

**Empirical and Mathematical Reasoning 20:
The Business and Politics of Health**

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Health care is a major economic industry and a central concern of the body politic. At the same time, it is an intensely personal matter, one which affects people throughout their life. This confluence of the personal, the economic, and the political creates tensions for which we would like to have policy solutions. In this course we will consider three health policy questions for which solutions are urgently needed:

- What steps should be taken to end the scourge of HIV/AIDS?
- How should the United States reform its health care system?
- How should prescription drugs be produced and sold?

Each of these questions is, on its face, *technological*. We should strive for a vaccine for HIV, come up with plans to cover uninsured people, and make it easier to develop cheap, effective medications. In each case, we will see that these technological solutions are incomplete. The reason is that these problems not just technological, they are *social* and *political* as well. Thus, addressing them will require consideration of a range of economic, scientific, and moral questions. We will consider these various dimensions in this course.

The course is divided into three units, focused on these three policy areas. At the end of each unit, students will be asked to come up with a solution to the problem being considered. The solutions will be discussed in section, and some will be presented in class.

In addition to learning about health, there is another goal for the course. Throughout our lives, we are forced to make decisions with imperfect information. What is the best way to reduce violence, address issues of chronic poverty, or improve underperforming schools? This course will show you how social scientists address empirical questions such as these. We will discuss the types of data that are available, how those data are analyzed, and the confidence with which causal statements are made.

Note: This course, when taken for a letter grade, meets the General Education requirement for Empirical and Mathematical Reasoning *or* United States in the World, but not both.

Prerequisites. None

Instructor

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Meetings by appointment, dingwell@fas.harvard.edu, 496-9126
Feel free to e-mail me as that is often quicker than scheduling a meeting.

Section Leaders

Vidit Munshi	vmunshi@g.harvard.edu
Jamie Cohen	jamiecohen@g.harvard.edu
Julia Dennett	jdennett@g.harvard.edu
Adrienne Sabety	asabety@g.harvard.edu

Meeting Time and Location. The course will meet Tuesday and Thursday, 10:00-11:30, in Sever 113. Class will start promptly at 10:07. Students who are habitually late or non-attendees will receive lower marks on participation. Sections will meet once a week for 1 hour. The times and dates will be announced.

Course web site. <https://canvas.harvard.edu/courses/31842>. Lecture notes will be posted before each class. I will not make physical copies of handouts.

Laptop Policy. No laptops or other electronic devices are permitted during class. Why? See [here](#).

Academic Adjustments/Accommodations. If you need academic adjustments or accommodations, you should present your letter from the Accessible Education Office (AEO, <http://www.fas.harvard.edu/~aeo/>) and speak with Professor Cutler or Vidit Munshi by the end of the second week of the term. Failure to do so may result in our inability to respond in a timely manner. All discussions will remain confidential, although AEO may be consulted to discuss appropriate implementation.

Collaboration. Discussion and the exchange of ideas are essential to doing academic work. For assignments in this course, you are permitted to consult with your classmates as you work on problem sets. However, after discussions with peers, make sure that you can work through the problem yourself and ensure that any answers you submit for evaluation are the result of your own efforts. In addition, you must cite any books, articles, websites, lectures, etc. that have helped you with your work using appropriate citation practices. Similarly, you must list the names of students with whom you have collaborated on problem sets.

Assignments. The class is divided into three units, covering the three topics noted above. In each unit, we will discuss substantive and methodological issues. The assignments will mirror this division. There will be one problem set in each unit, focused on the methodological issues that unit covers. In addition, students will complete an assignment at the end of each unit that involves coming up with an answer to the driving question of that unit. The units and assignments are as follows:

Unit	Methodological area	Unit question
HIV/AIDS	Epidemiology	Can we have a world without AIDS?
Health systems	Regression analysis; causality v. correlation	Write a memo to the Trump Administration on what to do about health care
Pharmaceuticals	Economics: Supply and demand	How do you position a pharmaceutical company for the next 20 years?

Grading. Grades will be based on a final project (either final exam or term paper; 30%), project analyses (40%), problem sets (20%), and lecture and section participation (10%). Final grades will be based on a curve, with approximately 1/3 A or A-.

