Published in final edited form as:
Popul Stud (Camb). 2012 November ; 66(3): 279–295. doi:10.1080/00324728.2012.681682.

The relationship between orphanhood and child fostering in sub-Saharan Africa, 1990s–2000s

Monica J. Grant[1] and **Sara Yeatman**[2]
[1]University of Wisconsin
[2]University of Colorado Denver

Abstract

In countries most afflicted by HIV/AIDS in sub-Saharan Africa, orphanhood has increased dramatically, but the potential consequences of the increase have been mitigated by the ability of households to absorb orphans. This paper examines what the rising levels of orphanhood mean for the common practice of non-orphan child fostering in regions of high and low HIV prevalence in sub-Saharan Africa, which has a long history of child fostering. Using Demographic and Health Survey data from 135 regions within 14 sub-Saharan countries that undertake HIV testing and have had at least two surveys, we examine changes in fostering patterns. In most regions, we find a more accommodating relationship between orphan and non-orphan fostering: communities are able to absorb the demand for both orphans and non-orphans. Where HIV prevalence exceeds ten per cent there is some evidence that the need to care for orphans is beginning to reduce opportunities for non-orphan fostering.

Keywords

orphans; fostering; sub-Saharan Africa; HIV; AIDS

Introduction

The rise in the number of orphans associated with the HIV/AIDS pandemic in sub-Saharan Africa has received much attention from international aid agencies, local governments, and academic researchers. Despite early catastrophic predictions (Poonawalla and Cantor 1991; Barnett and Blaikie 1992; United Nations Children's Fund 2003), however, there has not been the anticipated surge in Western-style orphanages or child-headed households. It is thought that fewer than five per cent of orphans live on the streets or in institutions although this has increased in the most severely affected countries (Monasch and Boerma 2004; Powell et al. 2004; Beard 2005; United Nations Children's Fund 2005; UNICEF, UNAIDS, and PEPFAR 2006; Morantz and Heymann 2010). Furthermore, a recent study of child-headed households in Zimbabwe found that few of these households comprised orphans, which challenges the idea that such households reflect the absorptive capacity of the extended family (Ciganda et al. 2010). Instead, the extended family system characteristic of the region has shown a remarkable capacity to absorb orphans and mitigate the consequences of there being so many newly orphaned children (Caldwell 1997; Monasch and Boerma 2004; Hosegood et al. 2007).

Monica Grant is at the Department of Sociology, Center for Demography and Ecology, University of Wisconsin, 4412 Sewell Social Sciences Building, 1180 Observatory Drive, Madison, Wisconsin 53706. grantm@ssc.eisc.edu. Sara Yeatman is at the department of Health and Behavioral Sciences, University of Colorado Denver.

The process of child fostering is an age-old mechanism in sub-Saharan Africa for reducing uncertainty and realizing opportunity. When parents die, children are necessarily fostered out. Historically, however, even where mortality was high, the majority of fostering in the region was elective (Madhavan 2004), serving as a means to buffer economic and demographic inequalities (Eloundou-Enyegue and Shapiro 2004). Although the majority of country-specific case studies of child fostering have focused on West Africa (for example Isiugo-Abanihe 1985; Bledsoe and Isiungu-Abanihe 1989; Vandermeersch 2002; Eloundou-Enyegue and Shapiro 2004; Akresh 2009), the practice is common throughout sub-Saharan Africa, including the AIDS-burdened areas of East and Southern Africa (McDaniel and Zulu 1996; Bicego et al. 2003; Monasch and Boerma 2004).

The study presented in this paper took a new approach to examining the consequences of the HIV/AIDS pandemic by asking what the rise in orphanhood meant for the traditional practice of non-orphan child fostering. With the number of orphans increasing, particularly in AIDS-afflicted countries, we assumed that the demand for fostering would grow but that the supply of households willing and able to take in foster children would be constrained. To test this assumption, we used Demographic and Health Surveys (DHS) from the 14 sub-Saharan countries that undertook HIV-testing and in which at least two rounds of the DHS had been conducted.

We first describe changes in fostering patterns over time and then present the fixed-effects models that we used to examine how orphan and non-orphan fostering vary by regional-level HIV prevalence.

