Population Health Course Outline

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Date November 15 to 26, 2021

Time 2 to 6 pm CET

Location Zoom and Nextcloud, links TBA

Course description

This intensive two-week course introduces key substantive and methodological topics in population health. Participants will be exposed to various research areas and perspectives within population health, with experts on global health, mortality trends, socio-economic differentials, intersectionality, family dynamics, migration, aging, and evolutionary biology coming together to give a 360-degree view of the current research landscape. Lectures on causal effects estimation and multistate modeling will accustom the participants to a broad set of currently applied methods.

Organization

The course will take place online via Zoom. Each day covers one topic taught by a domain expert. Depending on the topic and the instructor, the lecture format varies and may include a pre-recorded part, a coding session, or virtual group work. Lecture materials and recordings will be made available four days before the corresponding live session in a Nextcloud folder. In general, students should expect to spend about 6-8 hours per day on the course (lectures, discussions, readings, exercises) with lectures not exceeding 4 hours in length.

Course prerequisites

Students are expected to have basic knowledge of R and Stata. Participants need a laptop or desktop computer with the latest versions of R and RStudio installed. Instructions on how to download and install R can be found in "A (very) short introduction to R" by Torfs and Brauer (2014): https://cran.r-project.org/doc/contrib/Torfs+Brauer-Short-R-Intro.pdf.

If you don't have sufficient knowledge about R, you can use the following websites to familiarize yourself with the program:

swirlstats.com

coursera.org/course/rprog

stats.idre.ucla.edu/r

Examination

Active participation in all classes is required to earn the course certificate. No grades will be given beyond a pass/fail.

General readings

To be announced. Instructors will typically assign one or two core readings, and several optional readings to develop a deeper understanding of the topic. The readings will be made available with the course materials.

Schedule

Mortality trends Nov 15, 2-6pm CET
Enrique Acosta acosta@demogr.mpg.de
Materials will be available in Nextcloud by Nov 11

Tallies of the dead are one of the oldest and most widespread measures of population health. Thus, we start the week by positioning historical global mortality changes within the epidemiological transition theory, distinguish between extrinsic and intrinsic causes of death, and explain the distinction between age, period, and cohort effects on mortality. We implement the learned concepts by analyzing mortality data in R.

Family and Health Nov 16, 2-6pm CET
Mine Kühn kuehn@demogr.mpg.de
Materials will be available in Nextcloud by Nov 12

Family members can provide social support and resources that are beneficial for health. At the same time, certain family contexts can be characterized by stress and conflicts that may be harmful. The course covers theoretical concepts and empirical evidence on how health and well-being are associated with family dynamics. In the second part of the course, we will discuss "research in action" by looking at MPIDR research projects that investigate how family life events and critical periods in life impact health and well-being. The lecture includes interactive elements that require active student participation.

Intersectionality, cumulative disadvantage & health Nov 17, 2-6pm CET
Jo Mhairi Hale Jo.Hale@st-andrews.ac.uk
Materials will be available in Nextcloud by Nov 13

In this session, we will employ theories of intersectionality and cumulative (dis)advantage to explain health disparities over the life course. We will look at some examples in papers by Jo with various other Max-Planckers and learn about various methods to investigate how racial/ethnic, nativity, socio-economic, and gender identities intersect to affect health/wealth outcomes.

Migration and Health Nov 18, 2-6pm CET
Silvia Loi loi@demogr.mpg.de
Materials will be available in Nextcloud by Nov 14

We will focus on native-immigrant health disparities, starting with an introduction to the basic concepts, terminology, and literature on migration and health. We will describe how every single phase of the migration experience is associated with different health risks, from the decision to migrate in the origin country to the arrival in the receiving country (and eventually to the return migration in later life). We will then cover key issues, core theories, and hypotheses commonly used to explain native-immigrant health disparities. We will cover "the healthy immigrant effect" and "the salmon bias," as well as the process of deterioration of immigrant health over time, the "immigrant-native health convergence process," and the mechanisms behind it. We will continue illustrating health disparities across immigrant generations. Lastly, we will study some empirical examples on the relationship between early life exposures of immigrants and later health consequences and the immigrant-native health gap.

