

# SOCI 2220: Health of Populations

Hans-Peter Kohler

Fall Semester 2022

## Course Description

- This course studies the interactions between population and health, and the causes and determinants of **population health**. The class develops some of the major measures used to assess the health of populations and uses those measures to consider the major factors that determine levels of health in large aggregates. These factors include the disease environment, population dynamics, medical technology, public health initiatives, personal behaviors, and the interactions between these factors.
- During the first part of the course, readings, lectures, and problem sets will help students become familiar with the major measures used to characterize levels of health in populations, including life expectancy at birth and various measures of morbidity and disability. Problem sets will help students to consolidate their understanding of the construction and use of different measures. *You will need to know excel to complete the problem sets.*
- Substantive topics covered in the course focus on the health of populations from historical and comparative perspectives, focusing on both high-income and low- and middle-income countries. We will study the principal factors that contributed to the massive health improvements of the past century, and the impact of the Covid-19 pandemic on health and mortality. In addition, we will examine factors that contribute to variation in health and mortality within and between developed and less developed countries, and we will consider factors that underlie major health disparities among individuals by socioeconomic status, race/ethnicity, and/or geography in the United States and elsewhere. Policies to improve population health are discussed, including evidence that supports the implementation of such policies.
- This course satisfies the *Quantitative Analysis Requirement* of the School of Arts and Sciences. The course is cross-listed as *HSOC 2202*.

## Class Administration

**Lectures:** The course meets **Mondays and Wednesdays at 3:30–4:40pm** in McNeil Bldg (MCNB) 309.

**Recitations:** **Thursday 12–1pm** in Jaffe Bldg (JAFF) 113 or **Friday 10:15–11:15am** in Williams Hall (WILL) 24.

Recitations will include hands-on examples, calculations and discussions/presentations related to class discussions. Students should bring a laptop and/or calculator to recitations.

**Instructor: Professor Hans-Peter Kohler**

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*Email:* [hpkohler@pop.upenn.edu](mailto:hpkohler@pop.upenn.edu)

*Office hours:* Wednesdays 1:30–2:50pm in 272 McNeil or via Zoom

<https://upenn.zoom.us/j/91445092723> (Meeting ID 914 4509 2723).

Please sign up via Canvas Calendar.

**Teaching Assistant: Joan Ryan**

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Office hours: TBA

**Canvas Course Website:** <https://canvas.upenn.edu/courses/1679687>

**Course Readings:** Readings will be made available prior to class on the course's Canvas website. Original research articles provide most of the background readings for the course, and throughout the class discussions, an important focus will be determining the quality of evidence for health policy and understanding the manner in which it was generated.

Readings will be supplemented by material covered in class and posted on the Canvas Website. Canvas will also be used as a primary tool for electronic communication with students. Please make sure that you are enrolled in the class and in a recitation section and that your email address is correct.

#### Course Requirements:

- Four assignments that will cover methods discussed in class first part of the course.
- Midterm exam (in class), Wed, Oct 19, 2022.
- Outline of class project, due Friday October 28 (see below for description of class project).
- Class project (see below), due Monday December 12.
- Final exam (cumulative); TBA (take home exam during designated exam period).
- Midterm and final exam are *open book*.

**Grade composition:** midterm (20%), class project (20%), final exam (35%), assignments (15%) and class participation (10%)

One assignment can be missed during the course without any penalty; if all assignment are submitted, the assignment with the lowest score will be ignored.

**Late policy for assignments:** five percentage points will be deducted for each day the assignment/quiz is turned in late.

