

## **EDSD Course**

### **DATA AND METHODS—INDIRECT ESTIMATION TECHNIQUES**

Most demographers and population researchers are used to the classical direct methods, which are based on sex- and age-specific numbers of events like births or deaths and of the living population at risk. In most developing countries, however, such data are either lacking or severely deficient to an extent that the common direct methods cannot be applied. Mainly during the 1970s and 1980s, demographers developed a number of specific estimation methods to overcome these data problems. These methods can be subdivided into two broad groups: semi-direct methods and indirect methods. The first group comprises methods which are used for checking the completeness of registered data and for adjusting for typical underreporting in order to obtain less biased demographic measures. In the field of mortality research, the most commonly used semi-direct methods are different variants of the “growth balance method” and the “inter-censual estimation techniques”. With indirect techniques, mortality estimates are derived from survey information on the survival experiences of close relatives or household members. For the estimation of infant and child mortality, the most frequent method is based on information about children ever born and children surviving, whereas the most prominent indirect method for the estimation of adult mortality is the “orphanhood method”, which is based on survey reports on parental survival. Other approaches for the indirect estimation of adult mortality are based on the survival of spouses and siblings. Model life tables—like those developed by Coale and Demeny, the United Nations or the INDEPTH network—are used to translate survival estimates for specific age segments derived from such indirect techniques into complete life tables and thus into life expectancy. After two decades of intensive discussion and derivation of these specific estimation tools, the use of semi-direct and indirect estimation techniques seems largely forgotten among demographers in the developed world. However, for the majority of developing countries these methods are still the main and often the only possible estimation tool, even for the most recent demographic data.

The course provides an overview of the basic concepts of indirect estimation techniques with a special focus on the estimation of adult mortality by introducing practical examples. As an example for direct methods the growth balance method is chosen that consists primarily of comparisons of the age pattern of deaths with the age pattern of the population. Besides its application in developing countries with existing but biased and incomplete data on demographic processes, this method can also be very useful in historical demography. The orphanhood method serves as an example for indirect estimation of adult mortality. The method is based on the information of parental survival experiences in order to derive conventional life table measures of adult mortality using demographic models that relate the proportions of the population by age with a living mother or father back to the mortality conditions that produced them. It will be demonstrated that such classical tools for developing countries could also make a valuable contribution to the study of specific demographic aspects in developed populations. The course consists of four lectures and is divided into the following sections:

1. Semi-direct and indirect demographic estimation: background and introduction
2. Semi-direct methods: estimation of completeness and correction of registered number of deaths with the “growth balance method”
3. Indirect methods for mortality estimation: basic approaches

4. The impact of measures against Malaria on child mortality in Zanzibar: a WHO/MoH Zanzibar project 1986-92
5. The “orphanhood method” for indirect estimation of adult mortality
6. Practical application of the orphanhood method: example Bolivia, 1975
7. Indirect measurement of adult mortality from survey data in developed populations: an extended application of the orphanhood method

## SUGGESTED READINGS

Hill K., Zlotnik H., Trussell J., 1983: *Manual X. Indirect techniques for demographic estimation*, New York: United Nations.

Preston S., Heuveline P., Guillot M., 2001: *Demography. Measuring and modeling population processes*, Oxford: Blackwell Publishers.

Popoff C., Judson D. H., 2004: “Some methods of estimation for statistically underdeveloped areas,” pp. 603-641 in: Siegel J. S., Swanson D. A. (eds.): *The methods and materials of Demography*, second edition, Amsterdam et al.: Elsevier.

Hill K., 2006: “Indirect estimation methods,” pp. 619-631 in: Caselli G., Vallin J., Wunsch G. (eds.): *Demography. Analysis and synthesis*, Amsterdam et al.: Elsevier.

Luy M., 2012: “Estimating mortality differences in developed countries from survey information on maternal and paternal orphanhood”, *Demography* 49(2): 607-627.

Luy M., 2010: “A classification of the nature of mortality data underlying the estimates for the 2004 and 2006 United Nations’ World Population Prospects”, *Comparative Population Studies* 35(2): 315-334.

Moultrie T., Dorrington R., Hill A., Hill K., Timæus I., Zaba B., 2013: *Tools for demographic estimation*. Paris: IUSSP.