



Drexel University School of Public Health

Certificate in Epidemiology and Biostatistics

PBHL 702

Introduction to Analytic Epidemiology and Biostatistics

3 credit hours

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Quarter offered: Winter 2008

Course time: January 7th - March 15th, 2008

COURSE DESCRIPTION

This course is the second component of the epidemiology and biostatistics certificate series. The objective of this course is to provide students with the knowledge and understanding of the methods of biostatistical analysis applicable to epidemiological studies. It emphasizes concepts and application of statistical and epidemiological thinking. Basic statistical theory, parametric statistics, correlation, regression, ANOVA, non-parametric statistics, and methods in discrete statistical analysis, along with other quantitative methods will be introduced.

This course will include introduction of screening test, questionnaire design, and critical review of epidemiology literature, etc. This course will emphasize hands-on experience in statistical analysis and interpretation of data from epidemiological studies.

PRE-REQUISITE:

The students should have completed PBHL-701.

COURSE OBJECTIVES

Upon completion of this course, students should:

- 1). understand the basic concepts of hypothesis testing and statistical inference.
- 2). be able to apply statistical methods in epidemiological data analyses.

- (a). t-test, ANOVA
- (b). chi-square test
- (c). correlation and regression
- (d). multivariable regression analyses, including logistic regression and other statistical techniques.

3). understand the basic concepts of screening tests

4). understand questionnaire design, particularly for cross-sectional studies

5). have basic skills in assessing and critically reviewing published papers in epidemiological studies.

TEXTBOOKS

Required

Gordis, Leon: Epidemiology. 3rd Edition, Elsevier Inc. (USA). 2004

Dawson B. and Trapp R.G.: Basic & Clinical Biostatistics, 4th edition, McGraw-Hill Companies, Inc., 2004, ISSN: 1045-5523

Supplementary

Harvey Motulsky: Intuitive Biostatistics. Oxford University Press, NY. 1995.

A good online text in biostatistics is StatPrimer, Version 6.2 by B. Gerstman & Marg Innovera, available at: <http://www2.sjsu.edu/faculty/gerstman/StatPrimer/>

This text has useful exercises, some with answers provided.

Additional readings for each week studies

Prepared by the instructor

If you have not downloaded SPSS version 13 or higher, please do it now, from the Drexel University website. Step-by-step directions can be found at:

1. Go to <https://software.drexel.edu>
2. A box will pop up asking for you userid and password
3. Enter in userid by typing drexel\your userid (such as LL85)
4. Enter in your normal password

You are now at the software site. From here you can follow the appropriate links for your software. And to navigate to Students > PC Software > SPSS13 > SPSS13_Student.exe

Be sure to also take a look at the license_info.txt file in the SPSS link because contains important instructions on how to install and register the software.

If you have any questions about the software site, please contact Drexel computer help desk by email at: consult@drexel.edu , or call at 215-895-2698.

It is recommended that students not already familiar with the SPSS version 13.0 statistical package obtain a good primer or manual for SPSS version 13 (such as: *SPSS 13.0 Guide to Data Analysis* by Marija J. Norušis, ISBN 0-13-186535-8, Prentice Hall). Students who are familiar with other statistical packages may find that the online tutorial and Help topics are sufficient to familiarize them with SPSS.

TEACHING METHODS

The main framework for presenting the course content is online lectures. Students access the online course materials at your own convenience; there are no set times when you are required to be online. There is a wealth of information covered here and in your course textbook. Students are expected to devote **8 – 16 hours** to complete course requirements each week, depending on your technical abilities. **We believe hands-on experience doing statistics is the only way for you to acquire the analysis skills you will need.** We encourage you to communicate and collaborate with your fellow students throughout the course, using the Communication features in Blackboard and email.

OFFICE HOURS

The instructors can be reached by email or via telephone. **Email questions are encouraged.** We will get back to you as soon as we can. We may respond to email questions by sending the response to the entire class. This way you can all benefit from these inquires of other classmates. Of course, if the question is a personal one, then we will respond only to the questioner.

STUDENT ACTIVITIES AND EVALUATION

There are **Self-Tests** (homework) each week and three **Graded Assignments**.

Graded Assignments are due exactly 7 days after the assigned date. Graded assignments should be turned in via email to the Instructor, and incomplete assignments will result in points being deducted.

