

**Health Policy and Management 237C**  
**Issues in Health Services Methodologies**  
Syllabus - Spring 2017—updated May 16, 2017

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Class: Tuesdays, Thursdays, 1:00 - 2:50 pm  
CHS 71-257

Labs: Tuesdays, Thursdays 3:00 - 3:50 pm  
CHS 71-257

This is an applied research methods course. It provides a foundation for using econometric methods to investigate research questions in health services. The course builds on knowledge and skills in conceptual models, study designs, literature review, data acquisition and data management gained in the prerequisite courses HPM 225A-B and HPM 226A-B, and statistics learned in the prerequisite courses Biostatistics 201A and B. This course was originally developed by Susan Ettner, with a number of topics prepared and updated by Ninez Ponce, Jack Needleman, Fred Zimmerman and Jerry Kominski. The syllabus, selection of readings, and data sets, assignments and class presentations draw heavily on materials developed by Drs. Ettner and Needleman and are used with their permission.

There are a vast number of advanced techniques and all cannot be covered in 10 weeks. Topics were selected in coordination with instructors for the HPM and Biostatistics course prerequisites. Although the main criteria is to introduce you to new topics (for example models addressing selection bias), some topics build on statistical theories (for example maximum likelihood), or at times extending methods learned in previous quarters (for example extending logit models to multilevel negative binomial models). All topics will focus on application to health services research. Our approach is to teach topics by modules that unify what is seemingly a diverse (and overwhelming!) set of models in the econometric toolbox. To this end, the modules will be:

1. **Skewed Distribution of Dependent Variables**
2. **Clustered Data**
3. **Causal Inference**

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Lectures, lab sessions, sample code, readings, and 3 homework assignments will illustrate the methods. Demonstration of the student's knowledge and understanding of the material will culminate in an empirical research paper that addresses a research question using advanced regression models.

Grades will be based on:

- class participation (5%)
- 3 group homework assignments (45%)
- a solo-written final research paper (50%)

Grade distribution:

Homeworks are assigned grades of check+ (94%-100%), check (89% to 93%), check- (85%-88%). Unacceptable homeworks will be returned and must be resubmitted. The maximum grade for resubmitted homework is check- .

98% to 100%	A+
94% to 97%	A
89%-93%	A-
85%-88%	B+
80%-84%	B
75%-79%	B-
70%-74%	C+

A separate document distributed in the middle of the quarter will provide instructions regarding the final paper and how it will be graded. **The final paper will be due and posted at the CCLE class website by midnight, June 13, PST the Tuesday of finals week.** Students submitting papers past this deadline will automatically be assigned an "I" grade.

### Accommodations for Disability

Students needing academic accommodations based on a disability should contact the Center for Accessible Education (CAE) at (310)825-1501 or (310) 206-6083 (telephone device for the deaf) or in person at Murphy Hall A255. When possible, students should contact the CAE within the first two weeks of the term as reasonable notice is needed to coordinate accommodations. For more information visit [www.cae.ucla.edu](http://www.cae.ucla.edu).

### Title IX Protections

Title IX prohibits gender discrimination, including sexual harassment, domestic and dating violence, sexual assault, and stalking. If you have experienced sexual harassment or sexual violence, you can receive confidential support and advocacy at the CARE Advocacy Office for Sexual and Gender-Based Violence, 1<sup>st</sup> Floor Wooden Center West, [CAREadvocate@caps.ucla.edu](mailto:CAREadvocate@caps.ucla.edu), (310) 206-2465. In addition, Counseling and Psychological Services (CAPS) provides confidential counseling to all students and can be reached 24/7 at (310) 825-0768. You can also report sexual violence or sexual harassment directly to the University's Title IX Coordinator, 2241 Murphy Hall, [titleix@conet.ucla.edu](mailto:titleix@conet.ucla.edu), (310) 206-3417. Reports to law enforcement can be made to UCPD at (310) 825-1491.

Faculty and TAs are required under the [UC Policy on Sexual Violence and Sexual Harassment](#) to inform the Title IX Coordinator should they become aware that you or any other student has experienced sexual violence or sexual harassment.

