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# L&S 39G: Health, Human Behavior, and Data
**Fall 2015**

| CCN | Meeting time | Location | Final exam |
|-----|--------------|----------|------------|
| 52251 | Tuesdays 11am–1pm | Cory 105 | TBA |

*Sections below:*
Course Overview | Learning Objectives | Prerequisites | Math | Academic Integrity
Required Texts | Course Requirements | i>clickers | Class Participation | Term Projects
Web Sites | Students with Disabilities | Student Accommodations

**COURSE OVERVIEW.** Humans, especially we older ones, are obsessed with good health and longevity, and we are willing to pay for it. As a nation, Americans spend 17% of their incomes on health care, and that share has generally been rising above and beyond what one would expect based on aging of the population alone. In an era when the longevity gap between rich and poor may be widening, we are keenly interested in understanding and preventing health inequalities by improving the health of the disadvantaged. But what external elements and human behaviors produce good health? What kinds of influences reduce health? Is there a difference between activities that we observe healthy people engaging in and activities that actually improve health? The gold standard for disentangling cause and effect in medicine is the randomized controlled trial. But we suspect that many social and behavioral phenomena are important for population health but are never administered in specific dosages to randomly selected treatment and control groups. In this first year connector course, we will examine and discuss measures of human health and longevity alongside arrays of measurable influences on health, identifying the key questions traditionally addressed in health sciences and exploring the current frontier. We will develop broad knowledge of the metrics, methods, and challenges, and we will apply them toward understanding of current issues in health policy.

**LEARNING OBJECTIVES.** In L&S 39G, we will discuss measures and topics in health economics and policy, and we will develop some basic analytical techniques that are useful in understanding key questions. As part of Berkeley's Undergraduate Student Learning Initiative (USLI), the Economics Department has developed learning goals for the Economics major:
https://www.econ.berkeley.edu/undergrad/home/learning-goals
Although not an economics course, L&S 39G seeks to achieve the following learning goals:
CT1. Apply economic analysis to evaluate everyday problems
QT1. Understand how to use empirical evidence to evaluate an economic argument
QT2. Interpret statistical results
QT4. Obtain and/or collect relevant data using specific qualitative and/or quantitative research methods
CS1. Communicate effectively in written, spoken, and graphical form about specific economic issues
CS2. Formulate a well-organized written argument supported by evidence
LL2. Know how to locate and use primary data sources

**PREREQUISITES.** None. L&S 39G, like its parent class DS 8, is a first-year course and has no prerequisites other than being enrolled as a first-year student at UC Berkeley.

**MATH.** Students should have a basic knowledge of algebra for quantitative courses at UC Berkeley, and a background in calculus or statistics is helpful. We anticipate that DS 8 will prepare students sufficiently for the breadth of analytical and numerical work ultimately required for DS 8 and for L&S 39G.

**ACADEMIC INTEGRITY.** The student community at UC Berkeley has adopted the following Honor Code: "As a member of the UC Berkeley community, I act with honesty, integrity, and respect for others." The hope and expectation is that students will adhere to this code. Breaches of this code will lead to penalties up to and including an F in the class and a report to the Office of Student Conduct. Students are responsible for being up to date on the academic integrity policies outlined at http://sa.berkeley.edu/conduct/integrity

**REQUIRED TEXTS.** There is no textbook for the course. We will instead draw material from an assortment of readings, which are listed at the end of this syllabus, and from class notes provided via the class bCourses website (see below).

**COURSE REQUIREMENTS.** L&S 39G is a two-unit introductory course in data analysis with a focus on health economics and policy. Much of the grade derives from attendance and in-class participation via the i>clickers (see below), and the rest from a midterm draft of the term project (see below) and the final version of the project.

The overall course grade will be determined in the following way:
- In-class **participation** (i>clickers and reading reports):      40%
- Midterm **draft** project:                                        20%
- **Final** version of project:                                     40%

# i>clickers.  You must obtain an i>clicker for use in this course. i>clickers can be purchased at the ASUC store (recently, they were $39.95 new, $29.95 used; available also as rentals, $16.95) or elsewhere. You can buy i>clickers off the Internet, for example at Amazon. You can also buy one from a friend. There are several versions of i>clickers out there, and you can use any of them, as long as they are i>clickers. The version won't make a difference in our class. But please note that you *cannot use the smartphone apps* instead of buying an i>clicker. They do not work well.

You will need to REGISTER your i>clicker after you have obtained one. To register, navigate to
http://iclicker.com/registration
and enter your name, your Student ID, and the 8-character Remote ID on the back of your i>clicker. The Remote ID only uses letters A-F and number 0-9, so there is no letter "O," only the number zero. If you make a mistake, just register your i>clicker again. Also, if you have purchased a used i>clicker, this same process will re-register the i>clicker to you; you do not have to do anything differently.

