

# The Demographic Foundations of the Lived Experience of Kin Death\*

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## Abstract

The last two centuries have been marked by extremely large increases in life expectancy and reductions in variability of age at death. In this paper, we analyze how the ‘mortality revolution’ has altered individuals’ lived experience of death during life. Drawing upon nearly 360 years of historical and projected age-specific demographic rates for Sweden, we use formal demographic analysis and microsimulation to measure the extent and timing of child loss across the demographic transition as well as the average age at first experience of death of a maternal kin member and the type of kin death experienced. Our results indicate a considerable reduction in child loss across cohorts and a concentration of child loss in old age, an increase in the average age individuals experience their first maternal kin death, and a shift in first death experience from that of a sister, mother, or aunt to that of a grandmother. The transformation of the lived experience of kin death that we document has had profound implications for the health and well-being of individuals, the timing of major life course events, and the inequality of access to kinship resources.

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Our lifetime is defined by the timing of our own births and deaths, but our lived experience is defined by the lives and deaths of others. In this paper, we examine how demographic change observed in developed countries over the course of the last two centuries has altered individuals' lived experience of death during life. The first part of the article deals with historical and projected trends in child loss across birth cohorts of mothers. Improvements in infant, child, and young adult mortality have made the loss of a child a rare occurrence. But how rare? We provide quantitative answers. In the second part of the article, we analyze long-term trends in children's experiences of the death of their mothers as well as their typical first experience of death of a family member. Continued gains in life expectancy suggest that children should expect to have a living parent available to them for most of their life and that the age at which they first experience death will be later in the life course. The relationship, however, is not linear, as other important factors, like trends towards delayed fertility, have important effects. Our results indicate that beyond improvements in individual lifespan the demographic transition has led to increased time spent with family members and a chronological "ordering" of deaths within families with deaths of earlier generations generally preceding those of later generations. This transformation of the lived experience of death has important implications for the inequality of access to care and to family resources.

## Data and Approach

Capturing cohort changes in the lived experience of death across the demographic transition requires multiple centuries of age-specific fertility and mortality rates. For this analysis, we have chosen to use data from Sweden because of the unique availability of long series of historical data on vital rates. We combined data on historical fertility rates from the Human Fertility Database (HFD), historical mortality rates from the Human Mortality Database (HMD), and period vital rates projected through 2110 available from Statistics Sweden [HFD, 2010, HMD, 2010, Statistics Sweden, 2010]. Sweden is the country for which the longest series of data is available in the HMD and HFD with mortality data extending back to the birth cohort of 1751 and complete cohort fertility histories from the birth cohort of 1878. Partial information on cohort fertility is available in the HFD for cohorts extending back to 1836, and we extrapolate full fertility schedules from partial data using linear extrapolation.

We pursue two complementary strategies for quantifying changes in the lived experience of death across the demographic transition: (1) aggregate level demographic analysis building on existing methods for calculating frequencies of living kin [Goodman et al., 1974] and (2) SOCSIM, a computer-based demographic microsimulation program. Prior studies examining changes in kin death often relied on period rates and made inferences about stable populations corresponding to those rates [Watkins et al., 1987]. Our work builds on that of our predecessors in that we use similar methods, but with a data set that allows us to examine real change in the experience of loss across cohorts. The combination of microsimulation with classic demographic methods produces extremely rich results.

## Research Highlights

### Trends in Child Loss

Improvements in infant and child mortality along with declines in fertility over the course of the demographic transition decrease the likelihood of a mother experiencing the loss of a child during her life time while improvements in mortality that increase the mother's chance of survival increase the probability that she will experience child loss. As shown in Figure 1(a), later birth cohorts of mothers experience less child loss at all ages. For the birth cohort of 1880, the trend in expected child loss conditional on surviving to age  $a$ ,  $ECLC_{(a,c)}$ , indicates that mothers were losing children during their reproductive ages while for more recent birth cohorts, such as the birth cohort of 2000, the projected vital rates indicate that mothers are not likely to lose children before their 80th birthday. Figure 1(b) depicts expected child loss for birth cohorts of mothers as a proportion of  $TFR$  and gives some insight into the significance of these losses. In the earliest cohorts, mothers could expect to lose around 15% of the children they bore during their life time. For the most recent cohort, the birth cohort of 2005, the projected vital rates indicate that mothers born into this cohort can expect to lose close to 5% of the children that they bear during their lifetime. Figure 1(c) depicts the fraction of mothers of age 60 with at least one child dead by mother's birth cohort based on results from SOCSIM. This figure suggests that a mother's risk of losing a child before age 60 declined rapidly around the turn of the twentieth century. About half of the women born at the end of the 19th century who survived to age sixty experienced child loss. In contrast, for women born in the last quarter to the 20th century and the beginning of the 21st, the likelihood of losing a child before age 60 was negligible.