Students can elect to take the final exam or write a term paper. Notify your TF about your choice by November 2. Term papers are due at 9:00 am on the day of the final exam. Late papers are marked down 1/3 grade per day (including weekends).

Problem sets will be available online one week before they are due. When appropriate, solutions will be posted after they are due. As a result, late problem sets will not be accepted.

If you have questions about timing of assignments, email Professor Cutler at dcutler@harvard.edu. If you have questions about the grading of an assignment, you should submit your question in writing to Vedit Munshi, vmunshi@g.harvard.edu.

Class Participation. I would like this class to have as much participation as is possible. I welcome questions, comments, or items of news interest. Section participation is also encouraged, and section attendance is mandatory.

Texts: There are no required texts. You are expected to read all of the supplementary material. All of the readings are linked. Please contact dingwell@fas.harvard.edu if you are unable to access any of the readings.

Course Calendar

August 31 A Tour of the World's Health

Unit 1: HIV/AIDS

September 5	The Epidemiology of HIV	
September 7	Economic Impact of HIV	
September 12	Modeling Epidemics	
September 14	Addressing HIV in Poor Countries	
September 19	The HIV Epidemic in the United States	Problem set 1 due
September 21	**No class – Jewish New Year	
September 26	HIV Successes	
September 28	HIV Failures	Analysis 1 due
October 3	Presentations and discussion	

Unit 2: The US Health Care System

October 5	Introduction to Health Systems	
October 10	Western Health Systems	
October 12	The Affordable Care Act	
October 17	Statistical Interlude I: Regression analysis	
October 19	Statistical Interlude II: Correlation v. causation	
October 24	Quality of Medical Care in America	Problem set 2 due
October 26	Cost Sharing	
October 31	Provider Incentives	
November 2	Social Determinants of Health	Analysis 2 due
November 7	Presentation and discussion	

Unit 3: Pharmaceuticals

November 9	The Pharmaceutical Market	
November 14	Demand and Supply: Pricing and Costs	
November 16	Regulation and Negotiation	
November 21	Drivers of Innovation	Problem set 3 due
November 23	**No Class – Thanksgiving	
November 28	Current initiatives aimed at Pharma	Analysis 3 due
November 30	Presentation and discussion	
December 1	Optional class get together	

Syllabus

The start of each day lists the *key points* I want to develop in class.

August 31 A tour of the world's health

Health and economic development are strongly related.
The importance of HIV

Bardhan, Pranab. "[The State of Health Services in China and India: A Larger Context](#)," *Health Affairs* 2008, 27(4): 933-936.
Cutler, David, Angus Deaton, and Adriana Lleras-Muney, "[The Determinants of Mortality](#)," *Journal of Economic Perspectives*, 2006, 20(3), 97-120 (September 10, 17, & 26).

<i>Unit 1: HIV/AIDS</i>

September 5 The Epidemiology of HIV

Sources of HIV transmission
Treatment and prevention
A cure for HIV?

Pre-class viewing:
[HIV & AIDS - signs, symptoms, transmission, causes & pathology](#) (you are not responsible for knowing all the science).

Readings
Avert, "[Women and Girls, HIV and AIDS](#)," July 27, 2017.
Choi, Daniella, "[Transactional Sex: Women, Poverty, and AIDS](#)," Center for Strategic and International Studies, August 11, 2011.
Fettig, Jade, Mahesh Swaminathan, Christopher S. Murrill, and Jonathan E. Kaplan, "[Global Epidemiology of HIV](#)," *Infect Dis Clin North Am.*, 2014, 28(3): 323–337.

September 7 Economic Impact of HIV

The economic impact of HIV on individuals, households and society.

The impact of HIV that will be felt over next generation due to creation of 10+ million orphans and vulnerable children (OVC)

Overall economic impact:

Beresford, Belinda, "[AIDS Takes and Economic and Social Toll](#)," *Africa Recovery*, June 2001, 19-23.

Stover, John, and Lori Bollinger, "[The Economic Impact of AIDS](#)," March 1999, the Policy Project.