### PhD and MS Research Competencies

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Under the sponsorship of AcademyHealth and ARHQ, a list of core competencies for PhD training in health services research was developed and published (Forrest CB, Martin DP, Holve E, Millman A, Health services research doctoral core competencies, BMC Health Serv Res. 2009 Jun 25;9:107). A modification of this list, regrouping the competencies from 14 areas to 11 was subsequently published on the AHRQ website (*Health Services Research Core Competencies*. Final Report. Agency for Healthcare Research and Quality, Rockville, MD. <http://www.ahrq.gov/fund/training/hsrcomp08.htm>). This course provides primary training related to the following competencies from this list:

Learning Objectives	AHRQ/PhD Competencies
(1) design sound empirical analyses using secondary data	<ul style="list-style-type: none"> <li>• Conceptual models and operational methods</li> <li>• Study designs</li> </ul>
(2) use STATA to prepare the data for analysis, estimate regression models and run post-estimation commands associated with topics covered in the course.	<ul style="list-style-type: none"> <li>• Data management methods</li> <li>• Research conduct management</li> <li>• Data analysis</li> </ul>
(3) present findings in a coherent paper that is suitable for submission to a peer-reviewed health services journal.	<ul style="list-style-type: none"> <li>• Professional development</li> <li>• Communication</li> </ul>
(4) work collaboratively in teams within disciplines, across disciplines, and/or with stakeholders	<ul style="list-style-type: none"> <li>• Professional development</li> <li>• Communications</li> </ul>

### Textbooks

We have assigned STATA books that are quite flush with the STATA applications and provide generally sufficient relevant theoretical background. Most importantly, these books do quite well in linking the methods with the empirical applications via lots of examples. For further reading on theory and concepts you might consider purchasing books from the "Recommended Textbooks for your library" list.

#### Required Textbooks for the Course:

The following textbooks will be available for purchase at the UCLA Health Sciences Bookstore.

1. Rabe-Hesketh and Skrondal. *Multilevel & Longitudinal Modeling Using Stata*, 3<sup>rd</sup> edition. STATA 2012. (NOTE: The authors are the developers of GLLAMM ([www.gllamm.org](http://www.gllamm.org)), an ado command within STATA used for multilevel model estimation. However, we will not cover GLLAMM in this course. This is a two-volume book.)
2. Freese J. & Long J.S., *Regression Models for Categorical Dependent Variables Using Stata*, 3<sup>rd</sup> Edition, College Station, TX: Stata Press, 2014. (NOTE: My goto book for nearly all models except multilevel, and selection models. Great ado files for postestimation.)

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3. Angrist, J.D. & Pischke, J-S. *Mostly Harmless Econometrics: An Empiricist's Companion*. Princeton, NJ: Princeton University Press, 2009.

### Recommended Textbooks for Your Library:

1. Wooldridge, Jeffrey M. *Introductory Econometrics, A modern approach. 5<sup>th</sup> Edition*. South-Western College Publishing, 2013.  
(Note: A solid comprehensive intro econometrics textbook, but not so many examples relating to health or health services.)  
  
(Note: This is the only book that is not available through the UCLA Health Sciences Bookstore. Paperback and electronic editions of this book are available for purchase on [www.amazon.com](http://www.amazon.com).)
2. Kennedy, Peter, *A Guide to Econometrics, 5<sup>th</sup> Edition*, Cambridge, MA: MIT Press, 2003.  
(Note: a 6<sup>th</sup> edition is available. Either edition is fine. My favorite econometrics textbook conceptual, wittily written. NP)
3. Long, Scott J. *Regression Models for Categorical and Limited Dependent Variables*. Advanced Quantitative Techniques in the Social Sciences Series Volume 7. Thousand Oaks, CA: Sage Publications, Inc., 1997. (Note: an enduring classic book if you want to know more about logits, ordered logits and multinomial logits.)
4. Guo SY, Fraser FW. *Propensity Score Matching: Statistical Methods and Applications*. SAGE 2009.  
(Note: The title belies coverage of alternative specifications to propensity scores for purging the selection bias that plagues observational studies. This book includes relevant chapters for the causal inference module. Hardcover book available for rent from Amazon.com)
5. Hilbe, Joseph *Negative Binomial Regression*, 2<sup>nd</sup> edition. Cambridge University Press, 2007/8. (Electronic version of book available from Amazon.com)
6. Jones, A.M., Rice, N., Bago dUva, T. and Balia, S. *Applied Health Economics*, Second Edition. Routledge, 2013.
7. Imbens, G.W., Rubin, D.B. *Causal Inference in Statistics, Social, and Biomedical Sciences: An Introduction* Cambridge University Press, 2015.
8. Rabe-Hesketh, S., & Everitt, B. *Handbook Of Statistical Analyses Using Stata*, 4<sup>th</sup> edition Taylor & Francis Group, 2007.  
(NOTE: The book starts out with, "Stata is an exciting statistical package...". This book will cover a review on running STATA with OLS, and will cover CLUSTER module.)