### Timing of Parental Death

Figure 2(a) shows trends in the average age at mother's death across birth cohorts of children. The earliest cohorts (around 1890) experienced the death of their mothers on average around age 40 while more recent cohorts can expect to lose their mothers around age 60. Surprisingly, average age at mother's death looks to have reached a peak for the birth cohort of 1960. Figure 2(b) depicts the the ages at which 10%, 25%, 50%, 75%, and 90% of the cohort have experienced the loss of their mother. The results in this figure suggest that time spent with a living mother increased across the birth cohorts born in the late 1800s through the 1970s and variability in time spent with a living mother decreased. For more recent birth cohorts, observed delays in fertility coupled with possible slowdowns in mortality improvement (anticipated in the projected vital rates from Statistics Sweden) suggest a flattening of trends in time spent with a living mother.

### First Experience of Death

Figure 2(c) shows trends in the average age at the experience of first death of maternal kin across birth cohorts based upon results from SOCSIM. For the earliest birth cohorts, women generally experienced the first death of maternal kin in childhood (the mean

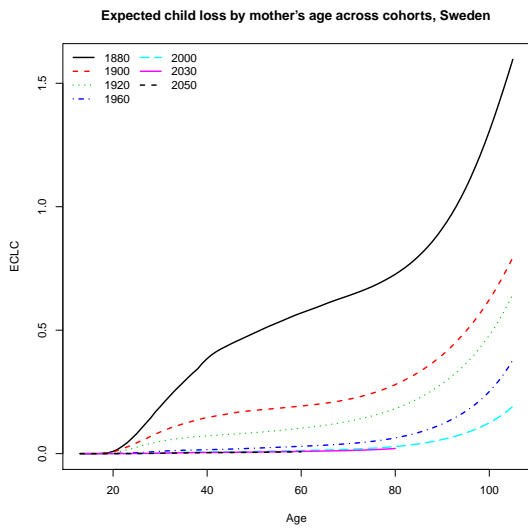
age being below 10). The mean age at experience of first death rises steadily across birth cohorts, although similar to trends for average age at mother's death, the trends seem to flatten somewhat for the most recent birth cohorts. For these recent cohorts, women on average experience the first death of a maternal kin member around age 30 suggesting that many women are transitioning into adulthood before experiencing the death of a grandmother, mother, sister, or aunt. The results depicted in Figure 2(d) suggest that the earliest cohorts were more likely to have their first experience of death of maternal kin be that of a sister. With fertility decline and continued improvements in mortality, women became more likely to have their first experience of death be that of their grandmother. For cohorts born at the turn of the twentieth century, grandmothers represented around half of first experiences of death of maternal kin, the deaths of mothers and aunts each made up around 20%, and the remaining 10% of experiences of death were those of sisters. For recent cohorts, the likelihood of the first experience of death being that of a sister is extremely rare and well over 80% of first deaths experienced are that of a grandmother.

## Significance

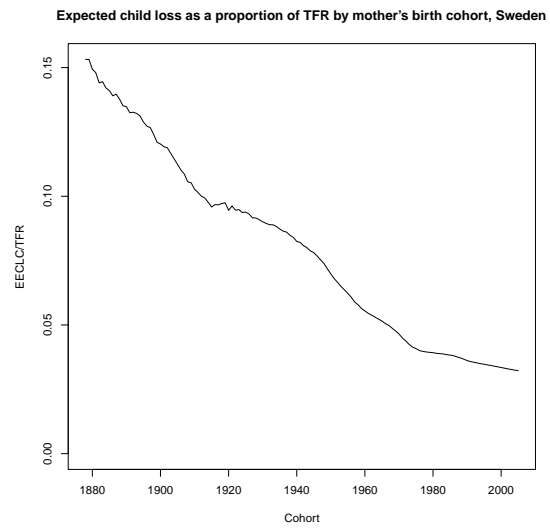
The lives and deaths of parents, children and close kin have an important impact on individuals' life trajectories, health and well being. Taken together, our analysis of cohort trends in child loss, age at mother's death, and typical first experience of death suggests that mortality transition has radically altered the lived experience of death. In an era of high fertility and mortality, death is more unpredictable. A woman is just as likely to have the first experience of death be that of her sister as that of her grandmother. As a result of the mortality transition, the average number of years spent with a living mother has increased dramatically, and mothers themselves rarely experience child loss when the child is young. The fact that the experience of close kin death has shifted to later ages and has become a rare phenomenon at young ages has relevant consequences for the inequality of access to family resources. On the one hand, the inequality of the lived experience of death has decreased as deaths occur in a more orderly way. On the other hand, those who now experience the death of a family member early in the life course may face more dire consequences, partly because family sizes and the safety net of kinship are smaller, partly because of stigmatization. As a result, a higher level of support may be necessary to meet the needs of those who experience death of kin early in the life course.

