Communications from professor and teaching assistants about the course will take place through Canvas. Students should make sure they regularly check for announcements and messaging notifications.

**Course Description**

**TOPICS**

- Investment and pricing decisions in health care
- Health insurance
  - Risk aversion and the social benefits of health insurance; optimal insurance coverage
  - Moral hazard and the social costs of health insurance
  - Asymmetric information, adverse selection, and private health insurance market failures; potential remedies
  - Choice among health plans: health insurance benefit design (optimal premium and copayment structure)
  - Empirical evidence about the impact of health insurance on the use of medical care
- Measuring and valuing health
  - Longevity: the “quantity” of life-years
  - The “price” (value) of life-years: How much should we pay to save a “statistical life”?
  - The “quality” of life-years
- Comparative effectiveness, cost effectiveness, and health technology assessment
- Physician behavior
  - Alternative ways of paying doctors and other providers: Retrospective payment, Prospective payment, and Value-based payment
  - Effect of medical malpractice regime on physician behavior
  - Is more information better? The effects of “report cards” on health care providers
- Pharmaceutical industry
  - Intellectual property, innovation and imitation
  - Drug development and pricing decisions
  - Precision medicine and pharmacogenomics
  - Medication adherence
DETAILED SYLLABUS

I. Introduction

How is health care different from other types of consumer services and goods?

Centers for Medicare & Medicaid Services, The nation’s health dollar ($3.8 trillion), calendar year 2019

Which industry innovates the most? National Science Foundation, R&D Expenditures by Industry Category

Is health care a consumption good or an investment good?

II. Pricing and investment decisions in health care

Merck: Pricing Gardasil (Kellogg case study): Should Merck follow the outside consulting firm's recommendation about the price of the vaccine?

Excel workbook: ‘Gardasil price.xlsx’

NY Times, HPV Sharply Reduced in Teenage Girls Following Vaccine, Study Says

Should the government mandate (or subsidize) vaccination?

Should a firm develop a vaccine or a drug?

Michael Kremer and Christopher Snyder, Why Are Drugs More Profitable Than Vaccines?

Institute of Medicine, Financing Vaccines in the 21st Century: Assuring Access and Availability

III. Health insurance

A. The theory of risk, uncertainty, and insurance: a brief introduction

NY Times, Yale’s Most Popular Class Ever: Happiness

Paul Krugman, The Economics of Soaking the Rich: What does Alexandria Ocasio-Cortez know about tax policy? A lot

Articles from Wikipedia and similar sources:

- Expected utility
- Certainty-equivalent income
- Medical loss ratio
- The theory of risk aversion

Excel workbook: ‘Optimal_insurance_coverage.xlsx’
B. Moral hazard and the social costs of health insurance

Wikipedia, Moral hazard
Wikipedia, Invisible hand

Excel workbook: Deadweight loss from insurance example.xlsx
Excel workbook: Insurance could increase efficiency if patients underestimate value of medical care.xlsx

NY Times, Getting Sick Can Be Really Expensive, Even for the Insured

Supplier-induced demand:

NY Times, Doctors Who Profit From Radiation Prescribe It More Often, Study Finds

Department of Health and Human Services, Office of Inspector General, Medicare Paid $22 Million In 2012 For Potentially Inappropriate Ophthalmology Claims

Role of patient’s time in demand for medical services; CVS Minute Clinics

Primary and secondary insurance; Why Choose Medicare Supplement Insurance?

C. Asymmetric information, adverse selection, and private health insurance market failures; potential remedies

George Akerlof, “The Market for Lemons”

Potential remedies for private health insurance market failures; Obamacare

Is the problem of adverse selection greater for some types of medical care than it is for others? Mark V. Pauly & Yuhui Zeng, Adverse Selection and the Challenges to Stand-alone Prescription Drug Insurance

Why might the problem of adverse selection be becoming more severe?

NY Times, New Gene Tests Pose a Threat to Insurers

NY Times, Policyholders in Limbo After Rare Failure of Insurer

D. Health insurance benefit design

What prices (premiums) should an employer charge her employees for health insurance?
Simple model of health plan selection when there are two individuals (high and low risk) and two plans (generous and moderate), based on Cutler and Zeckhauser, The Anatomy of Health Insurance. Wikipedia, Community rating.