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### Schedule of Lectures & Assignments

Dates	week	TOPIC	Lab Schedule	Assignments / Assigned	Assignments / Due Date
4/4	1	Introduction, Ground Rules, and Definitions	STATA MARGINS/Bootstrap RR and RD	Proposed Paper topics	
4/6		OLS and Quantile Regression	Quantile regression	HW 1	
4/11	2	Transformations and Retransformations	Transformations & Retransformations		
4/13		Two-Part Models	Two-Part Models		Proposed Paper topic
4/18	3	Generalized Linear Models (GLM)	GLM	Term Paper Instructions / Table 1	
4/20		Generalized Estimating Equations (GEE)	GEE		
4/25	4	Fixed Effects	Fixed Effects		HW 1
4/27		Random Effects	Random Effects		
5/2	5	Multilevel Models (Random Intercept and Random Coefficient Models)	Multilevel Models		Table 1 draft
5/4		Multilevel (continued) Review of Module 2	Q&A Lab	HW2	
5/9	6	Sample Selection Models: Heckman	Heckman Model		
5/11		NO CLASS	NO LAB		
5/16	7	Treatment Effects	Treatment Effects		Table 1 final
5/18		Propensity Scores	Propensity Scores		HW 2
5/23	8	Instrumental Variables	Instrumental Variables	HW 3	
5/25		Non-Linear Instrumental Variables	Non-linear IV		
5/30	9	Review of Module 3/ Review of Course & Paper Topics	No lab /Paper Consultation		HW 3
6/1		Extra Lecture: Survival Analysis: Dr. Catherine	No lab/Paper consultation		

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Dates	week	TOPIC	Lab Schedule	Assignments / Assigned	Assignments / Due Date
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6/6	10	OPEN OFFICE HOURS			
6/8		OPEN OFFICE HOURS			
6/13	11	FINALS WEEK			Term Paper

The textbook readings and articles will help you assimilate the materials presented in class and lab. We also encourage you to use articles from this list as references for your class papers. Please do not cite my lectures or the lab handouts when you present methodological issues in your final papers. Instead, cite from the list below or a published book/article. The list also provides examples of applied empirical work using one or a combination of models taught in this class. Students have found the readings most useful once they have decided on a research question and narrowed down the candidate estimation strategies to answer their question.

TOPIC	Readings
4-4 Introduction, Ground Rules, and Definitions	<p>1- Lumley T, Diehr P, Emerson S, Chen L. The importance of the normality assumption in large public health data sets. <i>Annu Rev Public Health</i> 2002; 23: 151-69. <a href="http://rctdesign.org/TechReports/ARPHnonnormality.pdf">http://rctdesign.org/TechReports/ARPHnonnormality.pdf</a></p> <p>2- Zhang J, Yu KF. What's the relative risk? A method of correcting the odds ratio in cohort studies of common outcomes. <i>Journal of the American Medical Association</i> 1998; 280(19): 1690-1691. <a href="http://jama.jamanetwork.com/article.aspx?articleid=188182">http://jama.jamanetwork.com/article.aspx?articleid=188182</a></p> <p>3- Rabe-Hesketh Multilevel &amp; Longitudinal Modeling Using Stata, 3<sup>rd</sup> edition. STATA 2013: Part 1 "Preliminaries" (posted on CCLE)</p>

