**Cumulative child death**

The cumulative number of offspring deaths experienced by a woman aged *a* standing before us is:

where for infant deaths, for child deaths and 00 for all-age offspring deaths. We restrict the female reproductive age to , so that for all cases.

**Proportion of mothers (per 1,000 mothers) who have ever lost one or more child**

We determine the prevalence of infant, child, and all-age offspring death at a population level by considering the age-specific probability that a woman will experience the death of a child:

.

With this, we create a life table with a radix or starting population , where is the fraction of women who have experienced the death of a child. We then rescale this in two ways. To account for the fact that not all women will have survived to age a, we multiply it by the share of women expected to survive to age a given the age-specific mortality rates in a given cohort and country of birth, what we might think of as a “traditional” life table survivorship column rescaled to , the start of the reproductive life . We then account for the fact that our estimates refer to women, not to mothers since the input UN WPP demographic rates are reported for women exclusively without data on parity. Given that no data exists on the fraction of women who are mothers at each age for every country in the world, we rescale our estimates using a similar life table approach as the one described above. We consider fertility as a “hazard rate” to evaluate the number of women that “survive” having children after experiencing the given age-specific fertility rates at each age. The fraction of women who have ever been mothers is 1 minus the fraction of “surviving” (i.e. childless) women. We can now define the proportion of mothers (per 1,000 mothers) who have ever lost one or more children younger than *k*:

.

We approximate period rates by taking the values along the diagonal from Eq.3 and obtain

# Multiple decerement

**Cumulative child death**

The cumulative number of offspring deaths experienced by a woman aged *a* standing before us is:

where for infant deaths, for child deaths and 00 for all-age offspring deaths. We restrict the female reproductive age to , so that for all cases.

**Proportion of mothers (per 1,000 mothers) who have ever lost one or more child**

We determine the prevalence of infant, child, and all-age offspring death at a population level by considering the age-specific probability that a woman will experience the death of a child:

.

With this, we create a multiple decrement life table where women can exit the population either by losing a child or by dying so that is the probability of leaving the state of being a non-bereaved woman. For a unitary radix , is the fraction of women who have experienced the death of a child.

Strictly speaking, these estimates do not refer to mothers, since the input UN WPP demographic rates are reported for women exclusively without data on parity. Given that no data exists on the fraction of women who are mothers at each age for every country in the world, we rescale our estimates using a similar life table approach. We consider fertility as a “hazard rate” to evaluate the number of women that “survive” having children (i.e. remain childless) after experiencing the given fertility rates at each age. The fraction of women who have ever been mothers is 1 minus the fraction of childless women. We can now define the proportion of mothers (per 1,000 mothers) who have ever lost one or more children younger than *k*:

.

We approximate period rates by taking the values along the diagonal from Eq.3 and obtain