Population health in low and middle-income countries Nov 19, 2-6pm CET
Joshua Wilde 💎 wilde@demogr.mpg.de
Materials will be available in Nextcloud by Nov 15

This section will cover the bi-directional interaction between economic development and population health and dynamics in low and middle-income country settings. Particular attention will be given to the effects of various demographic transitions which have occurred since the 1920s in LMICs – particularly of mortality, fertility, and infectious disease incidence – and their feedback to economic outcomes, both at the micro and macro levels.

Causality I Nov 22, 2-6pm CET
Peter Eibich 💎 eibich@demogr.mpg.de
Materials will be available in Nextcloud by Nov 18

In this part of the course, you will gain an understanding of the basic ideas, principles, and methods for causal inference on observational data. In a pre-recorded lecture video, I will first introduce the potential outcomes model as a useful tool to formulate causal research questions and identify potential problems for inference. I will then discuss three basic methodological approaches (fixed effects, difference-in-differences designs, instrumental variables) to resolve some of these issues. In the live tutorial session, we will work together through a real-world dataset to see how these methods are implemented in practice, how their output can be interpreted and how to avoid common pitfalls.

Causality II Nov 23, 2-6pm CET
Angelo Lorenti ⓘ lorenti@demogr.mpg.de
Materials will be available in Nextcloud by Nov 19

Although many research questions in the social sciences are inherently causal, it is common to avoid using the word 'causal' in favor of the word association when writing research articles. Building upon the understanding gained in the Causality I course, we further explore the potential outcome framework to understand how a design can help us toward causal thinking and to lay out the assumptions needed to identify causal effects. The theoretical introduction is complemented with a description and some practical applications of propensity-score-based analysis methods, as inverse probability treatment weighting, marginal mean weighting, and matching.

Health expectancies and multistate modelling Nov 24, 2-6pm CET
Tim Riffe ⓘ riffe@demogr.mpg.de
Materials will be available in Nextcloud by Nov 20

We introduce multistate models for population health. In the theoretical part of the session, we aim to understand the objectives and inner workings of these models, as well as considerations such as data requirements, specification options, and limitations. In the practical part, we walk through simplified code examples of model construction using both matrix algebra, lifetable approaches, and trajectory simulation. We end with a list of resources for continued learning in this area.

Aging and Health Nov 25, 2-5pm CET   Lectures during the same day
Emma Zai ⓘ zai@demogr.mpg.de
Materials will be available in Nextcloud by Nov 21

In this course, we will cover basic concepts of economic resources and family decision-making in the context of an aging population. We begin by introducing basic economic concepts, laying out economic models to understand constraints households face, reviewing typical empirical tools used to identify causal relationships in aging and health. Next, we will evaluate some public programs to analyze the effect of government policy on aging and health. Finally, we will combine economic theory and public policy to investigate research questions that are potentially important and policy informative.

Genome-wide data in social epidemiology Nov 25, 5-6pm CET
Lahtinen, Hannu A. 🔵 hannu.lahtinen@helsinki.fi
Materials will be available in Nextcloud by Nov 21

During the last decade or so, rapid development of the genotyping techniques and analysis methods have brought us to the dawn of an era where large and population-representative data samples including molecular genetic information are increasingly available. This lesson will cover the promises and pitfalls that these kind of data may offer to a social-scientifically oriented population health researcher or a demographer. The talk contains a brief review of the state of the research, some potential ways to utilize these data to answer social-scientifically interesting questions as well a practical guideline in conducting the analysis.

Evolutionary approaches to population health Nov 26, 2-6pm CET
D. Susie Lee iD lee@demogr.mpg.de
Materials will be available in Nextcloud by Nov 22

We close the week taking a birds-eye view over various aspects of population health through the lens of evolution. Evolution is the process that has shaped (and is still shaping) the biological foundations on which living organisms behave and interact with ecological conditions. As such, "Nothing in biology makes sense except in the light of evolution" (Dobzhansky). This course introduces principles of evolutionary influences in health. For example, we are used to the idea that improved living conditions lead to better health outcomes. However, this idea is challenged by counter-intuitive cases such as the evolutionary mismatch between modern conditions and the evolved susceptibility to diseases, urging us to critically re-examine how to "improve" living conditions and health.