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<p>4-6</p> <p>Quantile Regression</p>	<p>1- Bind, M and Coad, A. From Average Joe's happiness to Miserable Jane and Cheerful John: using quantile regressions to analyze the full subjective well-being distribution. <i>Journal of Economic Behavior &amp; Organization</i>, 2011; 79(3): 275-290.  <a href="http://pdn.sciencedirect.com/science?_ob=MiailImageURL&amp;_cid=271649&amp;_http://pdn.sciencedirect.com/science?_ob=MiailImageURL&amp;_cid=271649&amp;_user=4423&amp;_pii=S0167268111000692&amp;_check=y&amp;_origin=article&amp;_zone=toolbar&amp;_coverDate=2011--31&amp;_view=c&amp;_originContentFamily=serial&amp;_wchp=dGLbVIV-zSkWb&amp;_md5=c10e3a23e2508b831ba71a94063f676d&amp;_pid=1-s2.0-S0167268111000692-main.pdf">http://pdn.sciencedirect.com/science?_ob=MiailImageURL&amp;_cid=271649&amp;_http://pdn.sciencedirect.com/science?_ob=MiailImageURL&amp;_cid=271649&amp;_user=4423&amp;_pii=S0167268111000692&amp;_check=y&amp;_origin=article&amp;_zone=toolbar&amp;_coverDate=2011--31&amp;_view=c&amp;_originContentFamily=serial&amp;_wchp=dGLbVIV-zSkWb&amp;_md5=c10e3a23e2508b831ba71a94063f676d&amp;_pid=1-s2.0-S0167268111000692-main.pdf</a></p> <p>2- Koenker R, Hallock KF. Quantile Regression: An Introduction. <i>Journal of Economic Perspectives</i>. 2001, Vol 15, No. 4, pp.143-156.  <a href="http://www.econ.uiuc.edu/~roger/research/intro/rq3.pdf">http://www.econ.uiuc.edu/~roger/research/intro/rq3.pdf</a></p> <p>3- Buchinsky M. Recent Advances in Quantile Regression Models: A Practical Guideline for Empirical Research. <i>The Journal of Human Resources</i>, Winter 1998, 33(1): 88-126.  <a href="http://www.jstor.org/stable/pdfplus/146316.pdf?acceptTC=true">http://www.jstor.org/stable/pdfplus/146316.pdf?acceptTC=true</a></p> <p>4- Abrevaya J. The Effects of Demographics and Maternal Behavior on the Distribution of Birth Outcomes. 2001, Vol. 26, pp.247-257.  <a href="http://link.springer.com/article/10.1007/s001810000052">http://link.springer.com/article/10.1007/s001810000052</a></p> <p>5- Angrist, J.D. &amp; Pischke, J-S. Mostly Harmless Econometrics: An Empiricist's Companion. Princeton, NJ: Princeton University Press, 2009. Chapter 7.</p>
<p>4-11</p> <p>Transformations and Retransformations</p>	<p>1- Manning, W. "The Logged Dependent Variable, Heteroskedasticity, and the Retransformation Problem." <i>Journal of Health Economics</i>, 1998; 17(3): 283-295.  <a href="http://www.sciencedirect.com/science/article/pii/S0167629698000253">http://www.sciencedirect.com/science/article/pii/S0167629698000253</a>  <a href="http://www.sciencedirect.com/science/article/pii/S0167629698000253">http://www.sciencedirect.com/science/article/pii/S0167629698000253</a></p> <p>2- Duan, N. "Smearing Estimate: A Nonparametric Retransformation Method." <i>Journal of the American Statistical Association</i>, 1983; 78(383): 605-610.  <a href="http://www.jstor.org/stable/pdfplus/2288126.pdf?acceptTC=true">http://www.jstor.org/stable/pdfplus/2288126.pdf?acceptTC=true</a></p> <p>3- Ai, C. and E. Norton. "Standard Errors for the Retransformation Problem with Heteroskedasticity." <i>Journal of Health Economics</i>, 2000; 19(5): 697-718.  <a href="http://www.sciencedirect.com/science/article/pii/S0167629600000461">http://www.sciencedirect.com/science/article/pii/S0167629600000461</a></p> <p>4- Mullahy, J. "Much Ado about Two: Reconsidering Retransformation and the Two-Part Model in Health Econometrics." <i>Journal of Health Economics</i>, 1998; 17(3): 247-281.  <a href="http://www.sciencedirect.com/science/article/pii/S0167629698000307">http://www.sciencedirect.com/science/article/pii/S0167629698000307</a></p>

