Socioeconomic differences in life expectancy in Uruguay

Abstract

Among Latin American countries, Uruguay stands out for its high per capita income, low levels of poverty and inequality, and universal access to health care and free education. The country has achieved some of the lowest infant mortality rates and highest life expectancy levels in the region. However, socioeconomic inequalities—though modest by regional standards—persist, affecting living conditions, health, and mortality risks. This study examines the magnitude of socioeconomic differences in life expectancy in Uruguay. Using multiple data sources and an indirect estimation method, it finds significant socioeconomic disparities in mortality across the life course. The probability of dying during the first year of life is three to four times higher among infants whose mothers have low educational attainment compared with those whose mothers have higher education. Among adults, men exhibit a clear socioeconomic gradient in mortality, with death rates declining steadily across income quintiles, whereas women show a less consistent pattern, though differences remain pronounced between the most and least advantaged groups. These disparities result in life expectancy gaps of up to 10 years for men and 6.6 years for women. The study provides a detailed analysis of how socioeconomic differences in mortality evolve with age in Uruguay, based on data from 2023–2024.

Extended abstract

Introduction

Among Latin American countries, Uruguay stands out for its high per capita income, low levels of poverty and inequality, universal access to health care, and free education. The country has achieved some of the lowest infant mortality rates (IMR) and highest life-expectancy levels in the region: according to the 2024 revision of the United Nations' World Population Prospects (UN-DESA 2024), Uruguay ranks first (together with Chile) with the lowest IMR and fourth in terms of life expectancy at birth (e0), after Chile, Costa Rica and Panama.

However, socioeconomic inequalities—though modest by regional standards—persist, affecting living conditions, health, and mortality risks. This study examines the magnitude of socioeconomic inequalities in life expectancy in Uruguay. Several studies, including in Latin America, show that people with a lower socioeconomic position—whether measured by income, occupation, education or type of health provider—have shorter lives, on average, compared to the most privileged groups (Bilal et al. 2019; Chetty et al. 2016; Gómez-Ugarte and García-Guerrero 2023; Mackenback et al. 2019; Moreno et al. 2021; et al. 2017; Östergren et al. 2019; Rofman 1994; Sandoval and Turra 2015).

For Uruguay, there is only one previous study measuring life-expectancy differences by socioeconomic status: using the type of health care provider (public or private), Rodríguez-Oberlin (2017) estimates that, in 2015, females and males with access to private health care lived, on average, 1.5 and 2.9 years longer, respectively, than those covered by the public system. In this study, the type of health care provider is used as a proxy of socioeconomic status, as the majority of people enrolled in public health care belong to the lowest income quintiles, whereas those in private care are concentrated in the highest quintiles.

The present study aims to provide current estimates of socioeconomic differences in longevity in Uruguay.

Data and Methods

Despite having a vital registration system with universal coverage, the amount of information provided in the death certificate is quite limited in Uruguay. For instance, due to very high omission levels, it is not possible to use the variables on education and occupation of the deceased individuals to analyze mortality by these characteristics. Since there are no sources that provide information on the socioeconomic characteristics of the deceased people in all age-groups, I use mixed data sources to measure the probability of dying in infancy and at adult ages. These probabilities are then used as input for the log-quadratic model (Wilmoth et al. 2012), which allows obtaining complete life tables based on infant mortality and (optionally) mortality between two adult ages.

This method is based on the log-linear relationship that exists between mortality rates during infancy/childhood and adulthood. Compared to other indirect methods, the log-quadratic one captures better this relationship, producing life tables that should be closer to the ones of the population for which information is incomplete (which is the case of the data on deaths by socioeconomic characteristics in Uruguay).

To obtain the probability of dying before reaching the age of 1 by socioeconomic characteristics, I use data from the *Sistema Informático Perinatal* (SIP), which provides information on the perinatal clinical history of all births in the country, including the mothers' and newborns' health during pregnancy and childbirth (MSP 2025a). For each birth occurred between 2019 and 2024, these data were linked with the death certificates of the children who died during that period. Hence, it is possible to calculate the probability of dying according to mother's socioeconomic characteristics, such as her education level and type of health care provider.