**No Classes:** There are no classes on September 5 (Labor Day), November 23 (Thanksgiving) and December 12 (Class Project due)

### Academic Integrity

The work you submit in this class is expected to be your own. If you submit work that has been copied without attribution from some published or unpublished source or that has been prepared by someone other than you, or that in any way misrepresents somebody else's work as your own, you will face severe discipline by the university. All relevant University policies regarding Academic Integrity must be followed. Below is a link to a web page that has useful information on Penn's policy regarding plagiarism and guidelines for scholarly documentation. If you are not familiar with these topics, you should review the relevant materials (<https://www.college.upenn.edu/academic-integrity>)

### Course Outline

Date	Assignments (due dates)	Lecture Topic
Wed, Aug 31		<b>Introduction</b>
Mon, Sep 5	No Class – Labor Day	–
Wed, Sep 7		<b>Demographic &amp; Epidemiologicala Transition</b>
Mon, Sep 12		<b>Mortality and Other Population Health Data</b>
Wed, Sep 14		<b>Measures of Mortality 1: Crude death rate (CDR), Age-standardized CDR, Age-standardized CDR by Cause of Death</b>

Mon, Sep 19		... continued
Wed, Sep 21		<b>Impact of Covid-19 Pandemic on US mortality</b>
Mon, Sep 26		<b>Measures of Mortality 2: Cohort and Period Life Table</b>
Wed, Sep 28	<b>Assignment 1 due Sept 30</b>	... continued
Mon, Oct 3		<b>Determinants of Mortality Decline and Increases in Longevity</b>
Wed, Oct 5		... continued
Mon, Oct 10		<b>Measures of Health: Morbidity and Disability</b>
Wed, Oct 12	<b>Assignment 2 due Oct 14</b>	<b>Healthy Life Expectancy: What is it and how to measure it</b>
Mon, Oct 17		<b>Midterm Review</b>
Wed, Oct 19	<b>Midterm</b>	<b>Midterm</b>
Mon, Oct 24		<b>Collecting Data for Population Health Research</b>
Wed, Oct 26	<b>Outline of Class Project due Oct 28</b>	<b>Life-course Frameworks for Studying Health</b>
Mon, Oct 31		<b>Risk Factors in Adult Health &amp; US Health and Mortality in International Perspective</b>
Wed, Nov 2	<b>Assignment 3 due Nov 4</b>	... continued
Mon, Nov 7		<b>Do We Really Know What Makes Us Healthy?</b>
Wed, Nov 9		<b>Inequalities in Health and Mortality</b>
Mon, Nov 14		... continued
Wed, Nov 16	<b>Assignment 4 due Nov 18–19</b>	<b>Aging, Health and Longevity</b>
Mon, Nov 21		... continued
Wed, Nov 23	No Class (Friday schedule)	–
Mon, Nov 28		<b>Global Health and Aging</b>
Wed, Nov 30		... continued
Mon, Dec 5		<b>Health Policies</b>
Wed, Dec 7		<b>Final Review</b>
Mon, Dec 12	<b>Class Project due Dec 12</b>	<b>No class – class project due</b>

## Assignments

All students will be required to complete *three out of the four* problem sets that are assigned in the first part of the course. These assignments mostly consist of empirical analyses, quantitative exercises and short responses related to each week's materials. The assignments will be posted on Canvas, and are due on the indicated due date (usually Friday) by 11:59 PM. The assignments need to be submitted using the Canvas assignment tool.

Assignments will be graded on a 0–100% scale. For students submitting more than the three (out of four) required assignments, the best three assignments will count towards the overall course grade.

## Class Project

The requirements for the course include a class project in which students are asked to do some original research using demographic data to research some of the substantive issues covered in class. The paper (4–5 single-spaced pages of text + tables/figures + references) may focus on one disease process or risk factor that influences the health of a population, or on health-related population changes and policies, or it may consider some of the principal problems confronting a nation or large group. Useful data sets and online resources will be made available on the course website.

The first part of this project is an outline (approx. 1/2–1 page, due October 28, not graded) that describes (a) the topic to be investigated, (b) a short motivation of why it is relevant, and (c) a short outline about the data that is to be used. The final class project is due on December 12.

The primary requirements of this project are that students conduct their own empirical research on a topic related to this course and integrate their empirical findings with the conceptual frameworks discussed in class.

The analyses do not necessarily need to be complicated or use sophisticated statistical techniques. However, it is important that students try to use their own analyses of empirical data to shed some new light on a topic related to health. Examples of possible topics will be discussed in class. Papers should be 3–6 printed single-spaced pages, plus references, figures and tables. Content of the paper is more important than length, and longer papers are not necessarily better than shorter ones.