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<p>4-13</p> <p>Two-Part Models Transformations and Retransformations</p>	<p>1- Duan, N., W. Manning, C. Morris, J. Newhouse. "A Comparison of Alternative Models for the Demand for Medical Care." <i>Journal of Business and Economic Statistics</i>, 1983; 1(2): 115-126  <a href="http://www.jstor.org/stable/pdfplus/1391852.pdf">http://www.jstor.org/stable/pdfplus/1391852.pdf</a></p> <p>2- Duan, N. "Smearing Estimate: A Nonparametric Retransformation Method." <i>Journal of the American Statistical Association</i>, 1983; 78(383): 605-610.  <a href="http://www.jstor.org/stable/pdfplus/2288126.pdf?acceptTC=true">http://www.jstor.org/stable/pdfplus/2288126.pdf?acceptTC=true</a></p> <p>3- Manning WG, Mullahy J. "Estimating Log Models: To Transform or Not to Transform?" <i>Journal of Health Economics</i> 2001; 20(4): 461-494.  <a href="http://www.sciencedirect.com/science/article/pii/S0167629601000868">http://www.sciencedirect.com/science/article/pii/S0167629601000868</a></p> <p>4- Manning, W. "The Logged Dependent Variable, Heteroskedasticity, and the Retransformation Problem." <i>Journal of Health Economics</i>, 1998; 17(3): 283-295.  <a href="http://www.sciencedirect.com/science/article/pii/S0167629698000253">http://www.sciencedirect.com/science/article/pii/S0167629698000253</a></p> <p>5- Mullahy, J. "Much Ado about Two: Reconsidering Retransformation and the Two-Part Model in Health Econometrics." <i>Journal of Health Economics</i>, 1998; 17(3): 247-281.  <a href="http://www.sciencedirect.com/science/article/pii/S0167629698000307">http://www.sciencedirect.com/science/article/pii/S0167629698000307</a></p>
<p>4-18</p> <p>Generalized Linear Models (GLM) and Count Data Models: Review and HSR Applications</p>	<p><u>GLM Readings</u></p> <p>1- Buntin MB, Zaslavsky AM. Too much ado about two-part models and transformation? Comparing methods of modeling Medicare expenditures. <i>Journal of Health Economics</i>. 2004 May; 23(3): 525-42.  <a href="http://www.sciencedirect.com/science/article/pii/S0167629604000220">http://www.sciencedirect.com/science/article/pii/S0167629604000220</a>  <a href="http://www.sciencedirect.com/science/article/pii/S0167629604000220">http://www.sciencedirect.com/science/article/pii/S0167629604000220</a></p> <p>Rabe-Hesketh, Sophia, Everitt Brian. <i>Handbook of Statistical Analyses Using Stata</i>, 4<sup>th</sup> edition. Taylor &amp; Francis Group, 2007. Chapter 7.</p> <p><u>Count Data Model Readings</u></p> <p>Freese J. &amp; Long J.S., <i>Regression Models for Categorical Dependent Variables Using Stata</i>, 2<sup>nd</sup> Edition, College Station, TX: Stata Press, 2006. Chapter 8.</p> <p>2- Hidayat B, Pokhrel S. The Selection of an Appropriate Count Data Model for Modelling Health Insurance and Health Care Demand: Case of Indonesia. <i>International Journal of Environmental Research and Public Health</i>. 2010; (7): 9-17.  <a href="http://www.mdpi.com/1660-4601/7/1/9/pdf">http://www.mdpi.com/1660-4601/7/1/9/pdf</a></p> <p>If you are considering multilevel count models: Rabe-Hesketh <i>Multilevel &amp; Longitudinal Modeling Using Stata</i>, 3<sup>rd</sup> edition. STATA 2012. Chapter 13.</p> <p>Hilbe, Joseph. <i>Negative Binomial Regression</i>, 2<sup>nd</sup> edition. Cambridge U. Press, 2007/2008: Chapters 1-4: overview of count models; Chapter 9 compares NB vs. Poisson; Chapter 11 covers ZINB; Chapter 13.2.1 and 13.2.2, on endogeneity and 2SLS approach; Chapter 14 on count panel models (best to read after random intercept and random slope lectures).</p> <p>3- Kenkel, D. &amp; Terza, J. (2001). "The Effect of Physician Advice on Alcohol Consumption: Count Regression with an Endogeneous Treatment Effect." <i>Journal of Applied Econometrics</i>, 16, 165-184. (An example of count model with instrumental variables.)  <a href="http://www.jstor.org/stable/pdfplus/2678515.pdf">http://www.jstor.org/stable/pdfplus/2678515.pdf</a></p>