Your privacy is important to me, and I am committed to safeguarding it. Your Student ID is not publicly linked to any of your private information, and iclicker.com only keeps it linked to your

name and your i>clicker's Remote ID. The information you transmit with your answers is stored only on my laptop, and I will only use it to present aggregated tabulations that protects your privacy. I will only use the data for the purposes of instruction, and I will dispose of all the individual-level data once the term is concluded. If you have any concerns about privacy safeguards, please see me.

**CLASS PARTICIPATION.** To earn full participation credit, students are required to:
1. **Attend class**. You can miss one class when unexcused and still receive full credit
2. Use their **i>clickers** to answer multiple-choice questions in class. There are no right or wrong answers; students receive full credit just for responding
3. Periodically **report on assigned readings**. Past our first class meeting, there are 13 class meetings with readings, which we will divide up during the first class

**TERM PROJECTS.** Students are required to complete an **empirical term paper** on a topic of their choosing. The goal of the class paper is for you to analyze primary data and shed light on a theoretical question. Data from a published source in which they have already been analyzed are off limits without special exemption granted from the instructor.

In their final versions, papers should be no more than five printed double-spaced pages of text, plus any references and any figures and tables you may want to add, up to a maximum of 7 figures and tables combined. A good paper includes:
a. an introduction outlining the question you are trying to answer and why it is interesting
b. an explanation of which data you are using and how you analyze the data
c. a presentation of your findings
d. a conclusion explaining what light your findings shed on your original question
The conclusion can also recommend a better way to answer the question. For example, you could discuss another real or hypothetical data source that you didn't analyze.

The goal of the paper is for you to confront theory with real data. You do not need to do extensive reading on your subject, nor do you need to use any fancy statistical techniques to do your analysis. Simple is fine. What is important is that your paper be clear, original, and that you explain how your analysis addresses the question you are interested in.

**Deadlines.** At midterm, students must submit one-page draft proposals of their term paper projects, which must include at least some preliminary analysis. Final projects are due at the end of the term. The course calendar at the end of this syllabus contains the due dates.

**Data and Topics.** Students may choose any data and topics that they wish given prior clearance with Prof. Edwards. During the term, we will be collecting new **physical activity data** on ourselves via smartphone apps, solely for instructional purposes and only voluntarily. Students may analyze these new data for their term papers.

For measuring physical activity, student volunteers will use the **Moves app**, provided free of charge by a company owned by Facebook and available for iOS and Android. We will discuss in class how and when to use Moves, and how to submit deidentified information to Prof. Edwards,

who will construct a database of anonymized data that will be available to all students during the term solely for instructional purposes and will be destroyed immediately following the term.

We will discuss issues associated with data privacy in class, using the Moves app as a case study. Participation in data collection is strictly **voluntary**. Students who choose not to participate may instead write a one-paragraph summary of the weekly reading(s) and submit them for full participation credit.

**Collaboration.** By default, students must devise and write up their own term projects. Students who desire to collaborate must make their cases to Prof. Edwards. Collaborative projects, if approved, will be held to a higher standard appropriate for joint work.

**WEB SITES.** We will be using bCourses to distribute course materials, submit assignments, and check grades:

http://bCourses.berkeley.edu

**Optional Q&A Forum.** Piazza is a free online forum for students in a class to interact with each other and with GSIs and professors outside of the classroom environment. Per its founder and CEO, Piazza was started so that every student can have the opportunity to learn from classmates outside of class. To access the class Piazza site, navigate to

http://piazza.com

and sign up to get started. You will need to have a berkeley.edu or ucb.edu email address.

**STUDENTS WITH DISABILITIES** and other special needs will be fully accommodated. UC Berkeley's Disabled Students Program (DSP) is the group to approach initially for such needs:

http://www.dsp.berkeley.edu

Please email me or see me before or after class to address these needs as they may regard in-class participation or related issues.

**Accommodations.** Please carefully read the class schedule. If you need to request an alternative time for an exam or other accommodations pertaining to your religious creed, your extracurricular schedule, illnesses, disabilities, pregnancy or parenting, please submit a request directly to Prof. Edwards by the end of the second week of the semester or when the condition develops.  In general, please notify Prof. Edwards **in writing** (email is fine) about these issues and please recommend a solution.

# Reading List

**Week 1: August 26-28**

No meeting, no readings

**Week 2: September 1          Background and Motivation**

First meeting, no readings

**Week 3: September 8          Health metrics, social indicators, inequalities, and policy**

Bhattacharya, Jay, Timothy Hyde, and Peter Tu (2013) *Health Economics*. New York: Palgrave.
    Chapters 1 and 2

**Week 4: September 15          Mortality rates and life expectancy**

Cutler, David, Angus Deaton, and Adriana Lleras-Muney (2006) "The Determinants of
    Mortality," *Journal of Economic Perspectives* 20(3): 97–120.

Wachter, Kenneth W. (2014) *Essential Demographic Methods*. Cambridge: Harvard University
    Press. Chapters 2, 3, 7.

