CSDE 502 Winter 2021, Assignment 10

dcoomes

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1 Introduction

Despite considerable progress since 1990, approximately 5.2 million children under the age of five died worldwide in 2019.(UNICEF 2020) The most dangerous time for children under five is the neonatal period (the first month of life) . The chance of death after the first month and before the first year is slightly higher than the chance of death between 1-5 years of age.(UNICEF 2020)

Spain has one of the lowest under five (u5) mortality rates in Europe. The u5 mortality rate in Spain (2.7 deaths per 1,000 live births) is lower than that of the European Union average (3.5 per 1,000 live births) and much lower than that of the United States (5.7 per 1,000 live births).(INED 2021) Like many other countries, child mortality in Spain has reduced considerably since the beginning of the 20th century. In this analysis, we will examine mortality among children under five years of age in Spain over the last 108 years, and examine trends among male and female children during this time.

2 Methods

2.1 Data

The data used in this analysis is from the *Human Mortality Database* curated by the Max Planck Institute for Demographic Research. This database was designed to provide mortality data for various investigators, including researchers and students. For this analysis we use the mortality dataset from Spain from 1908 - 2018. The dataset we use reports aggregated deaths over five year periods for each five year age group. We limit our analysis to those aged 0-1 years and those aged 1-5 years. This dataset and others are available on the Human Mortality Database website

2.2 Analysis

In this analysis we show the total number of deaths among children under five years of age in Spain from 1910 - 2018. We show the total number of deaths for children under 1 year of age and children aged 1-4 separately. We also show the total number of deaths among male and female children separately.

3 Results

As is evident in **Figure 1** the total number of deaths among children under 1 year and children 1-4 years of age has steadily decreased from 1910 to 2018. During this entire time span the total deaths among children under 1 year has been higher than the total deaths among children aged 1-4. The total deaths decreased dramatically between 1920 and 1965 and have been decreasing more slowly since 1965.

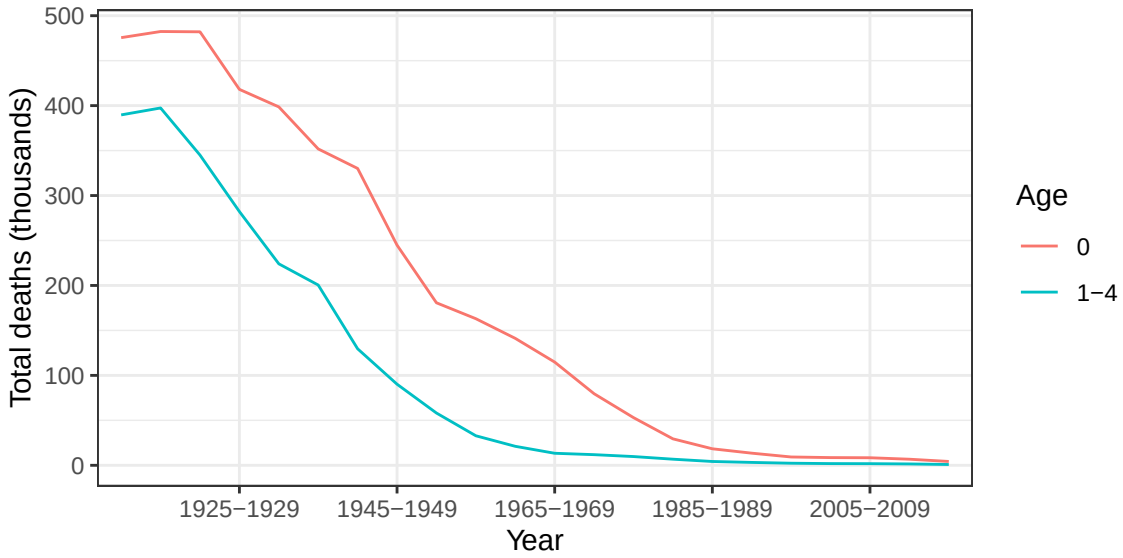

Figure 1: Total deaths for age 0 and age 1-4 in Spain from 1910-2018

Figure 2 shows the difference in total deaths for males and females, also disagregated by age. For both age groups there were more male child deaths as compared to female child deaths. The gap between absolute male deaths and female deaths has decreased as the total number of deaths has decreased, however, **Table 1** shows that the relative gap has remained similar over time.

