by issue (i.e. HIV infection in adolescent males) or by method (i.e. the use of computer surveys to examine sexual risk taking). Always ask:

1. How were articles selected for inclusion?
2. How were article excluded?
3. What method of analysis was used?
4. Are the articles included reasonable to compare to one another?
5. Are all the articles reviewed by the same person?

A review article is considered secondary source material. It is another person's interpretation of an original article. Review articles are a great starting place, but you need to include primary source material in your papers and analysis.

### Quantitative studies

Quantitative research is largely based in numerical data. Statistical analysis is then used to understand the data. Quantitative studies usually use a large sample size meaning that a larger number of people are questioned or studied. Typical qualitative study methods include surveys, biological markers, and observational data.

- Large sample sizes
- Reproducible
- Statistical analysis techniques
- Methods include surveys and tests

Example: Relationship between number of people with Type II diabetes and distance to grocery store

### Qualitative studies

In Community Health Sciences, we often use qualitative literature to fill out and explain quantitative data. Qualitative literature is often described the “why?” and “how?” behind the “what?” of quantitative literature.

- Small sample sizes
- Not easily reproducible
- Analysis is more subjective
- Methods include focus groups, interviews, and open ended surveys

Example: Social norms related to food consumption in people with Type II diabetes

*OK, but my article uses both a survey and an interview.*

Qualitative and quantitative research methods are often used together in public health. A survey can help a researcher understand how many people are engaging in a behavior. A focus group can help a researcher understand what people think about that behavior.

### Opinion/policy statements

Many large organizations, such as the American College of Obstetric and Gynecology (ACOG) or the American Medical Association (AMA) release policy statements on a variety of issues. Though these statements are based in research, they are not considered primary source material. They are very useful for presenting the official opinion of large groups.

### **Statistics for reading**

Research has simple goal: to advance knowledge in a field. However, researcher can be overzealous in claiming to have discovered significant findings when random possibility might really be at the root. To overcome this tendency, statistical analysis is used to examine findings in an ordered way. We will all get this information in epidemiology and biostatistics, but what if you need to understand now?

### Population v sample

It is very rare that an experiment or study will ever be able to include all people in a particular category. Instead researchers select a sample to study. The population is the total population of group of people that you could have sampled from. The sample is the people you actually included in your study.

Example:

Population = All similar patients

Sample = The group of patients that you surveyed on Wednesday morning.

Population=All single mothers in the Treme neighborhood

Sample= The 50 you sampled during a two-week survey collection period

### What is a p-value?

You've set up an study with two populations. In your analysis, you discover that the means are different. There are two possibilities:

1. The populations really have different means
2. The difference is a result of random sampling

The p value is the probability (expressed from 0 to 1) that the difference you observed is due to random sampling. If the p-value is .07, there is a 7% chance that the difference you observed is due to random sampling. This DOES NOT mean that there is a 93% chance that the difference is real. What you can say is that in a random sampling of the same population, you would observe a difference smaller than the one you observed 93% of the time and larger than you observed 7% of the time.

The generally accepted threshold for significant results is a p value equal to or less than .05.

### What is a confidence interval?

The mean that you calculate from your sample is exact, but it is only an estimate at the population mean. The confidence interval tells you how close your mean is to the true population mean. You can calculate intervals for any desired degree of confidence, but 95% confidence intervals are used most commonly. If you assume that your sample is randomly selected from some population, you can be 95% sure that the confidence interval includes the population mean.

*Why is this important?*

If your population sample does not include the population mean, it is not representative of the population.