

# E10.1995 INTRODUCTION TO BIOSTATISTICS

FALL 2005

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Office: Kimball Hall, 3<sup>rd</sup> Floor or 3R (no specific room)  
Class Hours: 4:55 to 7:35 PM Thursdays  
Text: Health & Numbers. 2<sup>nd</sup> Ed. Chap T. Le (Wiley-Liss 2001).

This course is intended for consumers of statistics in the biological and medical fields. It will concentrate on the interpretation and comprehension of graphical and statistical techniques that are important components of scientific literature. Presentation of statistical material will be linked to its application as reported in the medical literature. Although some mathematics will be presented it is not expected that the student will memorize formulas. Mathematical ability at the level of high school algebra is assumed.

## Class Schedule

**Sept 8, 2005:** Introduction – Data summary – numeric and graphic.

*Papers: Salsburg DS. The Religion of Statistics as Practiced in Medical Journals. American Statistician (1985), 39(3):220-223 [JSTOR]*

*E-links: Gould, SJ "The median isn't the message" [External links section]*

**Sept 15, 2005:** Conclusion of Data summary – numeric and graphic

*Papers: Khouam R, Apgar D, Phibbs B. Initial therapy for acute myocardial infarction. Chest (2004), 126:456-460 [EJOURNAL]*

*Chapters: 1.1, 1.2, 1.3.1, 1.3.2, 2.1, 2.2*

**Sept 22, 2005:** Probability

*Papers: None*

*Chapters: 3.1 – 3.4*

**Sept 29, 2005:** Concept of statistical hypothesis tests – Random Chance, Purpose, Errors, Power and Sample Size.

*Papers: None*

*Chapters: 5.1-5.3*

**Oct 6, 2005:** Two independent sample tests - T, Mann Whitney Wilcoxon, Permutation  
Paired sample tests - T, Wilcoxon, Permutation

*Papers: Esteban A, Frutos-Vivar F, Ferguson ND et.al. Noninvasive Positive Pressure Ventilation for Respiratory Failure after Extubation, New Eng J Med (2004), 350(24):2452-2460. [EJOURNAL]*

*Chapters: 4.1, 4.2, 4.3, 7.1, 7.2, 7.3*

- Oct 13, 2005:** ANOVA – One way, two way, repeated measures, non-parametric equivalents  
*Papers: Turner NH, O'Dell KJ, Weaver GD. Religion and the recovery of addicted women. Journal of Religion and Health (1999); 38(2):137-147 [EJOURNAL]*  
*Plante TG, Coscarelli L, Ford M. Does exercising with another enhance the stress-reducing benefits of exercise (2001); International Journal of Stress Management 8(3):201-213 [EJOURNAL]*  
*Chapters: 7.4, 7.5*
- Oct 20, 2005:** Correlation and introduction to regression  
*Papers: McPherson S, Hale R, Richardson P, Obholzer A. Stress and coping in accident and emergency senior house officers. Emerg Med J (2003), 20:230-231. [EJOURNAL]*  
*Chapters: 2.4, 4.5, 8.1*
- Oct 27, 2005:** Regression  
*Papers: Redeker NS, Ruggiero JS, Hedges C. Sleep is Related to Physical Function and Emotional Well Being After Cardiac Surgery. Nursing Research (2004), 53(3):154-162. [EJOURNAL]*  
*Chapters: 8.1, 8.2*
- Nov 3, 2005:** Categorical - Odds ratios, Diagnostic tests, Chi Square, Logistic regression  
*Papers: Walsleben JA, Norman RG, Novak RD, O'Malley EB, Rapoport DM, Strohl KP. Sleep habits of Long Island Rail Road Commuters. Sleep (1999), 22(6):728-734. [RESERVE]*  
*Chapters: Review Chap 1, 6.1-6.7*
- Nov 10, 2005:** Survival Analysis – Kaplan Meier, Cox Proportional Hazard  
*Papers: Kryle PA, Minar E, Bailonczyk C et.al. The Risk of Recurrent Venous Thromboembolism in Men and Women. New Eng J Med (2004), 350(25):2558-63. [EJOURNAL]*  
*Nordquist LT, Simon GR, Cantor A, Alberts WM, Bepler G. Improved survival in never-smokers vs current smokers with primary adenocarcinoma of the lung. Chest (2004), 126(2):347-351.*  
*Chapters: 2.3*
- Nov 17 2005:** Measurement – Reliability and Validity  
*Papers: Stepnowsky CJ, Berry C, Dimsdale JE. The Effect of Measurement Unreliability on Sleep and Respiratory Variables. Sleep (2004), 27(5):990-995. [RESERVE]*  
*Schneider JK, Deenan A. Reducing Quantitative Data Errors: Tips for Clinical Researchers. Applied Nursing Research (2004), 17(2):124-129. [EJOURNAL]*  
*Chapters: None*
- Dec 1, 2005:** Research Design – Controls, Randomization, Clinical trials, FDA Phases.  
*Papers: Handout*  
*Chapters: None*
- Dec 8, 2005:** Miscellaneous topics and in class research project  
*Papers: Fox NL, Hoogwerf JH, Czajkowski S et al. Quality of life after coronary artery bypass graft. Chest (2004); 126:487-495. [EJOURNAL]*

**Dec 13, 2005: Evidence based medicine and wrap up (THIS IS A TUESDAY)**

*Papers: Zou KH, Fielding JR, Ondategui-Parra S. What is Evidence-Based Medicine. Acad Radiol (2004), 11:127-133. [EJOURNAL]*

*Kalso E, Edwards J, McQuay HJ et.al. Five Easy Pieces on Evidence Based Medicine. European J Pain (2002), 6:89-93. [EJOURNAL]*

*Chapters: None*

**Papers are available as follows:**

[JSTOR] : Article is available via JSTOR from Bobst E-Journals web page.

[EJOURNAL] : Article is available via E-Journal from Bobst E-Journals.

[RESERVE] : Article is on reserve in Bobst Library.

**Term Paper**

A paper (3-4 pages maximum) will be required. This paper will be a review and evaluation of an assigned medically oriented paper. The review should include the hypotheses, statistical methods and results of the paper based on the student's interpretation of what is reported in the paper. The student will then critically evaluate the paper from a statistical standpoint. This may include items such as: Are the statistics reasonable? Are they presented in an understandable manner? Is the sample adequate? Are the results and conclusions supported by the statistics? What are some possible alternative explanations for the results obtained?

**Homework**

Homework will be assigned periodically. Assignments will be based on material covered in class, in the text and in the papers. The due date will be stated when the assignment is given. Homework may be handwritten (neatly) or typewritten. Late submissions will be penalized.

**Grades**

Homework	20 pts
Class participation	20 pts
Paper	40 pts
Quizzes (4)	20 pts

**WHY SHOULD A "CONSUMER" STUDY STATISTICS?**

"In an ideal world, editors of medical journals would do such an excellent job of ensuring the quality and accuracy of the statistical methods of the papers they publish that readers with no personal interest in this aspect of the research work could simply take it for granted that anything published was correct. If past history is any guide, however, we will probably never even approach that ideal. In the meantime, consumers of the medical literature – practicing physicians and nurses, biomedical researchers, and health planners – must be able to assess statistical methods on their own in order to judge the strength of the arguments for or against the specific diagnostic test or therapy under study."

Stanton A. Glantz  
Primer of Biostatistics  
McGraw-Hill