Child fostering

Child fostering has long been recognized as a coping mechanism used by African households to respond to adult mortality, offset economic hardships, take advantage of resources available through kin networks, and redistribute the costs and benefits of childbearing across the extended family (Isiugo-Abanihe 1985; Mason 1997; Akresh 2009). While particularly common in sub-Saharan Africa, the practice was also once common in the U.S. and Europe. For example, the 1910 U.S. Census showed that 3 per cent of white mothers and 12 per cent of African American mothers under the age of 35 had offspring who did not live with them (Moehling 2002). While high endemic adult mortality in sub-Saharan Africa meant that orphanhood was common even before the dramatic increase in mortality that accompanied the HIV/AIDS epidemic, the majority of fostering was not due to the mortality of parents. As late as 2002, almost nine per cent of all children in sub-Saharan Africa were fostered non-orphans who had two living parents but lived apart from both of them, whereas only slightly more than three per cent were fostered orphans (Monasch and Boerma 2004). Although child fostering is a widespread practice across sub-Saharan Africa, its historical antecedents differ across regions. Evidence from West Africa suggests that fostering was predominantly used as a mechanism for families to strengthen social connections and kinship ties, as well as to share the costs of childbearing (Frank 1984; Isiugo-Abanihe 1985; Alber 2004; Akresh 2009). In contrast, in southern Africa, it is likely that fostering emerged as a response to patterns of seasonal labour migration and family division that began during the colonial period (Madhavan 2004; Monasch and Boerma 2004; van Blerk and Ansell 2006).

The reasons for fostering are diverse. The broader literature classifies fostering as following from either 'non-crisis' or 'crisis' situations (McDaniel and Zulu 1995; Madhavan 2004). Non-crisis child fostering is used to smooth socioeconomic inequalities and to lessen demographic imbalances in a region marked by high fertility and sterility, that is, where some families have many children while others have none (Isiugo-Abanihe 1985; Bledsoe and Isiungu-Abanihe 1989; Lloyd and Desai 1992; Vandermeersch 2002). In these

situations, the relocation of children shares resources across the extended family and strengthens kinship networks. For older children, non-crisis fostering can open up opportunities for education or vocational training that would not have been available otherwise, through placement with more affluent relatives or with those who live near better quality schools (Goody 1982; Lloyd and Blanc 1996; Zimmerman 2003; Akresh 2009).

In contrast, crisis fostering is a strategy that families use to cope with sudden shocks and ongoing hardships. Temporary and longer-term migration often prompt parents to foster out their children, and fostering is often the only way that some African women are able to combine labour force participation with motherhood (Lloyd and Desai 1992; McDaniel and Zulu 1996; Vandermeersch 2002). Children of divorced or separated parents, or those who were born out of wedlock, are more likely to live apart from their parents, and some children who remain with a parent after divorce are subsequently fostered out when that parent remarries (Isiugo-Abanihe 1985; Page 1989; Lloyd and Desai 1992; McDaniel and Zulu 1996; Vandermeersch 2002; Grant and Yeatman 2008). Finally, many children are fostered following the deaths of one or both of their parents.

Orphanhood

The HIV/AIDS epidemic has led to an upsurge in orphans in Southern and Eastern Africa. The death of adults infected in the 1980s and 1990s has caused a sharp increase in orphans in the region from the late 1990s through to the present day (Bicego et al. 2003; Monasch and Boerma 2004; United Nations Children's Fund 2006). Unsurprisingly, there is a strong relationship between national HIV prevalence and orphan prevalence. Studies demonstrating the strength of the association include one by Bicego et al. (2003), who used data from DHSs to explore changes in the prevalence of orphans over time. They find that the percentage of children who had lost a parent increased from 9.5 to 14.9 in Zimbabwe between 1994 and 1999, where adult HIV prevalence was 25 per cent, while in Niger, where HIV prevalence was less than two per cent, the prevalence of orphanhood actually declined from 6.8 to 5.7 per cent of all children between 1992 and 1998 (Bicego et al. 2003). Furthermore, in many countries where the incidence of HIV has plateaued or declined, the prevalence of orphans continues to increase as parents infected in the past develop AIDS and die (Monasch and Boerma 2004). The dramatic increase in orphanhood in high-HIV-prevalence countries over a relatively short period of time means that a new group of children are being displaced from homes and must find space in other households. Despite the demands this increase has placed on communities, orphans in sub-Saharan Arica are still predominantly absorbed into the extended family system (McDaniel and Zulu 1996; Monasch and Boerma 2004; Heuveline 2004).

Researchers are divided over whether or not the extended family can continue to expand to meet the needs of the growing number of orphans (Hunter 1990; Ankrah 1993; Ryder et al. 1994; Urassa et al. 1997; Heuveline 2004). In a 1997 article on the African AIDS epidemic, John Caldwell stated that 'such levels of orphanhood will place great stress on the society, although perhaps less than on any other major society in the world (1997, p. 178)'. He continued, 'extraordinarily, the evidence up to now is that the fostering system will probably accommodate the very great numbers of AIDS orphans (1997, p. 179)'. He stopped short of speculating on what the increase in orphanhood would mean for the traditional practice of child fostering of non-orphans.