To obtain the probability of dying at adult ages, I use information from the *Banco de Previsión Social* (BPS 2025), the institution responsible for the administration of the social security and welfare system in Uruguay. From this institution, I obtained aggregate data on the number of people and deaths by sex, age and income decile, from 2021 to 2024. To avoid the impact of the COVID-19 pandemic, I focus on the data for the years 2023-2024. Income deciles were calculated by the BPS; they are based on the distribution of income within age groups, separately for each sex, as income levels vary by sex and over time during adulthood.

The data from BPS have a limited coverage, as they only include individuals within the formal labor market, as well as those that become eligible to receive some kind of allowance (for example, a widowhood allowance). Figure 1 shows that the coverage of these data change over age: it rises rapidly between the ages from 20-24 to 25-29, as people increase their participation it the formal labor market economy when they have their first job around these ages; then it remains relatively stable between the ages from 25-29 to 55-59 (although there is a drop, between the ages 45-49 to 55-49, more marked among men); finally, from ages 60-64 onwards, the coverage rises quickly, reaching 100% at the most advanced ages, as people who were not previously covered by the system get in because of social allowances.

Considering that the coverage of the data from BPS is more or less stable between the ages from 25-29 to 55-59, I calculate the probability of dying within this age range, for each sex and income quintile. I use income quintiles instead of deciles, as the latter produce distorted mortality curves due to the small size of the groups.

Finally, using the probability of dying before reaching the first year of life by mothers' education and type of health care provider, on the one hand, and the probability of dying between the ages of 25-29 and 55-59 by income quintile, on the other hand, I estimate the life table of different socioeconomic groups. I produce two scenarios, based on the combination of infant and adult mortality estimates presented in Table 1.

Figure 1. Coverage of BPS data

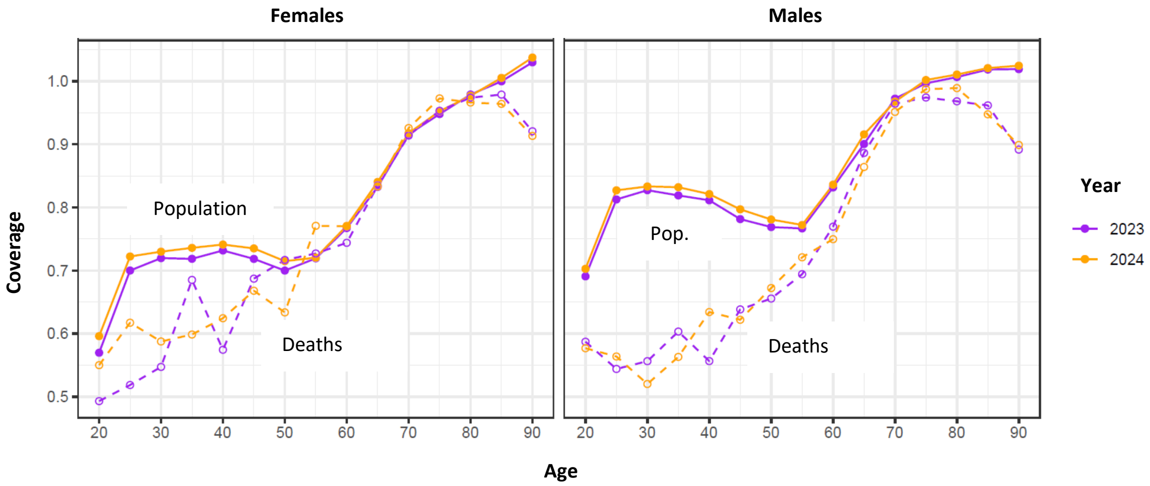


Table 1. Definition of socioeconomic levels based on input data (two scenarios)