World Health Organization, Commission on Macroeconomics and Health, "Channels of Influence from Disease to Economic Development," [Macroeconomics and Health: Investing in Health for Economic Development](#), 2001, p. 30-40

(If you want more detail): Dixon, Simon, Scott McDonald, and Jennifer Roberts. "[The Impact of HIV and AIDS on Africa's Economic Development](#)," *BMJ*, 2002, 324(7331): 232–234.

AIDS orphans

Unicef, [Africa's Orphaned and Vulnerable Generations: Children Affected by AIDS](#), 2006.

September 12 Modeling Epidemics

Basic epidemiology: incidence v. prevalence; life tables

Models of epidemics: how bad can it get?

From a contained to a widespread epidemic: the importance of sex workers

Pre-class viewing

Innocence for Sale, [Part 1](#), [Part 2](#), [Part 3](#).

Readings

Avert, "[Sex Workers, HIV and AIDS](#)," July 31, 2017.

Coggon, D, Geoffrey Rose, and David JP Barker, "[Chapter 2: Quantifying Disease in Populations](#)," in *Epidemiology for the Uninitiated*, 2017.

UNAIDS, "[What are Different Epidemiological Scenarios?](#)" 2017.

September 14 Addressing HIV in Poor Countries

A history of HIV goals

International financing for HIV

Critiques

- *Are we crowding out global health resources?*
- *Is aid effective?*

Setting targets

[Global HIV Targets](#), June 6 2017.

An agenda

Piot, Peter, et al., "[Defeating AIDS – Advancing Global Health](#)," *The Lancet*, 2015, 386: 171-218.

Critiques

Garrett, Laurie, "[The Challenge of Global Health](#)," *Foreign Affairs*, January/February 2007.

Kristof, Nicholas D., "[Can Aid Work?](#)" *New York Review of Books*, October 5, 2006.

September 19 The HIV Epidemic in the United States

The intersection between social movements and science

Socioeconomic gradient in HIV

Role of stigma in testing, prevention and treatment

You are strongly encouraged to watch:

[And the Band Played On](#) (Movie).

[How to Survive a Plague](#) (Documentary).

HIV and science:

Crimp, Douglas, "[Before Occupy: How AIDS Activists Seized Control of the FDA in 1988](#)," *The Atlantic*, December 6, 2011.

[World AIDS Day: how AIDS activists changed medical research](#), *The Guardian*, December 1, 2013.

The current epidemic:

Villarosa, Linda, "[America's Hidden HIV Epidemic](#)," *New York Times Magazine*, June 6, 2017.

September 21 **No Class – Jewish New Year

September 26 HIV Successes

Uganda: role of early action and vocal political response
Thailand: maternal-to-child transmission; the sex industry
Access to medications: innovation in pricing, generics, patent landscape

Uganda

Green, Edward C., Daniel T. Halperin, Vinand Nantulya, and Janice A. Hogle, "[Uganda's HIV Prevention Success: The Role of Sexual Behavior Change and the National Response](#)," *AIDS and Behavior*, 2006, 20(4), 335-346.
Genuis, SJ, and Genuis, SK, "[HIV/AIDS prevention in Uganda: why has it worked?](#)" *British Medical Journal, Postgraduate Medical Journal*, 2005, 81(960): 615-617.
Kron, Josh, "[In Uganda, an AIDS Success Story Comes Undone](#)," *New York Times*, August 2, 2012, A5.

Thailand

Rangsim Lolekha, Rangsim, et al., "[Elimination of Mother-to-Child Transmission of HIV – Thailand](#)," *Morbidity and Mortality Weekly Report*, June 10, 2016, 65(22): 562-566.
Rojanapithayakorn, Wiwat, "[The 100% Condom Use Programme in Asia](#)," *Reproductive Health Matters*, 2006, 14(28): 41-52.

Access to medications

Dugger, Celia W., "[Clinton Foundation Announces A Bargain on Generic AIDS Drugs](#)," *New York Times*, May 9, 2007, p. A9.
Nunn, Amy, Elize Da Fonseca, and Sofia Gruskin, "[Changing global essential medicines norms to improve access to AIDS treatment: Lessons from Brazil](#)," *Global Public Health*, 2009, 4(2): 131-149.