Some do's and don'ts for the research project include:

- **do** provide a motivation for the topic and state why it is interesting and/or relevant;
- **do** label graphs completely;
- **do** cite all data used completely (for websites, this means complete URL, the date, and the organization publishing it);
- **do** think about the topic and the choice of data early;
- **don't** use any data or publication without citing it;
- **don't** use secondary data analyses based on results already presented in a published paper (with exception to support a student's own original analyses);
- **don't** write a boring class project.

## Readings

Students are expected to read the assigned readings prior to the class meeting. The readings are available on the [Canvas](#) site for this class. Additional data or other online resources will be made available on Canvas.

### How to read assigned research papers:

Assigned readings are sometimes long, and sometimes involve methods that extend beyond what is taught in class. When you read assigned papers, **do not** get “lost in details,” become frustrated about not understanding complex methods that are not covered in class, or spend too much time on details that are not critical for the main findings of a paper. Instead, read the papers efficiently and focus on the following aspects:

- What is the main goal of the paper and its underlying research? What is the research question that is being addressed?
- What is the primary approach in terms of data and methods?
- What is the key finding and its interpretation?
- Why are the results relevant for understanding or improving the health of populations, and where appropriate, what are the implications of the findings for health policy?

### Topic 1: Demographic & Epidemiological Transition

Lee, Ronald D. (2003). The demographic transition: Three centuries of fundamental change. *Journal of Economic Perspectives*, 17(4): 167–190. doi: 10.1257/089533003772034943.

Horiuchi, Shiro (1999). Epidemiological transitions in human history. In *Health and Mortality: Issues of Global Concern*, edited by United Nations Population Division, pp. 54–71. New York: United Nations.

### Topic 2: Mortality Data

Vogel, Gretchen (2012). How do you count the dead? *Science*, 336(6087): 1372–1374. doi: 10.1126/science.336.6087.1372.

Aiken, Sally S. (2021). Death certification in the United States. *American Journal of Public Health*, 111(S2): S55–S56. doi: 10.2105/AJPH.2021.306443.

Ritchie, Hannah and Max Rosner (2019). Our world in data: Causes of death. URL <https://ourworldindata.org/causes-of-death>. Online Resource.

Kliff, Sarah and Julie Bosman (2020). Official counts understate the U.S. coronavirus death toll. *New York Times*. URL <https://www.nytimes.com/2020/04/05/us/coronavirus-deaths-undercount.html>. Published April 5, 2020, updated April 7, 2020.

McLean, Ruth (2021). A continent where the dead are not counted. *New York Times*. URL <https://www.nytimes.com/2021/01/02/world/africa/africa-coronavirus-deaths-underreporting.html>. Published Jan. 2, 2021, Updated Feb. 26, 2021.

### **Topic 3: Measures of Mortality 1: Crude death rate (CDR), Age-standardized CDR, Age-standardized CDR by Cause of Death**

Preston, Samuel H., Patrick Heuveline and Michel Guillot (2001). *Demography: Measuring and Modeling Population Processes*. Oxford: Blackwell Publishers. **Pages 1–8, 22–27**

Haupt, Arthur, Thomas T. Kane and Carl Haub (2011). *Population Reference Bureau's Population Handbook*. Washington, D.C.: Population Reference Bureau, sixth edition. URL <http://www.prb.org>. **Pages 16–18**

### **Topic 4: Impact of Covid-19 Pandemic on US mortality**

Alsan, Marcella, Amitabh Chandra and Kosali Simon (2021). The great unequalizer: Initial health effects of COVID-19 in the United States. *Journal of Economic Perspectives*, 35(3): 25–46. doi: 10.1257/jep.35.3.25.

Ackley, Calvin A., Dielle J. Lundberg, Lei Ma, Irma T. Elo, Samuel H. Preston *et al.* (2022). County-level estimates of excess mortality associated with COVID-19 in the United States. *SSM - Population Health*, 17: 101021. doi: 10.1016/j.ssmph.2021.101021.

