Appendix A

Calculation of synthetic cohort probabilities of dying

The procedure for calculating synthetic cohort probabilities of dying is based on the procedure first developed by Somoza (1980) and modified by Rutstein (1984). Probabilities of dying are built up from probabilities calculated for specific age intervals: less than 1 month, 1-2 months, 3-5 months, 6-11 months, 12-23 months, 24-35 months (2 years), 36-47 months (3 years), and 48-59 months (4 years). The probability of dying is the result of dividing the number of deaths occurring in the relevant age interval for children who were exposed to death in a specific the calendar period by the number of children exposed in the calendar period.

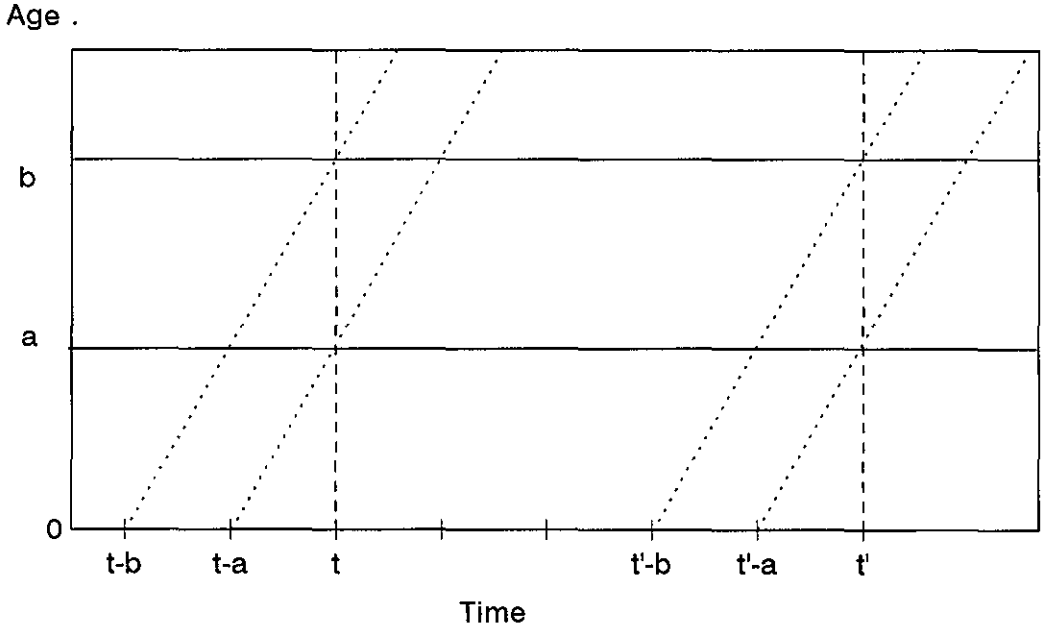
Figure A.1 shows that there are three groups of children who are exposed to death between ages *a* and *b* during the time *t* to *t'*:

(1) children born between *t-a* (age *a* at time *t*) and *t'-b* (age *b* at time *t'*),
(2) children born between *t-b* and *t-a*, and
(3) children born between *t'-b* and *t'-a*.

Children in the first group were exposed during the entire period in question, while children in the latter groups have been exposed only during part of that period. Due to the short length of the intervals used to code age at death, it can safely be assumed that in the latter case half of the deaths and the exposure occurred in the relevant period. The numerator thus becomes the sum of all deaths at ages *a* to *b* among children born between *t-a* and *t'-b*, plus half of the deaths among children born between *t-b* and *t-a*, plus half of the deaths among children born between *t'-b* and *t'-a*. Similarly, the denominator becomes the number of children born between *t-a* and *t'-b* who survived to age *a* plus half of the children born between *t-b* and *t-a* who survived to age *a*, plus half the children born between *t'-b* and *t'-a* who survived to age *a*.

An exception must be made for the period immediately before the survey since all deaths recorded for children exposed during this period must have occurred before the date of the survey. Therefore, all the deaths (rather than half) are counted for children born between *t'-b* and *t'-a*, although the children have been exposed on average for half of the time.

Figure A.1 Cohorts used to calculate synthetic rates, Demographic and Health Surveys, 1990-1994



To calculate the conventional probabilities of dying, which are presented in the tables in this report, the authors first calculated the probability of surviving through the subinterval by subtracting the probability of dying (the quotient given above) from one. Then they multiplied together the subinterval survival probabilities included in the conventional age limits and, finally, subtracted this product from one to give the probability of dying within the conventional limits:

$$(n)q(x) = 1 - \prod_{i=x}^{i=x+n} (1 - q[i])$$

where $(n)q(x)$ is the conventional probability of dying between ages x and $x+n$ and $q[i]$ are the subinterval probabilities of dying.

The conventional postneonatal mortality rate is defined differently from conventional rates. Although it refers to the age interval between one and eleven months (completed), it is not a probability, but rather is the arithmetic difference between the infant mortality rate (the probability of dying in the first year of life) and the neonatal mortality rate (the probability of dying in the first month of life).