

Biostatistics for Clinical Investigators, Fall 2018 Course Overview

Course Goals:

To be able to:

- 1) Determine which statistical tests are appropriate for data analyses in most clinical studies
- 2) Perform and interpret statistical analyses using common statistical tests/methods, including sample size and power calculations
- 3) Recognize when complex (eg, regression) analyses are indicated; be able to discuss these analyses with biostatistical consultants
- 4) Recognize errors and limitations of published statistical analyses
- 5) Present data analyses clearly with appropriate conclusions and interpretations

Course Structure:

Weekly lectures and in-class problem solving

Weekly homework assignments (cumulative)

Use the Stata 15 statistical package

Show all work including the statistical program output when applicable.

You may discuss the homework with others but you are expected to complete your own assignments.

Two in-class exams (cumulative; open book)

Use the Stata 15 statistical package

You may use books, notes and other written references, but **you are expected to complete your own test without help from others.**

Requirements for Credit:

1. Enrolling in the class for credit (email deborah.garcia@uth.tmc.edu)
2. **Laptop with internet connection**
3. In-class attendance for at least 7 of the 9 lectures (must sign in to get credit)
4. Attendance at remaining lectures by videostream - must email Deb Garcia after viewing videostream (<https://med.uth.edu/crebm/clinical-research-education/clinical-research-curriculum/> - see instructions at bottom of page) to get credit for "attendance"
5. Completion of all homework assignments **within 2 weeks** after the date assigned
6. Average score of at least 80% on the two in-class exams
7. Completion of the final exam and all other coursework by **12/5/18**

Course Directors:

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**Clinical Research Curriculum Course Schedule:
Biostatistics for Clinical Investigators**

DATE	SESSION	TOPIC	LECTURER
9/5/18	1	Types of Data, Summarizing Data	Claudia Pedroza
9/12/18	2	Principles of Statistical Analysis: Estimation and Testing, Sample Size, & Power	Charles Green
9/19/18	3	Comparing Two or More Groups - Continuous Data	Cynthia Bell
9/26/18	4	Comparing Two Groups - Categorical Data	Farhaan Vahidy
10/3/18	5	Measures of Association, Confounding and Interaction - Matched and Stratified Analyses	Cynthia Bell
10/10/18	6	In-Class Midterm Exam	
10/17/18	7	Linear Regression	Charles Green
10/24/18	8	Logistic Multiple Regression (Diagnostic tests)	Farhaan Vahidy
10/31/18	9	Time-to-Event Analysis	Charles Green
11/7/18	10	Bayesian Approaches	Claudia Pedroza
11/14/18	11	In-Class Final Exam	

Course Textbooks (both optional):

Altman DG. Practical statistics for medical research. CRC press; 1990.

Rosner B. Fundamentals of biostatistics, 8th edition. Nelson education; 2015. *Traditional approach to biostatistics but more readable than other texts, strong on examples from medical research.*

Course Software:

Stata 15 is required for coursework.

FOR STUDENTS ONLY (student ID not required but must use .edu email address)

Stata/IC 15 - \$89.00 for one-year license, \$198 for perpetual licensee

Small Stata 15 - (for "students" only, can only accommodate smaller data sets, adequate for the Introductory course but not the Advanced course) - \$45.00 for six-month license

 For more information about products: <http://www.stata.com/products/whichstata.html>

To order: <http://www.stata.com/order/new/edu/gradplans/gp-direct.html>

Be sure to include your .EDU email address when ordering.

Suggested Other Reading (General Statistics):

Altman DG, Machin D, Bryant TN, Gardner TN. Statistics with confidence 2nd ed. BMJ Publishing, 2000. *Excellent reference for calculating, using, and interpreting confidence intervals.*

Armitage P and Berry G: Statistical methods in medical research. 4th ed. London: Blackwell Publishers, 2001. *Good explanations of statistics commonly used in medical research.*

Bailar JC, Hoaglin D. Medical uses of statistics, 3rd ed. Wiley 2009. *Easy to read description of statistical concepts, study design, statistical writing.*

Berry DA. Statistics: A Bayesian perspective. Wadsworth Publishing 1995. *Very easy to read, lots of examples.*

Glantz SA. Primer of biostatistics, 7th ed. McGraw-Hill, 2011. *Very easy to read, good examples from the medical literature.*

Inglefinger JA, Ware JH, Thibideau LA. Biostatistics in clinical medicine 3rd ed. McGraw-Hill, 1993. *Tests presented as solutions to clinical problems, good explanations, many illustrations from the medical literature.*

Katz MH. Multivariable analysis: a practical guide for clinicians and public health researchers, 3rd ed. Cambridge University Press, 2011. *Very easy to read and understand discussion of more complex analyses.*

Khan Academy online course: <http://www.khanacademy.org/math/probability>. *The Kahn Academy offers a collection of short (5-10 min) videos by Sal Kahn on important concepts in statistics.*

Motulsky H. Intuitive biostatistics: a nonmathematical guide to statistical thinking, 3rd ed. Oxford University Press 2014. *Concepts of analysis and interpretation are explained with real-world examples that are intuitively apparent.*

Norman GR and Streiner DL. Biostatistics: The bare essentials. 4th ed. People's Medical Publishing House, 2014. *Very easy to read, limited math, excellent coverage of essential information, lots of examples, main limitation is frat-boy humor.*

StatSoft on-line textbook: <http://www.statsoft.com/textbook>. *Reasonable reference for those needing a fast easy-to-use statistical resource.*

Zar JH. Biostatistical Analysis 5th ed. Prentice Hall, 2009. *Traditional approach to biostatistics, heavy reading.*

Suggested Other Reading (Stata):

Acock AC. A Gentle Introduction to Stata, 4th ed. Stata Press, 2014 (ISBN: 978-1597181426) *Best overview for material covered in introductory class.*

Rabe-Hesketh S and Everitt B. A Handbook of Statistical Analyses Using Stata, 4th Ed, Chapman & Hall/CRC 2007 (ISBN: 978-1-58488-756-0) *Also covers some advanced topics, good for the more serious user.*