E. Empirical evidence about the impact of health insurance on the use of medical care

Wikipedia, RAND Health Insurance Study

NY Times, Oregon Study Shows Benefits, and Price, for Newly Insured

Lichtenberg and Sun, The Impact of Medicare Part D on Prescription Drug Use by the Elderly

IV. Measuring and valuing health and the cost-effectiveness of health care

A. Longevity/mortality: the “quantity” of life-years

Alternative indicators: crude and age-adjusted death rates, life expectancy, premature mortality (years of potential life lost), 5-year cancer survival rates

New Yorker, Final Forms: What death certificates can tell us, and what they can’t

NY Times, The Men Who Want to Live Forever

New Yorker, Silicon Valley’s Quest to Live Forever: Can billions of dollars’ worth of high-tech research succeed in making death optional?

National Center for Health Statistics, United States Life Tables, 2017

World Health Organization, WHO Global Health Estimates

Excel workbooks:
‘Computation of life expectancy from age-specific death rates.xlsx’
‘Comparing mortality rate profiles.xlsx’

Cohort vs. period life tables; Life Tables for the United States Social Security Area 1900-2100

Cancer survival rates; National Cancer Institute: Cancer Query Systems

Lead-time bias and overdiagnosis; competing risks

Explaining variation in longevity growth across regions; Lichtenberg, The quality of medical care, behavioral risk factors, and longevity growth

B. Measuring the quality of life (or life-years)
Health Outcomes in Economic Evaluation: the QALY and Utilities

The Burden of Disease Approach for Measuring Population Health

Activities of Daily Living (ADLs) and Instrumental Activities of Daily Living (IADLs)

Is average quality of life likely to be improved by advances in medicine?

C. The value (“price”) of a life-year (or a life): three alternative approaches

Viscusi and Gayor, Cost per life saved by various health and safety regulations

Human capital approach

“Full income” approach

“Compensating wage differential” approach


World Bank, Valuing Mortality Reductions in India: A Study of Compensating Wage Differentials

D. Comparative effectiveness, cost effectiveness, and health technology assessment

The difference between comparative-effectiveness and cost-effectiveness

The incremental cost-effectiveness ratio

Cost-Effectiveness Analysis Registry

World Health Organization, Cost–effectiveness thresholds: pros and cons

Potential pitfalls in cost effectiveness analysis

Two kinds of evidence: randomized clinical trials, and real-world evidence; Deaton and Cartwright, Understanding and misunderstanding randomized controlled trials


V. Pharmaceutical industry

A. Drug pricing
When the government/payor sets the price of the drug: Case study of darbepoetin alfa; Lichtenberg, Did CMS’ Functional Equivalence Decision Result in Equitable Payments?

When the drug manufacturer sets the price of the drug: Simple model of drug development and pricing decisions

Tiered copayments; Herper M (2012). Inside the Secret World of Drug Company Rebates

Healthcare Finance, Trump signs executive order on drug pricing, prompting pushback from stakeholders

Lichtenberg, Pharmaceutical innovation and the burden of disease in developing and developed countries

Lichtenberg, Importation and innovation

Lichtenberg, Are drug prices subject to creative destruction? Evidence from the U.S. and Denmark, 2007-2017

B. Intellectual property: What is the socially optimal level of IP protection?

Excel workbook: ‘Patents: benefits and risks.xlsx’

NY Times, Why Don’t More Americans Use PrEP?

Could imitators (e.g. generic drug companies) favor stronger intellectual property protection?

Duflos and Lichtenberg, The impact of patent expiration on U.S. drug prices, marketing, and utilization

C. Medication adherence

Case study: CVS Health: Promoting Drug Adherence

Blankart and Lichtenberg, Are patients more adherent to newer drugs?, Health Care Management Science

D. Pharmacogenomics and precision medicine

FDA, Table of Pharmacogenomic Biomarkers in Drug Labeling

VI. Provider behavior

A. Physician compensation: alternative ways of paying doctors and other providers

1. Retrospective payment (fee for service)
   CMS, Office of the Actuary, Physician volume and intensity response

2. Prospective payment
   Silverman and Skinner, Are For-Profit Hospitals Really Different? Medicare upcoding and market structure
   NY Times, Those Indecipherable Medical Bills? They’re One Reason Health Care Costs so Much
   New Yorker, The Personal Toll of Whistle-Blowing: Why one physician took the risk of becoming an F.B.I. informant to expose alleged Medicare fraud

3. Pay for performance (value-based payment)
   NY Times, New York City Hospitals to Tie Doctors’ Performance Pay to Quality of Care
   NY Times, Cornerstone: The Rise and Fall of a Health Care Experiment
   Milgrom & Roberts, Incentive contracting: a mathematical example
   Gaynor, Rebitzer, and Taylor, Incentives in HMOs: a case study

B. Medical malpractice regime

   NY Times, A Fear of Lawsuits Really Does Seem to Result in Extra Medical Tests
   NY Times, Malpractice Suits Capped At $750,000 In Texas Vote
   Kessler and McClellan, Do doctors practice defensive medicine?
   How cost-effective has medical malpractice reform been in the US?