**Week 5: September 22          How to think like a health economist – 1**

Bhattacharya, Jay, Timothy Hyde, and Peter Tu (2013) *Health Economics*, Chapter 3

**Week 6: September 29          How to think like a health economist – 2**

Bhattacharya, Jay, Timothy Hyde, and Peter Tu (2013) *Health Economics*, Chapter 4

**Week 7: October 6          Randomized controlled trials – 1**

Sutton, Graham (2003) "Putrid gums and 'Dead Men's Cloaths': James Lind aboard the
    Salisbury," J R Soc Med 2003;96:605–608.

Bartholomew, M. (2002) "James Lind's Treatise of the Scurvy," *Postgraduate Medical Journal*
    78: 695–696.

**Week 8: October 13          Randomized controlled trials – 2**

Aron-Dine, Aviva, Liran Einav, and Amy Finkelstein. 2013. "The RAND Health Insurance
    Experiment, Three Decades Later." *Journal of Economic Perspectives*, 27(1): 197–222.

**Week 9: October 20          Observational studies**

Oster, Emily (2014) *Expecting Better: Why the Conventional Pregnancy Wisdom Is Wrong—and What You Really Need to Know.* New York: Penguin. Chapter 4, "The Vices: Caffeine, Alcohol, and Tobacco"

**Week 10: October 27          Strong exogeneity: Weather and wine**

Ashenfelter, Orley, David Ashmore, and Robert Lalonde (1995) "Bordeaux Wine Vintage Quality and the Weather," *Chance* 8(4): 7–14.

Ziliak, Stephen T. (2008) "Retrospectives: Guinnessometrics: The Economic Foundation of 'Student's' t," *Journal of Economic Perspectives* 22(4): 199–216.

**Week 11: November 3          More strong exogeneity**

Ruhm, Christopher J. 2000. "Are Recessions Good for Your Health?" *Quarterly Journal of Economics* 115(2): 617–50.

**Week 12: November 10          Natural experiments and instrumental variables**

Small, Dylan S. and Paul R. Rosenbaum (2008) "War and Wages: The Strength of Instrumental Variables and Their Sensitivity to Unobserved Biases," *Journal of the American Statistical Association* 103(483): 924–933.

**Week 13: November 17          Case studies 1**

Buckles, Kasey S. and Daniel M. Hungerman (2013) "Season of Birth and Later Outcomes: Old Questions, New Answers," *Review of Economics and Statistics* 95(3): 711-724.

**Week 14: November 24          Case studies 2**

Carpenter, Christopher, and Carlos Dobkin (2011) "The Minimum Legal Drinking Age and Public Health," *Journal of Economic Perspectives*, 25(2): 133-56.

**Week 15: December 1          Perception and behavior**

Edwards, Ryan D. and Carl Mason (2014) "Spinning the wheels and rolling the dice: Life-cycle risks and benefits of bicycle commuting in the U.S.," *Preventive Medicine* 64: 8–13.

|  | | Topics & events in L&S 39G | Topics & events in DS 8 | |
|---|---|---|---|---|
| Week 1 | | *No meeting* | Why data science? Experiments & causality | |
| Week 2 | 1-Sep | Background and motivation | Programming basics, tables, visualizing, histograms | |
| Week 3 | 8-Sep | Health metrics, social indicators, inequalities, and policy | Comparing distributions, applying functions to tables | *Labor Day on Mon* |
| Week 4 | 15-Sep | Mortality rates and life expectancy | Random sampling, graphs | |
| Week 5 | 22-Sep | How to think like a health economist 1 | Iteration, comparing distributions, inference | |
| Week 6 | 29-Sep | How to think like a health economist 2 | Hypothesis testing, distributions, moments | |
| Week 7 | 6-Oct | Randomized controlled trials 1 | Standard deviation, confidence intervals, bootstrap | |
| Week 8 | 13-Oct | Randomized controlled trials 2 **MIDTERM DRAFT PROJECT DUE IN CLASS** | Bootstrapping other parameters, study design & sample size | |
| Week 9 | 20-Oct | Observational studies | Regression & graphical analysis, transformations | *Midterm exam in DS8* |
| Week 10 | 27-Oct | Strong exogeneity: Weather | Prediction, causal inference | |
| Week 11 | 3-Nov | More strong exogeneity | Nearest-neighbor regression, prediction | |
| Week 12 | 10-Nov | Natural experiments and instrumental variables | Randomness | *Veterans Day on Wed* |
| Week 13 | 17-Nov | Case studies 1 | Goodness of fit | |
| Week 14 | 24-Nov | Case studies 2 **FINAL DRAFT PROJECT DUE IN CLASS** | Simulation, conditional probability | *Thanksgiving on Thu/Fri* |
| Week 15 | 1-Dec | Perception and behavior | Bayes' Theorem, decision making | |