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<p>4-20</p> <p>Generalized Estimating Equations</p>	<p>1-Killip S, Mahfoud Z, Pearce K. What is an intracluster correlation coefficient? Crucial concepts for primary care researchers. <i>Annals of Family Medicine</i>. 2004 May-Jun; 2(3): 204-8. <a href="http://www.annfammed.org/content/2/3/204.full.pdf+html">http://www.annfammed.org/content/2/3/204.full.pdf+html</a></p> <p>2-Ghisletta P, Spini D. An introduction to generalized estimating equations and an application to assess selectivity effects in a longitudinal study on very old individuals. <i>Journal of Behavioral and Educational Statistics</i>. 2004; 29(4): 421. <a href="http://www.jstor.org/stable/pdfplus/3701330.pdf">http://www.jstor.org/stable/pdfplus/3701330.pdf</a></p> <p>3-Liang KY, Zeger SL. Regression analysis for correlated data. <i>Annual Review of Public Health</i>. 1993; 14: 43-68. <a href="http://www.annualreviews.org/doi/pdf/10.1146/annurev.pu.14.050193.000355">http://www.annualreviews.org/doi/pdf/10.1146/annurev.pu.14.050193.000355</a></p>
<p>4-25</p> <p>Fixed Effects</p>	<p>1-Ellis R, McGuire T. Hospital response to prospective payment: Moral hazard, selection and practice-style effects. <i>Journal of Health Economics</i>, 1996. (15) 257-277. <a href="http://www.sciencedirect.com/science/article/pii/0167629696000021">http://www.sciencedirect.com/science/article/pii/0167629696000021</a></p> <p>2-Grazier K, Pollack H. Translating Behavioral Health Services Research into Benefits Policy. <i>Medical Care Research and Review</i>, Vol. 57 Supplement 2, (2000); 53-71. <a href="http://journals.sagepub.com/doi/pdf/10.1177/1077558700057002S04">http://journals.sagepub.com/doi/pdf/10.1177/1077558700057002S04</a></p> <p>3-Lichter DT, McLaughlin DK, Ribar DC. State abortion policy, geographic access to abortion providers and changing family formation. <i>Fam Plan Perspect</i> 1998; 30(6): 281-7. <a href="http://www.jstor.org/stable/pdfplus/2991504.pdf">http://www.jstor.org/stable/pdfplus/2991504.pdf</a></p>
<p>4-27</p> <p>Random Effects</p>	<p>Rabe-Hesketh Multilevel &amp; Longitudinal Modeling Using Stata, 3<sup>rd</sup> edition. STATA 2012. Chapters 2.4, 3.7.5, 3.8, 3.10, 3.11</p> <p>1- Amy J. Schulz, Clarence C. Gravlee, David R. Williams, Barbara A. Israel, Graciela Mentz, and Zachary Rowe. Discrimination, Symptoms of Depression, and Self-Rated Health Among African American Women in Detroit: Results from a Longitudinal Analysis. <i>American Journal of Public Health</i> July, 2006; 96(7): 1265-1270. <a href="http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1483853/pdf/0961265.pdf">http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1483853/pdf/0961265.pdf</a></p> <p>2- Baxter-Jones AD, Cardy AH, Helms PJ, Phillips DO, Smith WC. Influence of socioeconomic conditions on growth in infancy: the 1921 Aberdeen birth cohort. <i>Arch Dis Child</i> 1999; 81(1): 5-9 <a href="http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1717981/pdf/v081p00005.pdf">http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1717981/pdf/v081p00005.pdf</a></p>