Socioeconomic level	Infant mortality	Adult mortality by income quintile
Scenario 1: Using infant mortality by mother's education		
High	Tertiary / University	5th quintile
Medium-high	Upper Secondary	4th quintile
Medium	Lower Secondary	3rd quintile
Medium-low	Primary	2nd quintile
Low	Unknown[1]	1st quintile
Scenario 2: Using infant mortality by type of mother's health care provider		
High	Private	5th quintile
Low	Public	1st quintile

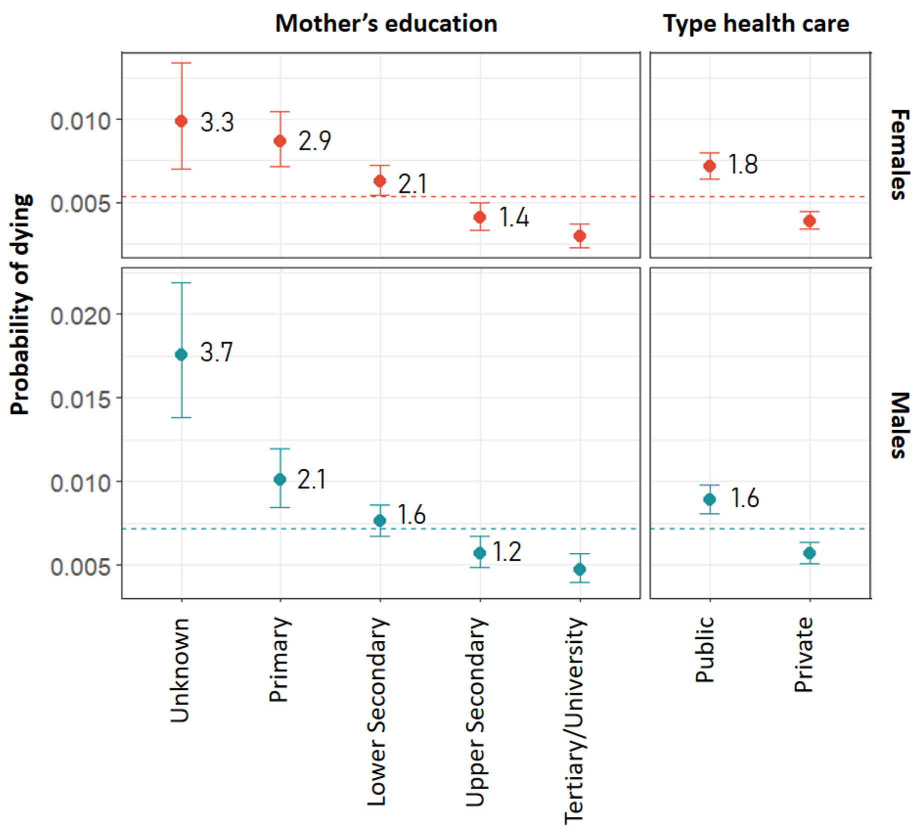
[1.] Mothers with an "Unknown" education level have a profile that resembles that of women in the most vulnerable position, as they are predominantly quite young and the deaths of their children also occur at young ages, like mothers with the lowest education level. Most of them are in the public health care system.

Using the life tables that result from the two scenarios presented in Table 1, I estimate the life-expectancy gaps between the most and least advantaged groups. In addition, I estimate the mortality levels of the population that is not covered by the social security data, by subtracting the BPS population and deaths from the total population estimates and deaths (INE 2025; MPS 2025b). I also calculate the probability to survive from birth to age 65 and then from age 65 to age 80, by sex and socioeconomic status. Finally, applying a decomposition method, I estimate the contribution of the different age groups to the gaps in life expectancy between the most and the least advantaged subpopulations.

Preliminary findings

Figure 2 shows the probability of dying before the age of 1 by mothers' education and by type of health care provider. It is clear that this probability increases as the mother's education level decreases: infants whose mother have an unknown education level (see note 1 under Table 1) have a death probability 3.3 to 3.7 times higher compared to infants whose mother has the highest education level. It is also significantly higher (1.6 to 1.8 times higher) among infants whose mother has a public health care provider, in comparison with a private one.

