

Biostatistics for Researchers-tools for evidence based medicine

Fall 2016 - Cedars/Sinai Medical Center - Tuesdays, Thursdays, 5 pm to 6:30 pm

No class Sept 20, Oct 11, Nov 24 P&S = chapter in Petrie & Sabin 3rd ed

| date | topic (subject to change) | Notes | P&S |
|---------|---|---------|----------|
| Sept 13 | Introduction – Confounding, bias | I | 12-16 |
| Sept 15 | Study design – observational, experimental | I | 12-16 |
| Sept 20 | No Class (Graduation / Welcome) | | |
| Sept 22 | Descriptive statistics for continuous data | II | 1,4-6 |
| Sept 27 | Descriptive stats for binary and survival data-Bayesian paradigm | II | 45 |
| Sept 29 | assignment 1 discussion (design) -Intro JMP session-descriptive stats | | |
| Oct 4 | Elementary probability theory – Normal distribution Normal, Binomial & Poisson probability distributions | III | 7-9 |
| Oct 6 | Normal, Binomial & Poisson probability distributions-(cont) | III | 7-9 |
| Oct 11 | No class | | |
| Oct 13 | assignment 2 discussion- descriptive stats Central Limit Theorem, Confidence intervals, meta analysis | III, IV | 8, 10,11 |
| Oct 18 | Hypothesis testing & equivalence testing | IV | 17,18,21 |
| Oct 25 | Power, sample size, multiple testing | V | 18,36 |
| Oct 27 | assignment 3 discussion – multiple testing (cont.) | | |
| Nov 1 | correlation & bivariate linear regression JMP session – correlation & regression | VIIIa | 26,27,28 |
| Nov 3 | Multiple linear regression | VIIIb | 21,22,29 |
| Nov 8 | Overview of regressions- Linear, Logistic, Poisson, Cox assignment 4 discussion | VIII | 23,24,25 |
| Nov 10 | Survival- Censoring, Kaplan-Meier- log rank test, Competing risks | X | 44 |
| Nov 15 | Survival – Cox model and survival calculator | X | 44 |
| Nov 17 | comparing means – t tests, analysis of variance JMP session – ANOVA & chi square | VI | 19-22 |
| Nov 22 | binary outcomes - comparing proportions – chi square tests- goodness of fit tests | VII | 23-25 |
| Nov 24 | No class – thanksgiving | | |
| Nov 29 | Logistic regression & propensity scores | IX | 30 |
| Dec 1 | Advanced topics - classification tree (time permitting) | X | 21,22 |
| Dec 8 | Advanced topic-Principle components & Factor (time permitting) Assignment 5 discussion | | |
| Dec 13 | Class Final presentations | | |
| Dec 15 | Class Final presentations | | |

Suggested texts:

P&S- Medical Statistics at a Glance, Aviva Petrie, Caroline Sabin, 3rd ed, Blackwell Publishing, 2009—*chapters roughly corresponding to lectures are indicated above*

Designing Clinical Research, S Hully, S Cummings, W Browner, D Grady, T Newman,
3rd ed, Lippincott, Williams & Wilkins, Nov 2006

Reinhart Alex, Statistics Done Wrong No Starch Press 2015

Wainer Howard, Truth or Truthiness, Cambridge Univ Press 2015

Wheelan Charles, Naked Statistics WW Norton & Co, 2013

Moye, Lemuel Statistical Reasoning in Medicine, the intuitive p value primer
Springer 2000

Bibliography for Basic Biostatistics

- Altman, Douglas G Practical Statistics for Medical Research, Chapman and Hall 1991
- Bailer & Mosteller Medical Uses of Statistics- NEJM Books 1986. Not a statistics text but documents how statistics is used in the New England Journal of Medicine.
- Bland Martin An Introduction to Medical Statistics , Oxford University Press 1987
- Bland M, Peacock J Statistical Questions in Evidence Based Medicine, Oxford Univ Press 2000
- Bourke, Daly and McGilvey Interpretation & Uses of Medical Statistics Blackwell Scientific 1985
- Campbell, M J, Machin, D Medical Statistics, a Commonsense Approach Wiley 1990
- Colton T Statistics in Medicine Little & Brown 1974
- Dawson-Saunders B, Trapp RG Basic and Clinical Biostatistics Appleton & Lange 1990
- Dixon WJ and Massey FJ Introduction to Statistical Analysis 4th ed 1983
- Elston and Johnson Essentials of Biostatistics 1987
- Freedman, Pisani and Purves Statistics WW Norton 1978
- Feinstein A, Clinical Biostatistics CV Mosby Co 1977
- Furberg B, Furberg C All That Glitters is Not Gold: Evaluating Clinical research, Springer 2007– Well illustrated book that discusses design-highly recommended**
- Gigerenzer, Gerd Calculated Risks Simon & Schuster 2002 – Good book for sensitivity & specificity discussion**
- Glantz, SA Primer of Biostatistics 1981
- Ingelfinger, Mosteller et al Biostatistics in Clinical Medicine Macmillan 1987
- Matthews, Farewell Using and Understanding Medical Statistics Karger 1988
- Michael, Boyce and Wilcox, Biomedical Bestiary - 1984- Little Brown Basic epi in fun style
- Mlodinow, Leonard The Drunkard's Walk – How Randomness rules our lives Vintage 2009**
- Pocock SJ Clinical Trials, A Practical Approach Wiley 1983
- Scakett et. al. Evidence Based Medicine Churchill Livingstone 2000
- Samuels, ML Statistics for the Life Sciences Dellen/McMillan 1989
- Van Belle, Gerald, Statistical Rules of Thumb Wiley 2002 – **good summary of practical methods**