OPT 6111 Research Methodology

10/7/08

Remaining requirements

- October 15 – List of references due to advisors (OVS format)
- October 20 or later - Individual group appointments with Dr. Salmon to discuss project
- December 2 – Literature review due
    - Become an expert on the topical area
    - Solid understanding of background principles relevant to question and methods
    - Not just summaries of articles—integrate knowledge
- December 9 – Research outline due (refer to 8/26 lecture notes)

What's next?

Spring semester (OPT 6262)

- Write, submit IRB application (if applicable)
- Finalize methods, write detailed research protocol
- Prepare everything necessary to begin collecting data
- Do trial run of experiment
- Submit first half of final paper (Introduction, methods)

Summer semester (OPT 7062)

- Run the experiment, collect all data
- Analyze data
- Write results and discussion sections of paper
- Submit final paper, formatted for journal submission
- Prepare poster of project, for Oklahoma Research Day (October 2009)
- Submit poster abstract and register for Research Day (October 2009)
- Oklahoma Research Day poster presentation (November 2009)

What we've covered

8/19 Course introduction, syllabus
8/26 Overview of research & the research protocol
9/2 IRB lecture by Dr. Miller
9/9 Library information resources lecture by Sandra Martin
9/16 Electronic literature search exercise
9/23 Overview of statistics, lecture by Mr. Richard Hoenes
9/30 Excel statistics exercise
10/7 Today

Statistics review

Sample size calculations
Determine or estimate you margin of error (MOE)
MOE = CI*stdev/sqrt(n)
CI for 95% = 1.96
Rough rule of thumb ~ 25 subjects
Or, as many subjects as you can do in 6 weeks.

Kinds of data
Nominal data – categories (like glaucoma or no glaucoma)
Ordinal data – Leikert scales (survey data, like a scale of 1-5)
Interval data – regular numbers

Determine if the data paired data or not. For example, same eye before & after treatment.

Which test should you use?
- What is your research questiojn?
- What will your data look like?

	Use	**Nominal**	**Ordinal**	**Interval**
Nominal	Mode	Chi-squared		
Ordinal	median	Wilcoxon Friedman Kendall Kruskall- Wallis Cochran Mann-Whitney Kolmogorov	Spearman's rho correlation coefficient	
Interval	Mean stdev	t-test ANOVA		Pearson's correlation coefficient

Bland-Altman method to test agreement between two tests or to determine repeatability.

P values – 95% probability for statistical significance.
Also consider clinical significance, or for smaller sample sizes, use 90% CI

Using Excel to do statistics
Use the data analysis toolpack to do
- Descriptive statistics
- Test quality of data (Skewness, kurtosis) because most statistical tests are based on the assumption that the data is normally distributed.
- ANOVA
- Correlation coefficient
- Linear regression
- T-tests
- Chi-squared test