MEASURING CHILD MORTALITY IN
AIDS-AFFECTED COUNTRIES *

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A. INTRODUCTION

Recent estimates show that over the past decade there has been a stagnation and reversal in the previous gains made in child mortality in some countries. HIV/AIDS is thought to be an important cause of this reversal of trends (Walker and others, 2002; Nicoll and others, 1994). At the same time, current methods of measuring child mortality in low resource settings are compromised because of the association between child and maternal mortality in settings with high AIDS prevalence. Children whose mothers have died have higher child mortality (Nakinyingi, 2003a). This association results in a bias in reported child deaths in data collected retrospectively from mothers because only living mothers are able to report.

In 2001 UNICEF funded the London School of Hygiene and Tropical Medicine (LSHTM) to assess the impact of the HIV epidemic on child mortality. One component of that study was to evaluate current methods for estimating child mortality in high HIV prevalence countries. That component is the focus of this paper. Reports on the full project can be found elsewhere (Zaba and others, 2003). This paper presents a brief overview of the impact of AIDS on child mortality trends and summarizes the research on the effects of AIDS on measuring child mortality. The effects of AIDS on both indirect and direct estimation of child mortality are discussed. In conclusion, recommendations are made for surveys measuring child mortality in AIDS-affected countries.

B. OVERVIEW OF THE IMPACT OF AIDS ON CHILD MORTALITY

A number of studies have pointed to increased child mortality as a result of the AIDS epidemic. This is a natural conclusion based on the evidence that vertical transmission of HIV occurs in approximately 32 percent of births to HIV infected mothers in countries where breastfeeding is prevalent (Walker, 2003). And 60 percent of children who are infected with HIV will die before their fifth birthday (Spira and others, 1999). However, questions about what proportion of the increase in child mortality is due to vertical transmission and what proportion is due to other factors (including those related to a countries' HIV epidemic) are still being debated.

At the aggregate level, Adetunji (2000) reviewed Demographic and Health Survey (DHRt 0 0(DHc 382.606911.10a

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1. Indirect Estimation Methods

For the indirect technique the proportion of children who have died by age group of the mother (15-19, 20-24, …45-59) is calculated and an estimate of the probability of dying between birth and various ages is estimated from these calculations. The proportion dead can then be translated to mortality at different points in time over the years prior to the survey. The result is estimates of child survival to different ages, and corresponding to different points in time. (For a complete description of this technique see UN Manual X, United Nations, 1983)

The indirect technique relies on a number of assumptions including: 1) the correlation of mortality between mother and child is sufficiently small to ignore, 2) child mortality is independent of mother's age, and 3) the child mortality pattern can be described using a model life table. The first assumption is violated in countries with high levels of vertical transmission of HIV. As explained before, HIV positive mothers are more likely to have HIV positive children and since the case fatality is so high for HIV positive individuals a correlation exists between child and maternal mortality. The second assumption is violated also in HIV settings because in most countries HIV prevalence

Despite efforts to create correction factors, the assumptions and simplifications required for the model make the correction factors difficult to apply. Their conclusion was that countries with high prevalence should not use indirect estimates of child mortality.

2. Direct Estimation Methods

Direct estimation methods require collecting birth histories from women including the date of birth and date of death of every child. This data allows relatively accurate estimates of child mortality by time period and the age of the child. This technique does not use life table models nor does it rely heavily on data from women about births that occurred in the distant past. This makes the child mortality estimates more reliable, although there are still margins of error based on the size and sampling of the survey.

Similar to the indirect method, this method also relies on the assumption that maternal and child mortality are independent. However, this assumption is relied upon to a much smaller degree, especially for more recent estimates of child mortality. In addition the direct method does not use model life tables and does not depend on the mother's age. For these reasons there is a different effect of AIDS on the direct methods of estimating child mortality as compared to the indirect effect.

Artzrouni and Zaba (2003) looked at the bias introduced by AIDS when using direct estimation techniques. The duration since onset of the epidemic was included in the model because the survival function of the mother will be related to the time since infection. This model did not take into account the variable timing of survival based on the introduction of antiretroviral drugs or improved nutritional and care status of mothers. However we can infer that these two components will reduce the bias by keeping mothers alive longer.

The model measured the different mortality experience of infected and uninfected women and calculated the magnitude of the bias between the mortality risks in five settings. The settings incorporate various degrees of HIV prevalence and disease spread. Unfortunately they were all based on settings with low child mortality. In further analysis (personal correspondence) the authors find that there is a very small – 2 percentage point – increase in the estimate of bias in situations of higher underlying mortality.

Even at high prevalence levels they found that overall child mortality rarely exceeds five percent for the most recent time period (over the previous five years). Figure I presents the estimated bias 25 years into an epidemic. The same model for 35 years into the epidemic suggests there will be about a seven percent bias at age five. The more far reaching estimates of child mortality are less reliable given that only living mothers responded to the survey. Current confidence intervals around child mortalityHehat overa

significant, so it will be important to advise countries to collect birth history data only in countries where no other accurate, current estimates of child mortality are available. Another possible resource saving

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