Please pay attention to the dates of Graded Assignments, and let me know before these dates are reached if you have any specific circumstances, such as a serious illness/injury, etc., that would affect your ability to complete the assignment in a timely manner. An agreement indicating what activities are expected and the dates for their completion will be agreed upon by the student and instructor.

EVALUATION METHODS

Grade Grade Points Definition

A	4.0	The student has exceeded the required standards and expectations
A-	3.7	The student has met the required standards and expectations slightly below the exceptional level.
B+	3.3	The student has met the required standards and expectations slightly above the satisfactory level
B	3.0	The student has met the required standards and expectations at a satisfactory level.
B-	2.7	The student has met the required standards and expectations slightly below the satisfactory level
C+	2.3	The student met the required standards and expectations slightly above the marginally acceptable level
C	2.0	The student has met the required standards and expectations at the marginally acceptable level.
F	0	The student has failed to meet the required performance standards and expectations.

Numerical scores will be determined by the Graded Assignments and weighted as follows:

Evaluation method	Proportion of final grade
Graded Assignment I	30%
Graded Assignment II	30%
Graded Assignment III	40%

Week	Topic	Lecture	Assignment	Readings
1	Inferential statistics: hypothesis test and research questions about means in two groups	1). Parametric tests: t test 2). Nonparametric test: Wilcoxon rank tests for paired design and non-paired design 3). Examples for using SPSS	Self-test	1). Dawson: p134-146 2). Parametric comparison of two groups 1 (article) 3). Parametric comparison of two groups 2 (article) 4). http://www.bmj.com/collections/statsbk/7.dtl
2	Inferential statistics: hypothesis test and research question about proportions in one and two groups	1). Binomial distribution 2). Z test for a hypothesis about a proportion 3). Chi-square test to compare proportions or frequencies in two groups 4). Examples for using SPSS	Self-test	1). Dawson: p110-113; p146-153 2). Non-parametric comparison of two groups—1 (article) 3). Gerstman: CH9: Inference about a proportion (pdf file)
3	Research questions about means, frequencies or proportions in three or more groups	1). One-way Analyses of variance 2). Two-way ANOVA 3). Chi-square test 4). Examples for using SPSS	Graded test	Dawson: p162-180; 182-184 Gerstman: CH10: Cross-Tabulated counts and independent proportions Gerstman: CH12: ANOVA Gerstman: CH13: Additional ANOVA
4	Research questions about relationships among variables	1). Linear correlation Pearson correlation and Spearman correlation 2). Linear regression	Self-Test	Dawson: 190-212 Primer on Correlation Coefficients (article) Correlation and Simple Linear Regression (article)
5	Introduction to multivariate analyses	1). Multiple linear regression 2). Logistic regression	Self-Test	Dawson: 245-254; 260-263 An introduction to multiple regression performing a multiple regression on SPSS (Article) Understanding Logistic Regression Analysis in Clinical Reports: An Introduction (article) Logistic regression in SPSS (article)
6	Screening	Introduction to Screening	Graded Case Study: Screening for Antibody to the Human Immunodeficiency Virus	Gordis 71- 77; 82-92; 281-298 Uses and abuses of screening tests (article)
7	Introduction to survival analysis	Kaplan-Meier method	Self-Test: Survival Analysis	Gordis 104 – 105; Dawson p227-228 Survival probabilities: the Kaplan-Meier method (article)

8	Community Survey for Cross-Sectional Studies	How to design a questionnaire	Discussion Board Question	What is a Survey (article) Primer on Interpreting Surveys (article) Developments in Survey Research in the Past 25 Years (article)
9	Introduction to Critical Review of Epidemiology Literature	Reading suggested materials	Self-test	Writing Assignment 1). How to read a paper: getting your bearings (web site) http://www.bmj.com/cgi/content/full/315/7102/243 2). Primer on Dissecting a Medical Imperative (article) 3). An overview of clinical research: the lay of the land (article)
10	Introduction to Critical Review of Epidemiology Literature	Reading suggested materials	Graded Assignment: Article Review	1). How to read a paper: Assessing the methodological quality of published papers (web site) http://www.bmj.com/cgi/content/full/315/7103/305 2). Assessing the Medical Literature: Let the Buyer Beware (article) 3). Poor Quality Medical Research: What Can Journals Do? (article) 4). Absence of evidence is not evidence of absence (article)