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<p style="text-align: center;">5-2 and 5-4</p> <p>Multilevel Models (Random Intercept and Random Coefficient Models)</p>	<p>For Random Intercept: Rabe-Hesketh Multilevel &amp; Longitudinal Modeling Using Stata, 3<sup>rd</sup> edition. STATA 2012. Chapters 2.3 – 2.7.2, 2.9.1, 2.10, 3.1 – 3.11 (skip glamm)</p> <p>For Random Coefficient: Rabe-Hesketh Multilevel &amp; Longitudinal Modeling Using Stata, 3<sup>rd</sup> ed. STATA 2012. Chapters 4.1 – 4.11 (skip glamm and empirical bayes sections)</p> <p>For Non-Linear Multilevel Models (Random Intercept and Random Coefficient Models): Rabe-Hesketh Multilevel &amp; Longitudinal Modeling Using Stata, 3<sup>rd</sup> edition. STATA 2012. Chapters 10.6 – 10.14, 11.6 – 11.13, 13.7 – 13.16, 15.9 – 15.12</p> <ol style="list-style-type: none"> <li>1. Sullivan LM, Dukes KA, Losina E. “An Introduction to Hierarchical Linear Modeling.” <i>Statistics in Medicine</i> 1999; 18(7): 855-888. <a href="http://onlinelibrary.wiley.com/doi/10.1002/(SICI)1097-0258(19990415)18:7%3C855::AID-SIM117%3E3.0.CO;2-7/epdf">http://onlinelibrary.wiley.com/doi/10.1002/(SICI)1097-0258(19990415)18:7%3C855::AID-SIM117%3E3.0.CO;2-7/epdf</a></li> <li>2. Diez Roux AV. “A Glossary for Multilevel Analysis.” <i>Journal of Epidemiology and Community Health</i> 2002; 56: 588-594. <a href="http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1732212/pdf/v056p00588.pdf">http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1732212/pdf/v056p00588.pdf</a></li> <li>3. Rice N, Jones A. “Multilevel Models and Health Economics.” <i>Health Economics</i> 1997; 6(6): 561-575. <a href="http://onlinelibrary.wiley.com/doi/10.1002/(SICI)1099-1050(199711)6:6%3C561::AID-HEC288%3E3.0.CO;2-X/abstract">http://onlinelibrary.wiley.com/doi/10.1002/(SICI)1099-1050(199711)6:6%3C561::AID-HEC288%3E3.0.CO;2-X/abstract</a> Subramanian SV, Jones K, Duncan C. “Multilevel methods for public health research.” In Kawachi I and Berkman L, editors. <i>Neighbors and Health</i>. 2003. New York: Oxford University Press, 65-111. Posted on CCLE</li> </ol>
<p style="text-align: center;">5-9</p> <p>Sample Selection Models</p>	<ol style="list-style-type: none"> <li>1. Heckman, J. Sample Selection Bias as a Specification Error. <i>Econometrica</i> 1979. 47(1): 153-161. <a href="http://www.jstor.org/stable/pdfplus/1912352.pdf">http://www.jstor.org/stable/pdfplus/1912352.pdf</a></li> <li>2. Grasdal A. “The Performance of Sample Selection Estimators to Control for Attrition Bias.” <i>Health Economics</i> 2001; 10(5): 385-398. <a href="http://onlinelibrary.wiley.com/doi/10.1002/hec.628/pdf">http://onlinelibrary.wiley.com/doi/10.1002/hec.628/pdf</a></li> <li>3. Benson K, Hartz, AJ. A Comparison of Observational Studies and Randomized, Controlled Trials. <i>New England Journal of Medicine</i> 2000; 342: 2878-1886. <a href="http://www.nejm.org/doi/pdf/10.1056/NEJM200006223422506">http://www.nejm.org/doi/pdf/10.1056/NEJM200006223422506</a></li> </ol>
<p style="text-align: center;">5-16</p> <p>Treatment Effects</p>	<ol style="list-style-type: none"> <li>1- Feng W, Zhou W, Butler JS, Booth BM, French MT. “The Impact of Problem Drinking on Employment.” <i>Health Economics</i> 2001; 10(6): 509-521. <a href="http://onlinelibrary.wiley.com/doi/10.1002/hec.611/pdf">http://onlinelibrary.wiley.com/doi/10.1002/hec.611/pdf</a></li> <li>2- Crown W., R. Obenchain, L. Englehart, T. Lair, D. Buesching and T. Croghan. “The Application of Sample Selection Models to Outcomes Research: The Case of Evaluating the Effect of Antidepressant Therapy on Resource Utilization.” <i>Statistics in Medicine</i> 1998; 17(17): 1943-1958. <a href="http://onlinelibrary.wiley.com/doi/10.1002/%28SICI%291097-0258%2819980915%2917:17%3C1943::AID-SIM885%3E3.0.CO;2-0/pdf">http://onlinelibrary.wiley.com/doi/10.1002/%28SICI%291097-0258%2819980915%2917:17%3C1943::AID-SIM885%3E3.0.CO;2-0/pdf</a></li> </ol>