Luck, Anneliese N., Samuel H. Preston, Irma T. Elo and Andrew C. Stokes (2022). The unequal burden of the Covid-19 pandemic: Capturing racial/ethnic disparities in US cause-specific mortality. *SSM - Population Health*, 17: 101012. doi: 10.1016/j.ssmph.2021.101012.

### **Topic 5: Measures of Mortality 2: Cohort and Period Life Table**

Preston, Samuel H., Patrick Heuveline and Michel Guillot (2001). *Demography: Measuring and Modeling Population Processes*. Oxford: Blackwell Publishers. **Pages 16, 18–19, 38–44, 51–53.**

Haupt, Arthur, Thomas T. Kane and Carl Haub (2011). *Population Reference Bureau's Population Handbook*. Washington, D.C.: Population Reference Bureau, sixth edition. URL <http://www.prb.org>. **Pages 19–20**

Stephenson, Joan (2022). COVID-19 deaths helped drive largest drop in US life expectancy in more than 75 years. *JAMA Health Forum*, 3(1): e215286–e215286. doi: 10.1001/jamahealthforum.2021.5286.

### **Topic 6: Determinants of Mortality Decline and Increases in Longevity**

Cutler, David M., Agnus S. Deaton and Adriana Lleras-Muney (2006). The determinants of mortality. *Journal of Economic Literature*, 20(3): 97–120.

Preston, Samuel H. (2015). Identifying the principal factors responsible for improvements in the health of populations. In *Population Health: Behavioral and Social Science Insights*, volume 89. Rockville, MD: Agency for Healthcare Research and Quality and Office of Behavioral and Social Sciences Research, and National Institutes of Health.

Easterlin, Richard A. (1999). How beneficent is the market? A look at the modern history of mortality. *European Review of Economic History*, 3(03): 257–294. doi: 10.1017/S1361491699000131.

Kuhn, Randall (2010). Routes to low mortality in poor countries revisited. *Population and Development Review*, 36(4): 655–692. doi: 10.1111/j.1728-4457.2010.00353.x.

### Topic 7: Measures of Health: Morbidity and Disability

- National Research Council (2001). *Preparing for an Aging World: The Case for Cross-National Research*. Washington, D.C.: National Academy Press. **Pages 225–249.**
- Haupt, Arthur, Thomas T. Kane and Carl Haub (2011). *Population Reference Bureau's Population Handbook*. Washington, D.C.: Population Reference Bureau, sixth edition. URL <http://www.prb.org>. **Pages 21–22**
- Sen, Amartya (2002). Health: Perception versus observation. *British Journal of Medicine*, 324: 860–861. doi: 10.1136/bmj.324.7342.860.

### Topic 8: Healthy Life Expectancy: What Is It and How to Measure It

- Crimmins, Eileen M., Yuan Zhang and Yasuhiko Saito (2016). Trends over 4 decades in disability-free life expectancy in the United States. *American Journal of Public Health*, 106(7): 1287–1293. doi: 10.2105/AJPH.2016.303120.
- Murphy, Heather (2020). Rich people don't just live longer. they also get more healthy years. *New York Times*. URL <https://www.nytimes.com/2020/01/16/science/rich-people-longer-life-study.html>. Published Jan 16, 2020.
- Jagger, Carol, Bianca Cox, Sophie Le Roy and the EHEMU team (1999). Health expectancy calculation by the sullivan method: A practical guide. NUPRI Research Paper Series, No. 68. University of Leicester, U.K. This reading explains the method we will teach you in class and provides you with an additional explanation

### Topic 9: Collecting Data for Population Health Research

No required reading

### Topic 10: Life-course Frameworks for Studying Health

- Glass, Thomas A. and Matthew McAtee (2006). Behavioral science at the crossroads in public health: Extending horizons, envisioning the future. *Social Science and Medicine*, 62: 1650–1671.
- Montez, Jennifer Karas and Mark D. Hayward (2011). Early life conditions and later life mortality. In *International Handbook of Adult Mortality*, edited by Richard G. Rogers and Eileen M. Crimmins. Amsterdam, Netherlands: Springer.
- Parker-Pope, Tara (2010). Is marriage good for your health? URL <http://www.nytimes.com/2010/04/18/magazine/18marriage-t.html>. *New York Times Magazine*, April 12, 2010.
- Christakis, Nicholas A. and James H. Fowler (2007). The spread of obesity in a large social network over 32 years. *New England Journal of Medicine*, 357: 370–379.