September 28 HIV Failures

Failure of governance and effects of this failure on the populations concerned
HIV-Tuberculosis Coinfection
Reinforcement of socioeconomic inequalities of health, production of new pockets of poverty, increase in maternal and child mortality

South Africa

Cohen, Jon, "[South Africa's Bid to End AIDS](#)," *Science*, June 29, 2016,
Specter, Michael, "[The Denialists](#)," *The New Yorker*, March 12, 2007.

HIV-TB Co-infection, and Multi-drug resistant TB

Avert, "[HIV and Tuberculosis Co-Infection Programs](#)," July 27, 2017.

Difficulties of scale-up

Ellman, Tom, "[Demedicalizing AIDS Prevention and Treatment in Africa](#)," *New England Journal of Medicine*, 2015, 372: 303-305.

Are there sufficient resources?

Garrett, Laurie, "[The Next AIDS Pandemic](#)," *Foreign Policy*, July 26, 2017.
Havlir, Diane, and Chris Beyrer, "[The Beginning of the End of AIDS?](#)" *New England Journal of Medicine*, 2012, 367: 685-687.

October 3 Presentation and Discussion

Select a country. Write a 2-page paper assessing whether the sustainable development goal for AIDS is achievable for this country, using data to support your argument.

The danger of renewed pandemic

Gates, Bill, "[The Next Epidemic – Lessons from Ebola](#)," *New England Journal of Medicine*, 2015, 372:1381-1384.

<i>Unit 2: Health Systems</i>

October 5 Introduction to Health Systems

What is a health system?

The major issues in developed countries are the rising cost of care, haphazard quality, and the lack of complete access (US).

Pre-class viewing:

University of Maryland, [Health systems video](#).

Kaiser Family Foundation, [Health of the Healthcare System](#)

Readings

Mills, Anne, "[Health Care Systems in Low- and Middle-Income Countries](#)," *New England Journal of Medicine*, 2014; 370(6), 552-557.

World Health Organization, [Everybody's Business: Strengthening Health Systems to Improve Health Outcomes](#), Geneva: World Health Organization, 2007, Introduction and Health Systems Challenges and Opportunities

October 10 Western Health Systems

*All countries face a tradeoff between equality and efficiency
Typically, equality has been judged more important, but this is less true than it used to be.*

Western countries are struggling with how to improve efficiency without creating material differences in care across groups.

Cutler, David, “[Equality, Efficiency, and Market Fundamentals: The Dynamics of International Medical Care Reform](#),” *Journal of Economic Literature*, 2002, 40(3), 881-906.

Fuchs, Victor, “[Major Trends in the U.S. Health Economy Since 1950](#),” *New England Journal of Medicine*, 2012, 366, 973-977.

Newhouse, Joseph P., “[Medical Care Costs: How Much Welfare Loss?](#)” *Journal of Economic Perspectives*, 1992, 6(3), 13-29.

Oberlander, Jonathan, “[Unfinished Journey — A Century of Health Care Reform in the United States](#),” *New England Journal of Medicine*, 2012, 367, 585-590.

October 12 The Affordable Care Act

*Two parts to the Affordable Care Act: coverage and cost/quality
Insurance market failures and the implications for coverage
What happened to ‘repeal and replace’?*

Cook, Robin, “[Decoding Health Insurance](#),” *New York Times*, May 22, 2005.

Cutler, David, “[Should Healthy People Have to Pay for Chronic Illnesses?](#)” *Washington Post*, March 17, 2017.

Reinhardt, Uwe, *New York Times Economix Blog*, “[Is Health Care Special?](#)”, August 6, 2010; “[Health Care, Uncertainty, and Morality](#),” August 13, 2010;

(If you have had Ec10) Einav, Liran, and Amy Finkelstein, “[Selection in Insurance Markets: Theory and Empirics in Pictures](#),” *Journal of Economic Perspectives*, 2011, 25(1): 115-38.

October 17/19 Learning About Causality I and II

*What a regression involves
How to analyze regression output
What are the threats to validity?*

Cutler, Notes on Regression Analysis (available on course web site).