C. Information about provider quality

   National Committee for Quality Assurance, Healthcare Effectiveness Data and Information Set
   New York State Department of Health, CABG in New York State
Is mandatory disclosure of health scores necessary?

Some recent guest speakers

W. James McCarthy, CEO, Community Health Connection, a Federally Qualified Health Center

Johannes Schoder, PhD, market intelligence specialist, Helsana (one of the largest Swiss health insurance companies): The Swiss health care system and health insurance market

Sharon Smith, MD, MBA, FACP, Vice President and Chief Medical Officer at Prudential Financial

Klaus Kjaer, MD, MBA, Chief Quality and Patient Safety Officer Weill Cornell Physician Organization

John Balch, CEO & Founder, The Pharmacare Network

Tracy Bahl, President & CEO of the Bahl Group as well as an Operating Partner, National Payor Strategy at SCALE Physician Group: Physician Practice Consolidation: Building value for physician groups in the wake of COVID-19

Anil K. Lalwani, M.D., Columbia University, Cost-effectiveness of cochlear implants

Case Links

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<thead>
<tr>
<th>Title</th>
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<tr>
<td>Managing Drugs on the Forefront of Personalized Medicine: the Erbitux and Vectibix Story</td>
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<tr>
<td>Exubera and NICE</td>
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<tr>
<td>Plavix: Drugs in the Age of Personalized Medicine</td>
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<td>Merck: Pricing Gardasil</td>
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<td>Obamacare</td>
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<td>CVS Health: Promoting Drug Adherence</td>
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<td><strong>Strategy in the 21st Century Pharmaceutical Industry: Marck &amp; Co. and Pfizer Inc.</strong></td>
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<td><strong>Performance Pay for MGOA Physicians (A)</strong></td>
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<tr>
<td><strong>Developing and Marketing a Blockbuster Drug: Lessons from Eli Lilly’s Experience with Prozac</strong></td>
</tr>
<tr>
<td><strong>Can Health Technology Assessment Help Control Drug Costs?</strong></td>
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STUDENT FOCUS
Students who plan to work in any of the following segments of the health care field should find this course to be valuable:
- pharmaceutical, biotechnology, and medical device companies
- health insurance companies and managed care organizations
- hospitals and physician practices
- financial services focused on health care
- public and not-for-profit organizations focused on health care

REQUIRED COURSE MATERIALS
All required and recommended course readings and materials will be posted on Canvas.

CONNECTION TO THE CORE
The learning in this course will utilize, build on, and extend concepts covered in the following core courses:

<table>
<thead>
<tr>
<th>MANAGERIAL ECONOMICS</th>
<th>CORPORATE FINANCE</th>
<th>GLOBAL ECONOMIC ENVIRONMENT I</th>
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<tbody>
<tr>
<td>• Maximization and thinking on the margin</td>
<td>• Risk (health insurance)</td>
<td>• GDP (as an incomplete measure of economic prosperity)</td>
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<td>• Analyzing complex decision-making under uncertainty</td>
<td>• Incremental cost/benefit (of medical expenditure)</td>
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<td>• Pricing with market power</td>
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<td>• Market segmentation and other advanced pricing strategies</td>
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<td>• Understanding market competition and equilibrium thinking (in the short run)</td>
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<tr>
<td>• Market equilibrium thinking (in the long-run) and barriers to entry</td>
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<td>• Strategic interaction among firms</td>
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CLASSROOM NORMS AND EXPECTATIONS
Students are expected to adhere to CBS Core Culture in this class by being Present, Prepared, and Participating. Students should be prepared to answer multiple-choice questions posed in class via Poll Everywhere on their smartphones. No other use of phones, laptops, or other electronic devices in class is permitted.

METHOD OF EVALUATION
The course will be taught using a combination of case discussions and lectures, including a few guest lectures. Students will be evaluated on the basis of class participation (15%), two problem sets (25%), and an in-class final exam (60%) administered by the Office of Student Affairs during the exam period.
ASSIGNMENTS

Problem Set 1 will be due towards the end of week 3, and Problem Set 2 will be due at the last class session. Problem sets are of type B2 (see below).

All of your assignment submissions are subject to the CBS Honor Code. Violations of the CBS Honor Code may lead to failing the assignment, failing the course, suspension, and/or dismissal. In order to avoid ambiguity that may lead to unintentional violations of the Honor Code, assignment description types have been standardized and specified below.