Figure 2. Probability of dying before the age of 1 (with 95% confidence intervals), by mother's education and type of health care provider, Uruguay 2019-2024

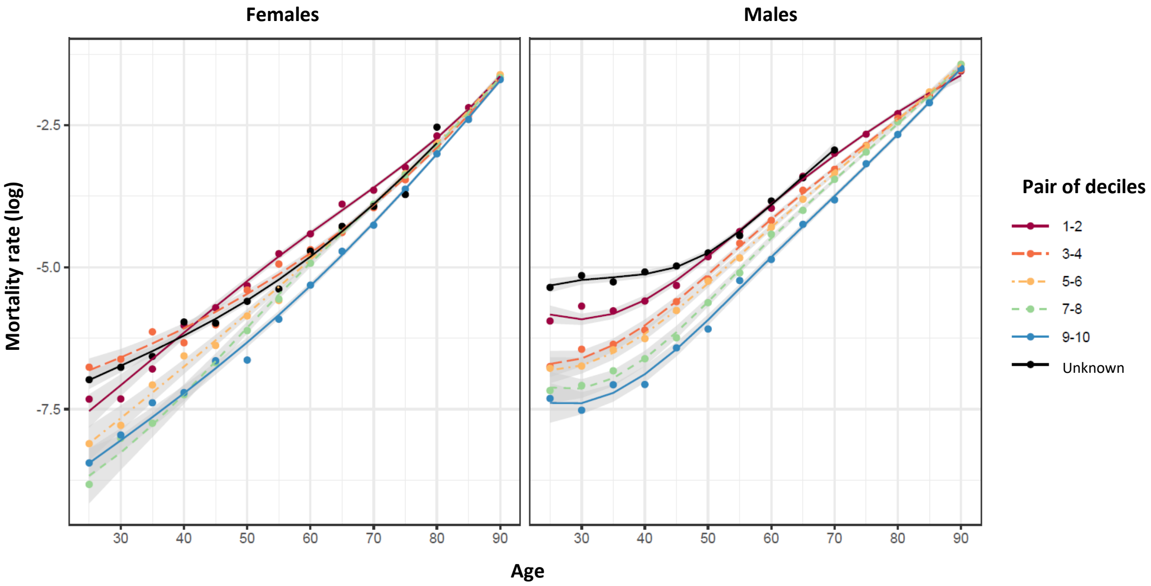


Note: The numbers within the plottin area indicate the ratio between the probabilitiy of each group compared to the most advantaged (mother's education: tertiary/university; type of health care: private).

Figure 3 shows the mortality rate for adults in each income quintile, from ages 25-29 onwards. The dots show the mortality rate for each 5-year age group (calculated directly from the BPS data) and the lines indicate the smoothed curves obtained after applying P-splines (Camarda 2012).

In the case of males, a clear gradient appears, where mortality rates decrease as the income quintile increases. Those with an unknown income quintile – i.e., people outside of the social security system and outside of the formal labor market – have mortality rates that are even higher than those of males in the lowest income quintile (pair of deciles 1 and 2) up until the age of 50, when both groups converge. In the case of females, there are marked differences starting from ages 55-59 onwards, between the lowest and the highest income quintiles, while all other groups (including those with unknown quintile) display mortality levels in the middle of these two extreme positions. At younger ages, there is a less clear pattern for women, although those with the highest income levels have the lowest mortality rates.

Figure 3. Mortality rates by sex and income quintile, Uruguay 2023-2024



Using the mortality levels in infancy and in adulthood displayed in Figures 2 and 3, I estimate life expectancy at birth by socioeconomic status for scenarios 1 and 2. Preliminary calculations indicate that life-expectancy gaps between the most vulnerable and the most privileged groups could be considerably higher than previously thought, considering the only other evidence available brought by Rodríguez-Oberlin (2017): the gap in e0 reaches 6.6 years and 10 years for females and males respectively. Life expectancy at other ages as well as the survival probabilities and the decomposition of these gaps by age-contributions will be available by the time of the conference.

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