October 24 Quality of Medical Care in America

Quality of care in the US and elsewhere is mixed. It is characterized by overuse, underuse, and misuse.

Berwick, Donald, "[A User's Manual for the IOM's 'Quality Chasm' Report](#)," *Health Affairs*, 2002, 21(3), 80-90.

Fisher, Elliott S., David E. Wennberg, Therese A. Stukel, Daniel J. Gottlieb, F. L. Lucas, and Étoile L. Pinder, "[The Implications of Regional Variations in Medicare Spending. Part 1: The Content, Quality, and Accessibility of Care](#)," and "[Part 2: Health Outcomes and Satisfaction with Care](#)," *Annals of Internal Medicine*, 2003, 138(4). (skim)

Gawande, Atul, "[The Cost Conundrum](#)," *The New Yorker*, June 1, 2009.

Gawande, Atul, "[Overkill](#)," *The New Yorker*, May 11, 2015

October 26 Cost Sharing

Moral hazard vs. risk protection in insurance
What happens when people decide between money and care?

Furman, Jason, "[Health Reform Through Tax Reform: A Primer](#)," *Health Affairs*, 2008, 27(3): 622-632

Huskamp, Haiden A., et al., "[The Effect of Incentive-Based Formularies on Prescription-Drug Utilization and Spending](#)," *New England Journal of Medicine*, 2003; 349: 2224-2232.

Rosenthal, Meredith, "[What Works in Market-Oriented Health Policy](#)," *New England Journal of Medicine*, 2009, 360(21): 2157-2160.

(More advanced) Swartz, Katherine, [Cost Sharing: Effects on Spending and Outcomes](#), Robert Wood Johnson Foundation, 2010.

October 31 Provider incentives

There are a number of financial approaches to improve quality of care.
The evidence on all the approaches is mixed.

Accountable Care Organizations:

Chernew, Michael E., Robert E. Mechanic, Bruce E. Landon, and Dana Gelb Safran, et al., "[Private-Payer Innovation in Massachusetts: The Alternative Quality Contract](#)," *Health Affairs*, 2011; 30(1):51-60.

McWilliams, J. Michael, et al., "[Early Performance of Accountable Care Organizations in Medicare](#)," *New England Journal of Medicine*, 2016; 374:2357-2366

Defensive Medicine

Baicker, Katherine, Elliott S. Fisher, and Amitabh Chandra, “[Malpractice Liability Costs and the Practice of Medicine in the Medicare Program](#),” *Health Affairs*, 2007, 26(3): 841-852.

Professionalism

Pronovost, Peter J., Jill A. Marsteller, and Christine A. Goeschel, “[Preventing Bloodstream Infections: A Measureable National Success Story in Quality Improvement](#),” *Health Affairs*, 2011, 30(4): 628-634.

November 2 Social Determinants of Health

Social factors are key influences in population health.

To what extent should health care policy encompass housing policy, education policy, tax policy, and other domains?

Chetty, Raj, et al., “[The Association Between Income and Life Expectancy in the United States, 2001-2014](#),” *JAMA*, 2016, 315(16): 1750-1766.

Marmot, Michael, et al., “[Closing the Gap in a Generation: Health Equity through Action on the Social Determinants of Health](#),” *The Lancet*, 2008, 372(9650): 1661-1669.

Taylor, Lauren, et al., “[Leveraging the Social Determinants of Health: What Works?](#)” *PLoS One*, 2016; 11(8): e0160217.

November 7 Presentation and discussion

You have been asked to write a memo advising the Trump Administration on what to do about health care. The memo is for the President and his senior advisors. They have a range of views about the ACA, ranging from marginally friendly to hostile. What advice would you give them?

What Comes Next?

Antos, Joe, James Capretta, and Gail Wilensky, “[Replacing the Affordable Care Act and Other Suggested Reforms](#),” *JAMA*, 2016; 315(13): 1325-1325.

Cutler, David, “[How Congress Could Pass a Bipartisan Health Bill That People Actually Like](#),” Washington Post, June 30, 2017.