<table>
<thead>
<tr>
<th>Type</th>
<th>Designation</th>
<th>Grade</th>
<th>Preparation of submission</th>
<th>Discussion of Submission*</th>
<th>Discussion of Concepts**</th>
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<tr>
<td>A</td>
<td>Group Work</td>
<td>Same grade for all group members</td>
<td>By the group</td>
<td>Permitted to discuss (within group)</td>
<td>Permitted</td>
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<tr>
<td>B¹</td>
<td>Individual w/ Discussions of Concepts and Submission</td>
<td>Individual grade</td>
<td>Individual preparation</td>
<td>Permitted to discuss; sharing solutions or submission files is not allowed</td>
<td>Permitted</td>
</tr>
<tr>
<td>B²</td>
<td>Individual w/ Discussions of Concepts Only</td>
<td>Individual grade</td>
<td>Individual preparation</td>
<td>Not permitted to share/discuss solutions or submission</td>
<td>Permitted</td>
</tr>
<tr>
<td>C</td>
<td>Individual</td>
<td>Individual grade</td>
<td>Individual preparation</td>
<td>Not permitted to share/discuss solutions or submission</td>
<td>Not permitted***</td>
</tr>
</tbody>
</table>

The designated group can be either an assigned study group or a self-selected one.

* Submission means any work and/or output pertaining to the specific assignment. If an assignment submission contains a calculation or decision related to a specific set of data and setting, discussing the details how to make this calculation or decision with regard the data/setting is to discuss the submission. Providing another student with a draft of the calculation or decision is sharing the submission.

** Concepts mean any ideas, examples, readings, or other related materials from the class/course. Conceptual discussion should not be based on a specific set of data or setting related to a calculation or decision required in the assignment, but could be based on other related examples, preferably those from class/course materials.

*** As no conceptual discussion is permitted, Type C is akin to a take-home exam.

ATTENDANCE POLICY

Students are required to attend each class. Students should reach out to the instructor or TA regarding excused absences (for religious observances; personal, medical, and family emergencies; military service; court appearances such as jury duty). Unexcused absences will affect your course grade.
NOTE: The following is applicable for Core Courses and for any electives with OSA-administered exams:

- Students that miss the exam for an **excused** reason but are unable to take the exam within the stated make-up period will receive a **zero for the final exam grade**
- Students that miss the exam without notifying OSA (**unexcused**), will receive an **F for the course grade**.

This course will use Poll Everywhere as a tool to increase in-class student engagement. Poll Everywhere may also be used to confirm student attendance and participation records.

If a student is absent from class and is allowed to attend a different cluster’s class meeting, it is at the discretion of the faculty member to count responses to any polls presented during this time as attendance or participation. Responding to a poll when not present in the classroom is a violation of the Honor Code.

**INCLUSION, ACCOMMODATIONS, AND SUPPORT FOR STUDENTS**

At Columbia Business School, we believe that diversity strengthens any community or business model and brings it greater success. Columbia Business School is committed to providing all students with the equal opportunity to thrive in the classroom by providing a learning, living, and working environment free from discrimination, harassment, and bias on the basis of gender, sexual orientation, race, ethnicity, socioeconomic status, or ability.

Columbia Business School will make reasonable accommodations for persons with documented disabilities. Students are encouraged to contact the Columbia University’s Office of Disability Services for information about registration. Students seeking accommodation in the classroom may obtain information on the services offered by Columbia University’s Office of Disability Services online at [www.health.columbia.edu/docs/services/ods/index.html](http://www.health.columbia.edu/docs/services/ods/index.html) or by contacting (212) 854-2388.

Columbia Business School is committed to maintaining a safe environment for students, staff and faculty. Because of this commitment and because of federal and state regulations, we must advise you that if you tell any of your instructors about sexual harassment or gender-based misconduct involving a member of the campus community, your instructor is required to report this information to a Title IX Coordinator. They will treat this information as private, but will need to follow up with you and possibly look into the matter. Counseling and Psychological Services, the Office of the University Chaplain, and the Ombuds Office for Gender-Based Misconduct are confidential resources available for students, staff and faculty. “Gender-based misconduct” includes sexual assault, stalking, sexual harassment, dating violence, domestic violence, sexual exploitation, and gender-based harassment. For more information, see [http://sexualrespect.columbia.edu/gender-based-misconduct-policy-students](http://sexualrespect.columbia.edu/gender-based-misconduct-policy-students).