## References

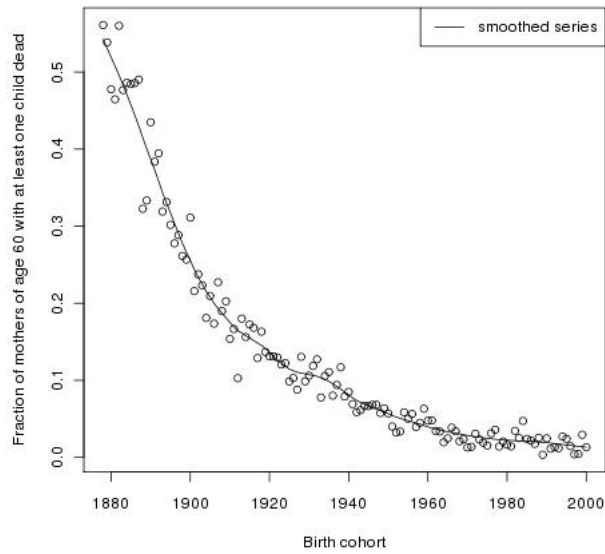
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(a) Child loss across age by mother's birth cohort

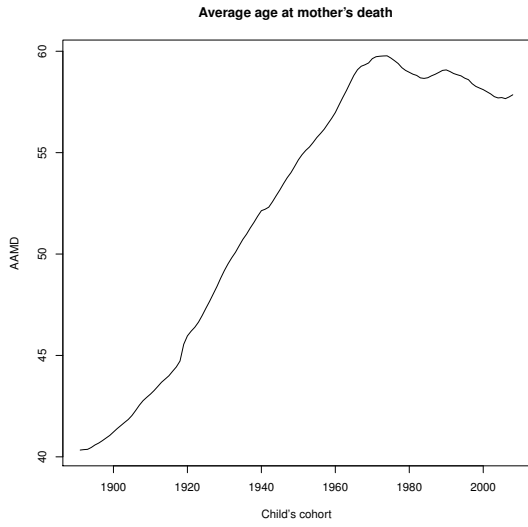


(b) Child loss as proportion of TFR

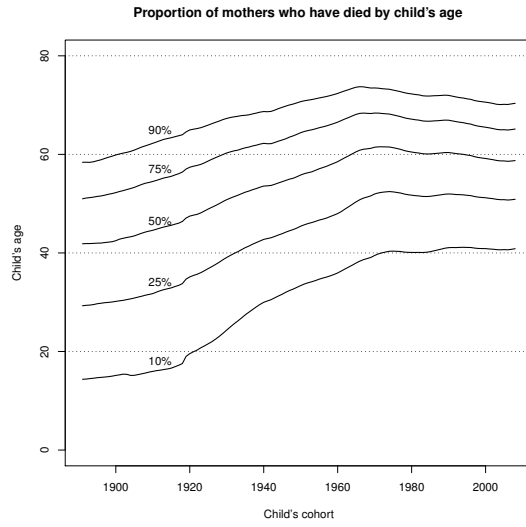


(c) Fraction of mothers of age 60 with at least one child dead by mother's birth cohort.

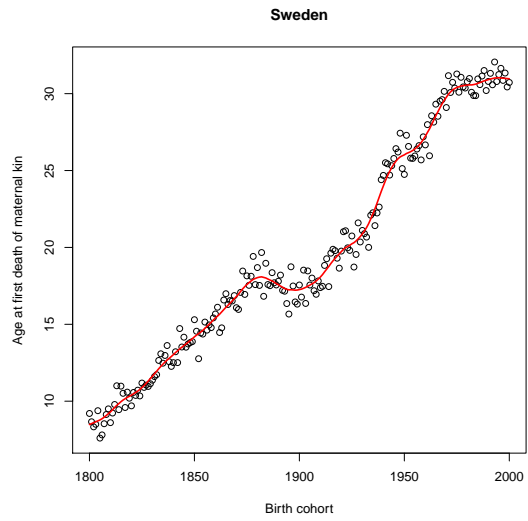
Figure 1: Expected child loss across cohorts, Sweden, 1880-2050



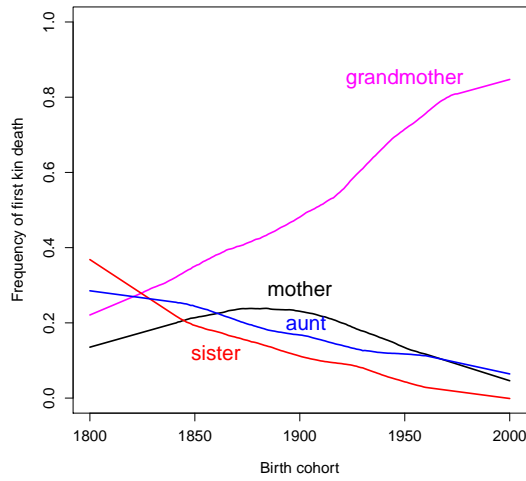
(a) Average age at mother's death by birth cohort



(b) Proportion of mother's dead by child's age



(c) Age at first experience of death of maternal kin



(d) Frequency of different types of kin death

Figure 2: Trends in experiences of kin death, Sweden