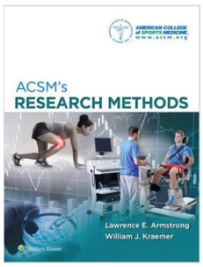
REVIEW FOR EXAM 3

Block 3 *Applications of Epidemiology (Including Your Project)*

Block 4 *The Statistical Models that Follow Epidemiology*



READINGS:

LECTURE 26:
ACSM Research Methods: Chapter 20 (359-372)

LECTURE 28:
ACSM Research Methods: Chapter 14 (253-262)
ACSM Research Methods: Chapter 18 (325-342)

TOPICS:

What is science?
Why is science important?

What is the purpose of research?
What's a good place to start with research?

What are the qualities of a good research question?

What kinds of questions would you use epidemiological methods to answer?
What kinds of questions would epidemiology be less effective at answering?

Understand the differences between observational and experimental research.

Understand these statistical models: descriptives, frequencies, bivariate correlations, independent-samples t-tests, paired-samples t-tests, chi-squared, linear regression, logistic regression, negative binomial regression, sensitivity, specificity, ANOVA with repeated measures (one way and mixed).

Upon seeing an output, know what test was conducted.
Upon seeing an output, be able to interpret the findings.

P-values. What *exactly* do they mean? How *exactly* do you interpret them?

If presented with a research question, know what the most appropriate statistical model would be to answer it (including the difference between two-way and mixed ANOVAs).

Understand what a t-test is measuring.
Know the difference between independent-samples and paired-samples t tests.

Understand what a regression is measuring (linear, logistic, and negative binomial).

Understand correlations. What's the difference between a Pearson correlation coefficient and a point-biserial correlation? What range of correlation is strong-ish? What range is weak-ish? What's no correlation at all? What's a perfect correlation? What are positive and negative correlations?

Understand the different modes of qualitative methods: case report, case series, phenomenological study, and ethnography.

If presented with a qualitative research scenario, know which design would be most appropriate.

Measurements of central tendency (mean, median, and mode): know which would be most appropriate to report in various circumstances.

Post-hoc power analysis. What is this? Why would you do it?

What's representative sampling?
What's convenience sampling?

Variables. Know everything about them. Dependent variables (which largely define which statistical model to use) and independent variables (or "predictors" in regression models). Confounding, moderator, and mediator variables. Nominal, ordinal, interval and ratio data. Categorical variables (e.g., binary) vs. "scale" (discrete and continuous). Between-group and within-group variables.

Univariate and multivariate analyses.

Hierarchy of evidence (i.e., the pyramid). Know it.

Blinding. Single and double blinding.

What's GIGO? Why is it important?

What have we learned about industry-funded research?

Is every published article trustworthy?
How would you find reliable articles to learn about a scientific subject?

What's the difference between internal and external validity?

Have a clear understanding of what a null hypothesis is.

What's a Type I error? What's a Type II error?

Be able to read and interpret a "Table 1"; know what analyses are used to calculate each value in the table.

Extra credit questions come from lectures 31-33.