Obama, Barack, “[United States Health Care Reform: Progress and Next Steps](#),” *JAMA*, 2016, 316(5): 525-532.

Physicians for a National Health Plan, “[Beyond the Affordable Care Act: A Physicians’ Proposal for Single-Payer Health Care Reform](#),” 2016.

Unit 3: Pharmaceuticals

November 9 Pharmaceutical Markets

Worldwide markets for pharmaceuticals

Framing the problem:

- *Low income countries – getting medicines*
- *Middle income countries – affording medicines*
- *High income countries – affording medicines; the tradeoff between price and innovation*

Pre-class viewing

CBS News, “[The Cost of Cancer Drugs](#),” October 5, 2014.

Reading

Ellis, Lisa, [Snapshot of the Pharmaceutical Industry](#), Harvard T.H. Chan School of Public Health.

Kremer, Michael, “[Pharmaceuticals and the Developing World](#),” *Journal of Economic Perspectives*, 2002, 16(4): 67-90.

Wilson, Andrew W., and Peter J. Neumann, [The cost-effectiveness of biopharmaceuticals: A look at the evidence](#),” *mAbs*, 4:2, 281-288.

Example: Cancer

Bach, Peter B., Leonard B. Saltz, and Robert E. Wittes, “[In cancer care, cost matters](#),” *New York Times*. October 15, 2012; A25.

Experts in Chronic Myeloid Leukemia, “[The price of drugs for chronic myeloid leukemia \(CML\) is a reflection of the unsustainable prices of cancer drugs: from the perspective of a large group of CML experts](#),” *Blood*, 2013, 121:4439-4442.

November 14 Demand and Supply: The Economics of Pharmaceuticals

Pharmaceuticals are characterized by relatively inelastic demand.

Fixed costs of pharmaceuticals are high, but marginal costs are low

Cutler, David, Notes on Monopoly Pricing, (available on course website).

Sood, Neeraj, et al., “[Follow the Money: The Flow of Funds in the Pharmaceutical Distribution System](#),” *Health Affairs blog*, June13, 2017.

November 16 Drivers of Pharmaceutical Innovation

What is the relationship between pricing, regulation, and innovation of new medicines?

Frakt, Austin, “[Why Preventing Cancer is Not the Priority in Drug Development](#),” *New York Times, Upshot*, December 25, 2015.

Scherer, F.M., “[The Link Between Gross Profitability and Pharmaceutical R&D Spending](#),” *Health Affairs*, 2001, 20(5), 216-220.

Stern, Ariel D., Brian M. Alexander, and Amitabh Chandra, “[How Economics Can Shape Precision Medicines](#),” *Science*, 2017, 355(6330):1131-1133.

November 21 Policy Options for Low and Middle Income Countries

How should prices of medicines be set in low and middle income countries?

Wirtz, Veronika J., et al., “[Essential Medicines for Universal Health Coverage](#),” *the Lancet*, 2017, 389(10067): 403-476. (long)

November 23 **No Class – Thanksgiving

November 28 U.S. Policy Options for Pharma

A review of ideas to address pharmaceutical costs in the United States:

- Price negotiations
- Selective abridgement of patents

Bach, Peter B., “[Indication Specific Pricing for Cancer Drugs](#),” *JAMA*, 2014, 312(16): 1929-1930.

Conti, Rena M., and Meredith B. Rosenthal, “[Pharmaceutical Policy Reform — Balancing Affordability with Incentives for Innovation](#),” *New England Journal of Medicine*, 2016, 374:703-706

Conti, Rena M., Rebecca E. Gee, and Joshua M. Sharfstein, “[Pharmaceuticals and the Public Health](#),” *JAMA*, 2016; 316(2): 2083-2084.

Rawlings, Michael D., “[NICE Work – Providing Guidance to the British National Health Service](#),” *New England Journal of Medicine*, 2004, 351(14), 1383-5.

Van Nuys, Karen, Dana Goldman, and Ian D. Spatz, “[Reining in Pharmaceutical Costs](#),” August 3, 2017.

November 30 Presentation and discussion

You are the CEO of GlobalPharma, Inc. You need to position your company for the next 20 years. What should you do?