GREATLEAP Summer Training School

Health Inequalities: From Sources to Statistical Models

Course Description

This course is designed to strengthen students' statistical skills in the collection, construction, and analysis of historical individual mortality data, which usually includes causes of deaths, with the aim of investigating the roots and drivers of health inequalities across regions and countries in Europe and beyond. Through hands-on work with real-world datasets, students will apply key analytical methods and explore long-term patterns in population health, and become initiated in R.

An interdisciplinary approach is central to the course, integrating insights from demography, statistics, history, sociology, economics, and political science to provide a comprehensive perspective on methods for exploring the social and structural determinants of health.

Course Prerequisites

There are no formal prerequisites for this course.

Learning Objectives

At the end of the course, students will:

• Have discussed the implications of historical mortality sources for the study of health inequalities.

• Have learned how to build a relational database from original source materials.

• Have acquired a solid foundation in both basic and advanced methods for the analysis of aggregated and individual-level mortality data.

• Become am a w h R o u y engage w h h s exc ng p og am f ili r it t f ll it t i iti r r .

Course Workload

The course is structured around lectures, discussions, and field studies. Students should expect to read several scientific papers each week and engage in working with real historical data, whether sourced from their own research or provided by the course organizers.

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Course Contact Hours: 70 hours over a 2-week period.

Course development

First week:

The course will begin by focusing on developing skills for building databases, with particular attention to students' own data. Students will also be introduced to using R, ensuring they are prepared to use the program in the second week for learning statistical models to study health inequalities.

Day 1:

- Individual-level Causes of Death Sources for Studying Health Inequalities: Exploring death parish/civil registers, hospital records, and "Bring Your Data" (3 hours)
- R for Historians (Working with Real Data / Your Data) (4 hours)

Day 2:

- Procedures for Building Individual Databases: Handwriting recognition algorithms and relational databases (5 hours)
- R for Historians (Working with Real Data / Your Data) (2 hours)
- Social Activity to Build Cohesion Among Students: Visiting a historical archive (outside of contact hours).

Day 3:

- Data Harmonization: Standardizing variables and coding (ICD10, HISCO, HISCLASS, etc.) (3 hours)
- R for Historians (Working with Real Data / Your Data) (4 hours)

Day 4:

- Record Linkage: Deterministic and probabilistic record linkage (3 hours)
- R for Historians (Working with Real Data / Your Data) (4 hours)

Day 5:

- Individual Database Formats: Standardizing formats—Intermediate Data Structure (3 hours)
- R for Historians (Working with Real Data / Your Data) (4 hours)

Weekend (End of Week 1): Social Activity: To be planned

Second Week:
The second week of the course will focus on providing students with a solid foundation for estimating statistical models to analyse health inequalities, using R.

Day 1:

- Direct and Indirect Methods for Analysing Mortality: Life tables, age-specific mortality rates, etc. (7 hours: theory and practice – working on your final assessment).

Day 2:

- Decomposition Methods: Arriaga's method (7 hours: theory and practice – working on your final assessment).

Day 3:

- Essential Multivariable Methods: Linear, logit, and multinomial regressions (7 hours: theory and practice – working on your final assessment).

Day 4:

- Introduction to Survival Analysis: Kaplan-Meier, Cox regressions, and competing risks (7 hours: theory and practice, and working on your final assessment).

Day 5:

- Working on and presenting the final assessment (2/5 hours)

Host institution

The **Centre for Demographic Studies (CED)**, located on the campus of the Autonomous University of Barcelona (UAB), was founded in 1984 as a public research consortium between the Generalitat de Catalunya and the UAB. Between 2019 and 2024, CED published over 550 scientific contributions, including 11 books and monographs and over 320 articles in indexed journals. During the same period, it obtained funding for around 100 projects, including 7 ERC projects and 2 RIA projects from H2020 and Horizon Europe.

The **Historical Demography Unit** will serve as co-organizer from the Centre for Demographic Studies (CED), under the leadership of **Dr. Pujadas-Mora**. The unit comprises ten members, including early-career researchers, postdoctoral fellows, senior researchers and research technicians specializing in Historical Demography and Computer Science (from the Computer Vision Center). It is widely recognized for its projects and publications across a broad range of topics in Historical Demography, including socioeconomic inequality, social mobility, epidemics, and the advancement of Artificial Intelligence in the construction of demographic databases (https://ced.cat/es/directori/joana-maria-pujadas-mora/).

Dr. Pujadas-Mora is also an Associate Professor and Associate Dean for Research at the Faculty of Arts and Humanities at the Open University of Catalonia (UOC). She was recently honoured with the prestigious ICREA Academia Award, granted by the Catalan

Agency for the Management of University and Research Grants (AGAUR) under the Catalan Ministry of Research and Universities.

CED occupies 1,400 m² and offers individual offices, shared research spaces, meeting rooms, a specialized library, the Àngels Torrents Room for seminars and conferences (with a capacity of 58 people), and a computer lab (accommodating up to 20 participants).

The location of the CED at the Autonomous University of Barcelona means that participants have access to the **university's student residence services**:

https://www.uab.cat/web/mobility-international-exchange/international-support-service/living-in-barcelona/accommodation-1345819414069.html

Additionally, the university is connected by train to the centre of Barcelona in no more than 35 minutes.

[1] More details can be found in: https://adeh.org/wp-content/uploads/2022/10/Programa-Curso-Metodos-2023.pdf)