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<p>5-18 Propensity Scores</p>	<p>1- Becker SO and Ichino A. "Estimation of Average Treatment Effects Based on Propensity Scores." <i>The Stata Journal</i> 2002; 2(4): 358-377. <a href="http://www.stata-journal.com/sjpdf.html?articlenum=st0026">http://www.stata-journal.com/sjpdf.html?articlenum=st0026</a></p> <p>2- Black DA, Smith JA. "How Robust is the Evidence on the Effects of College Quality? Evidence from Matching." <i>Journal of Econometrics</i> 2004; 121(1-2): 99-124. <a href="http://faculty.smu.edu/Millimet/classes/eco7377/papers/black%20smith.pdf">http://faculty.smu.edu/Millimet/classes/eco7377/papers/black%20smith.pdf</a></p> <p>3- Lightfoot M, Rotheram-Borus MJ, Comulada WS, Reddy V, &amp; Duan N (2010). Efficacy of brief interventions in clinical care settings for persons living with HIV. <i>JAIDS</i>. 53(3): 348-56 (Posted on CCLE).</p>
<p>5-23 Instrumental Variables</p>	<p>1- Terza J., Bradford WD, &amp; Dismuke CE. (2008). "The Use of Linear Instrumental Variables Methods in Health Services Research and Health Economics: A Cautionary Note." <i>Health Services Research</i>, 43, 1102-1120. <a href="http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2442231/pdf/hesr0043-1102.pdf">http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2442231/pdf/hesr0043-1102.pdf</a></p> <p>2- Harris, K and D. Remler. "Who is the Marginal Patient? Understanding Instrumental Variables Estimates of Treatment Effects." <i>Health Services Research</i>, 1998; 33(5): 1337-1360. <a href="http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1070319/pdf/hsresearch00030-0163.pdf">http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1070319/pdf/hsresearch00030-0163.pdf</a></p> <p>3- Stukel TA, Fisher ES, Wennberg DE, Alter DA, Gottlieb DJ, Vermeulen MJ. "Analysis of Observational Studies in the Presence of Treatment Selection Bias: Effects of Invasive Cardiac Management on AMI Survival Using Propensity Score and Instrumental Variable Methods." <i>Journal of the American Medical Association</i> 2007; 297(3): 278-285. <a href="http://jama.jamanetwork.com/data/Journals/JAMA/5092/joc60185_278_285.pdf">http://jama.jamanetwork.com/data/Journals/JAMA/5092/joc60185_278_285.pdf</a></p>
<p>5-25 Non-linear Instrumental Variables</p>	<p>1- Bhattacharya J, Goldman D, McCaffrey D. "Estimating Probit Models with Self-Selected Treatments." <i>Statistics in Medicine</i> 2006; 25: 389-413. <a href="http://onlinelibrary.wiley.com/doi/10.1002/sim.2226/pdf">http://onlinelibrary.wiley.com/doi/10.1002/sim.2226/pdf</a></p> <p>2- Hadley J, Polsky D, Mandelblatt JS, Mitchell JM, Weeks JC, Wang Q, Hwang Y, and the OPTIONS Research Team. "An Exploratory Instrumental Variable Analysis of the Outcomes of Localized Breast Cancer Treatments in a Medicare Population." <i>Health Economics</i> 2003; 12(3): 171-186. <a href="http://web.ntpu.edu.tw/~hwangyt/publications/Anexploratoryinstrumentalvariableanalysis.pdf">http://web.ntpu.edu.tw/~hwangyt/publications/Anexploratoryinstrumentalvariableanalysis.pdf</a></p> <p>3- Mullahy J. (1997). "Instrumental-Variable Estimation of Count Data Models: Applications to Models of Cigarette Smoking Behavior." <i>Review of Economics and Statistics</i>, 79, 586-593. <a href="http://www.jstor.org/stable/pdfplus/2951410.pdf?acceptTC=true">http://www.jstor.org/stable/pdfplus/2951410.pdf?acceptTC=true</a></p>