The relative proportion of child deaths under age one has remained relatively stable from 1908 - 2018. Female deaths have ranged from 42.5% to 45.6% of overall during this time. There does seem to be a small trend in female deaths relative to male decreasing between 1920 to 1980 and then increasing again slightly. The overall proportion of female deaths among children aged 1-4 was similar to those under one year of age.

Figure 3A shows more recent trends in child deaths that cannot be seen when looking at overall deaths from 1910 - 2018. It shows that the reduction in deaths continues for both age groups over the time period of 1985 - 2014. **Figure 4B** shows a similar trend among males and females.

4 Discussion

The number of deaths among Spanish children aged below five has steadily decreased over the past 100 years. In this study we use the absolute number of deaths, which does not necessarily show a decrease in the mortality rate. For example, if the birth rate decreased during this time, then we would see a decrease in the

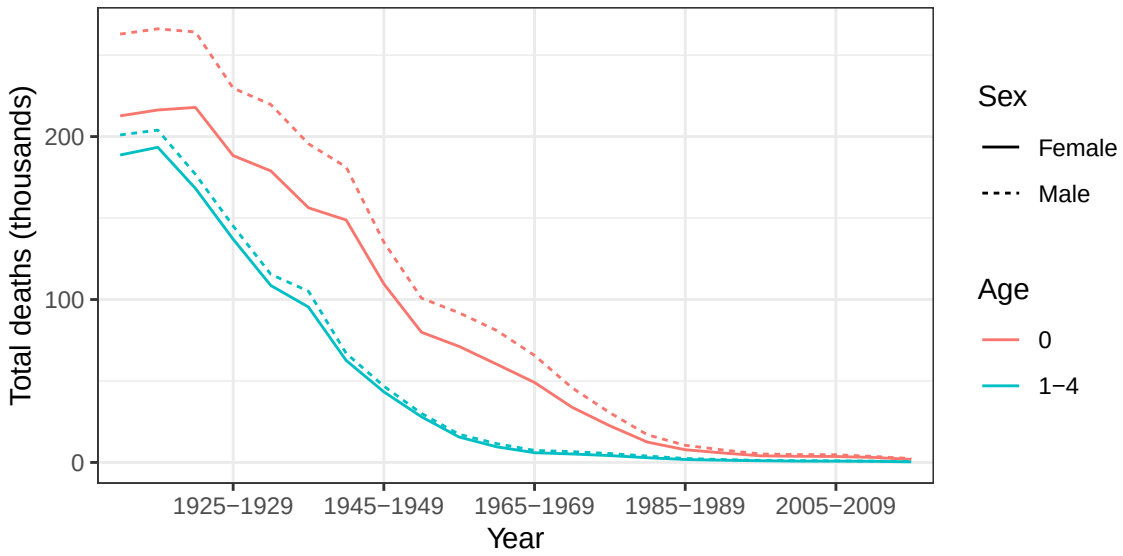

Figure 2: Total deaths for males and females age 0 and age 1-4 in Spain from 1910-2018

Table 1: Deaths for infants age 0 in Spain by 5-year age span for males and females

Year	Female	Male	Female %	Male %
1908-1909	91,878	113,725	44.7	55.3
1910-1914	212,698	262,909	44.7	55.3
1915-1919	216,320	266,105	44.8	55.2
1920-1924	217,885	264,197	45.2	54.8
1925-1929	188,319	229,734	45.0	55.0
1930-1934	178,918	219,670	44.9	55.1
1935-1939	156,287	195,541	44.4	55.6
1940-1944	148,811	181,309	45.1	54.9
1945-1949	109,605	135,223	44.8	55.2
1950-1954	79,889	100,846	44.2	55.8
1955-1959	71,193	91,823	43.7	56.3
1960-1964	60,234	80,920	42.7	57.3
1965-1969	49,082	65,688	42.8	57.2
1970-1974	33,828	45,759	42.5	57.5
1975-1979	22,503	30,506	42.5	57.5
1980-1984	12,467	16,949	42.4	57.6
1985-1989	7,817	10,533	42.6	57.4
1990-1994	5,818	7,654	43.2	56.8
1995-1999	4,043	5,206	43.7	56.3
2000-2004	3,765	4,801	44.0	56.0
2005-2009	3,657	4,734	43.6	56.4
2010-2014	3,074	3,674	45.6	54.4
2015-2018	1,871	2,405	43.8	56.2