### Topic 11: Risk Factors in Adult Health & US Health and Mortality in International Perspective

- Woolf, Steven H. and Laudan Aron (Editors) (2013). *U.S. Health in International Perspective: Shorter Lives, Poorer Health*. Washington, DC: National Academies Press. Report by the National Research Council (NRC) and Institute of Medicine (IOM). **Pages 1–11 (Summary)**; also, see video summary at <https://www.youtube.com/v/Q9jzwZrlxUg>.
- Ho, Jessica Y. (2019). The contemporary American drug overdose epidemic in international perspective. *Population and Development Review*, 45(1): 7–40. doi: 10.1111/padr.12228.
- Case, Anne and Angus Deaton (2015). Rising morbidity and mortality in midlife among white non-Hispanic Americans in the 21<sup>st</sup> century. *Proceedings of the National Academy of Sciences*, 112(49): 15078–15083. doi: 10.1073/pnas.1518393112.
- Sudharsanan, Nikkil, Yuan Zhang, Collin F. Payne, William Dow and Eileen Crimmins (2020). Education and adult mortality in middle-income countries: Surprising gradients in six nationally-representative longitudinal surveys. *SSM - Population Health*, 12: 100649. doi: 10.1016/j.ssmph.2020.100649.

### Topic 12: Do We Really Know What Makes Us Healthy? Is Medical Care Worth its Costs?

Taubes, Gary (2007). Do we really know what makes us healthy? *New York Times*. URL <http://www.nytimes.com/2007/09/16/magazine/16epidemiology-t.html>.

Cutler, David M. (2004). Are the benefits of medicine worth what we pay for it? URL <http://ideas.repec.org/p/max/cprpbr/27.html>. 15<sup>th</sup> Annual Herbert Lourie Memorial Lecture on Health Policy, Center for Policy Research, Maxwell School, Syracuse University (available as Center for Policy Research – Policy Brief #24).

### Topic 13: Inequalities in Health and Mortality

Murray, Christopher J. L., Sandeep C. Kulkarni, Catherine Michaud, Maria T. Tomijima, Niels ad Bulzacchelli, Terrell J. Iandiorio *et al.* (2006). Eight Americas: Investigating mortality disparities across races, counties, and race-counties in the United States. *PLoS Medicine*, 3(9): e260. doi: 10.1371/journal.pmed.0030260.

Chetty, R., M. Stepner, S. Abraham and et al (2016). The association between income and life expectancy in the United States, 2001-2014. *JAMA*, 315(16): 1750–1766. doi: 10.1001/jama.2016.4226.

Gutin, Iliya and Robert A. Hummer (2021). Social inequality and the future of US life expectancy. *Annual Review of Sociology*, 47(1): 501–520. doi: 10.1146/annurev-soc-072320-100249.

Williams, David R., Jourdyn A. Lawrence and Brigitte A. Davis (2019). Racism and health: Evidence and needed research. *Annual Review Public Health*, 40(1): 105–125. doi: 10.1146/annurev-publhealth-040218-043750.

### Topic 14: Aging, Health and Longevity

Oeppen, Jim and James W. Vaupel (2002). Broken limits to life expectancy. *Science*, 296(5570): 1029–1031.

Interview with Jim Vaupel at <https://www.prb.org/resources/100-years-and-beyond-increasing-human-life-expectancy/>

Couzin-Frankel, Jennifer (2011). A pitched battle over life span: Predicting whether life expectancies will keep rising is as much art as science. two demographers disagree about what the coming years will bring. *Science*, 333: 549–550.