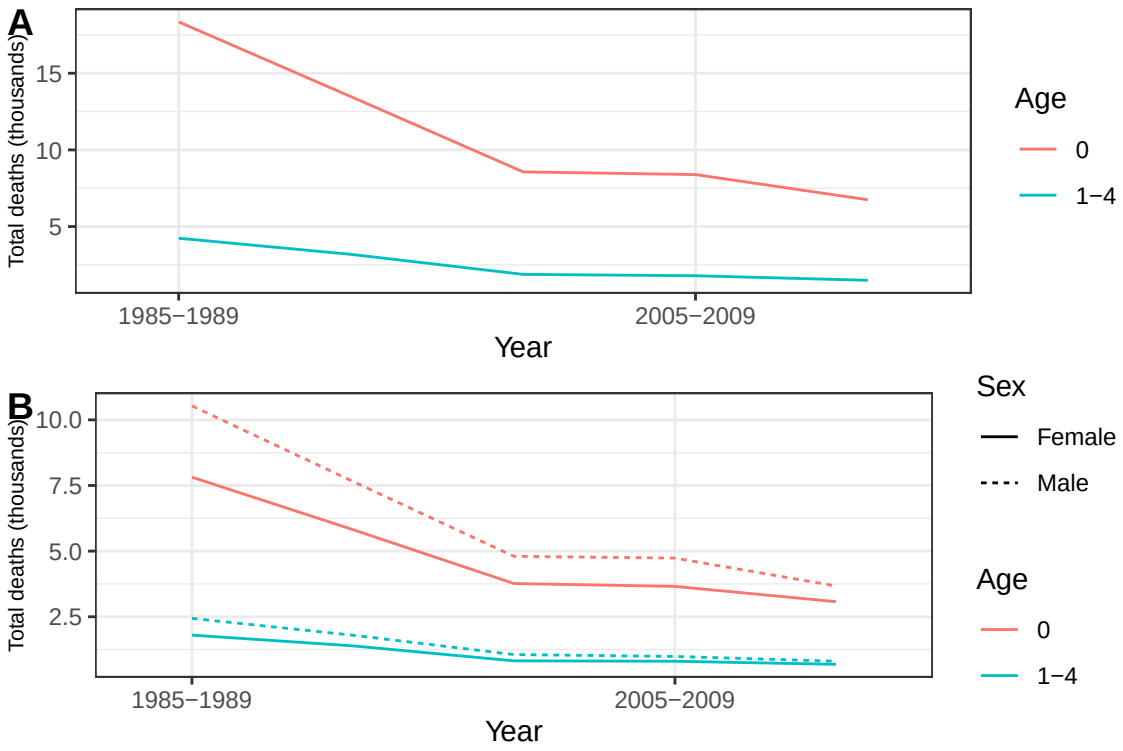

Figure 3: Total deaths for age 0 and age 1-4 in Spain from 1985-2018

number of deaths even if the mortality rate remained constant. Previous studies have shown a reduction in child mortality in Spain over the last 100 years, but also a reduction in the birth rate from 1970 - 2000. Since 2000, the birth rate has remained relatively stable, lending evidence that the reduction in deaths is caused by a reduction in child mortality rates.

The proportion of deaths among male and female infants has remained relatively stable over the last 100 years in Spain, with male babies accounting for about 55% of all under five deaths. This proportion is similar among those under one year of age and those aged 1-4 years. Previous research has shown that male babies have a biological disadvantage in survival as compared to female babies, however, this disadvantage does not necessarily lead to reduced survival for male babies as there may be other factors, such as cultural preferences for males, that lead to differential distribution of resources for children under five based on sex.(Byass 2012) In the Spanish population over the last 100 years, based on our analysis, male children under five do have a survival disadvantage compared to female children.

5 Conclusion

The number of deaths among children under the age of five in Spain has decreased over the last 100 years, however, the proportion of male and female deaths has remained relatively stable.

References

Byass, Peter. 2012. "Child Mortality Estimation: Estimating Sex Differences in Childhood Mortality since the 1970s." *PLoS Medicine* 9 (8).

INED, The French Institute for Demographic Studies. 2021. "Births, deaths and infant mortality." https://www.ined.fr/en/everything_about_population/data/europe-developed-countries/birth-death-infant-mortality/.

UNICEF. 2020. "Under-five mortality." https://data.unicef.org/topic/child-survival/under-five-mortality/#status.