Ailshire, Jennifer A., Hiram Beltrán-Sánchez, Eileen M. Crimmins and Stephen Kritchevsky (2015). Becoming centenarians: Disease and functioning trajectories of older U.S. adults as they survive to 100. *Journals of Gerontology, Series A: Biological Sciences and Medical Sciences*, 70(2): 193–201. doi: 10.1093/geronol/glu124.

Sanderson, Warren and Sergei Scherbov (2008). Rethinking age and aging. *Population Bulletin*, 63(4): 1–16.

### Topic 15: Global Health and Aging

Bor, Jacob, Abraham J. Herbst, Marie-Louise Newell and Till Bärnighausen (2013). Increases in adult life expectancy in rural South Africa: Valuing the scale-up of HIV treatment. *Science*, 339(6122): 961–965. doi: 10.1126/science.1230413.

Kohler, Iliana V., Fabrice Kämpfen, Alberto Ciano, James Mwera, Victor Mwapasa *et al.* (2022). Curtailing COVID-19 on a dollar-a-day in Malawi: Implications for the ongoing pandemic. *World Development*, 151: 105753. doi: 10.1016/j.worlddev.2021.105753. Epub 25 November 2021.

Kohler, Iliana V., Collin F. Payne, Chiwoza Bandawe and Hans-Peter Kohler (2017). The demography of mental health among mature adults in a low-income high HIV-prevalence context. *Demography*, 54(4): 1529–1558. doi: 10.1007/s13524-017-0596-9.

Payne, Collin, James Mkandawire and Hans-Peter Kohler (2013). Disability transitions and health expectancies among adults 45 years and older mature in Malawi: A cohort modeling approach. *PLOS Medicine*, 10(5): e1001435. doi: 10.1371/journal.pmed.1001435.

Ciano, Alberto, Fabrice Kämpfen, Hans-Peter Kohler and Iliana V. Kohler (2021). Health screening for emerging disease burdens among the global poor: Evidence from Sub-Saharan Africa. *Journal of Health Economics*, 75. doi: 10.1016/j.jhealeco.2020.102388.

Jamison, Dean T, Lawrence H Summers, George Alleyne, Kenneth J Arrow, Seth Berkley *et al.* (2013). Global health 2035: A world converging within a generation. *Lancet*, 382(9908): 1898–1955. doi: 10.1016/S0140-6736(13)62105-4.

### Topic 16: Health Policies

Graham, Carol (2008). Happiness and health: Lessons—and question—for public policy. *Health Affairs*, 27(1): 72–87. doi: 10.1377/hlthaff.27.1.72.

Green, Tiffany and Atheendar S. Venkataramani (2022). Trade-offs and Policy Options — Using Insights from Economics to Inform Public Health Policy. *New England Journal of Medicine*, 386(5): 405–408. doi: 10.1056/NEJMp2104360. URL <https://doi.org/10.1056/NEJMp2104360>. Also listen to interview with T. Green on [nejm.org](https://www.nejm.org)

Woolhandler, S. and D. U. Himmelstein (2017). The relationship of health insurance and mortality: Is lack of insurance deadly? *Annals of Internal Medicine*. doi: 10.7326/m17-1403; see related *New York Times* article at <https://www.nytimes.com/2017/03/29/opinion/is-obamacare-a-lifesaver.html>

Acton, Riley K, Wenjia Cao, Emily E Cook, Scott A Imberman and Michael F Lovenheim (2022). The effect of vaccine mandates on disease spread: Evidence from college COVID-19 mandates. doi: 10.3386/w30303. NBER Working Paper #30303.

Beard, John R and David E Bloom (2015). Towards a comprehensive public health response to population ageing. *Lancet*, 385(9968): 658–661. doi: 10.1016/S0140-6736(14)61461-6.

Lomborg, Bjørn (2015). *The Nobel Laureate's Guide to the Smartest Targets for the World 2016–2030*. Lowell, MA: Copenhagen Consensus Center. **Pages 3–17 and 109–112.**