There is early evidence that the cumulative strain of a decade of high adult mortality and growing numbers of orphans may strain even these extended family networks in the countries most affected. Recent evidence from Zimbabwe, where HIV prevalence is high, suggests that high mortality among household heads and income earners is beginning to overwhelm the ability of other households to provide sufficient orphan care (Gregson et al.

2007). In rural Malawi, a qualitative study found that men who knew they were HIV-positive often cited concern about who would care for their children as a reason for having smaller families (Yeatman 2009). This new evidence suggests that there may be a limit on the absorptive capacity of extended families, a limit that may have been reached in some of the countries where HIV/AIDs is most prevalent. If so, it is likely that non-orphan fostering may be the first place where this limit is felt.

To address this issue, we tested the hypothesis that orphan fostering and non-orphan fostering are competitive. The hypothesis is based on the following reasoning. The recent increase in AIDS-related mortality in high-prevalence communities led to a surge of orphaned children in need of care from their extended family and larger community. Meeting their needs may close opportunities for fostering that would otherwise have been used by children with living parents. At the same time, HIV-related adult mortality may reduce the number of households able and willing to take in children for any reason, and further shift the emphasis to fostering those children with the greatest need, such as orphans. On this view, orphan fostering may displace non-orphan fostering in countries and communities most severely affected by the HIV/AIDS epidemic. To the extent that child fostering is used by families to increase a child's access to education, share the economic burden of childbearing, and strengthen kinship ties, the epidemic (if it is associated with a reduction in elected fostering) may affect intergenerational and horizontal resource sharing in ways that have not yet been empirically measured. Similarly, where non-orphan fostering is used to cope with other crises apart from parents' death, families unable to foster out children who would have historically been able to find a home elsewhere may be placed under increased economic and social strain.

If there is not a negative association between orphan and non-orphan fostering, this would imply that the capacity of extended families to absorb fostered children is elastic enough to accommodate the increase in orphans, while still providing for traditional types of fostering. Even when traditional arrangements for fostering children become saturated, other relatives may begin to assume greater responsibility for care-giving (Monasch and Boerma 2004). In fact the social organization of families in the region and their adaptive capacity suggest that fostering and orphanhood could be accommodating instead of competitive (Chirwa 2002), though it is important to note that an increase in the supply of in-fostering says little about its quality. Where fostering demands are growing rapidly, the ability of communities to accommodate the increased demand may indicate that these children are sheltered but could also reflect a dilution in the quality of the fostering arrangements. The present study was limited to the question of the quantity of fostering rather than its quality.

Data and methods

Data

The DHS is a standardized nationally representative household survey. Although it focuses on sexual and reproductive health, fertility, and child-health issues, the household rosters collect extensive information about all current residents of sampled households, whether or not a woman of reproductive age is present in the household. In particular, the survey collects information on parents' survival and co-residence for all children aged 14 and younger. In a sub-set of countries, the DHS collected information on parents' survival and co-residence for children younger than 18 years old. We restricted our analysis to children aged 14 years and younger to maintain comparability between countries and because children under 14 are most likely to be dependent on care from others and unlikely to be married.

The most recent DHS surveys in sub-Saharan Africa and selected other countries include household-based HIV testing. To date, the surveys have collected HIV-biomarker data in 21 African countries. Because we were interested in changes in the magnitude and composition of child fostering over time and the association with HIV prevalence, we restricted our analysis to the 14 countries in sub-Saharan Africa in which at least two surveys had been conducted that contained data on parents' survival and co-residence, including one survey that included HIV-biomarker data (see Table 1: Benin, Burkina Faso, Cameroon, Cote d'Ivoire, Ethiopia, Ghana, Kenya, Malawi, Mali, Niger, Senegal, Tanzania, Zambia and Zimbabwe). For countries where more than two surveys had been conducted, we used data from all available surveys that included data on parents' survival and co-residence with children. Across the set of countries in this analysis, an average 9.6 years had elapsed between the earliest and most recent survey. The analysis excluded three countries for the following reasons: Rwanda because the impact of the 1994 ethnic genocide on child orphanhood could not be distinguished in the data from trends related to the HIV epidemic; Liberia because the first survey had been conducted using an abbreviated household roster; and Guinea because coding of regions across survey rounds had been inconsistent.

The stage of the epidemic varies substantially from country to country in our sample (Table 1). According to their latest DHSs, HIV prevalence is less than one per cent of the adult population (ages 15–49) in Niger and Senegal. Six countries have HIV prevalence levels of between one and five per cent; except for Ethiopia, all these countries are in West Africa. In three countries—Cameroon, Kenya, and Tanzania—HIV prevalence is between five and ten per cent. Finally, HIV prevalence is greater than 10 per cent in Malawi, Zambia, and Zimbabwe. These national estimates of HIV prevalence disguise substantial intra-country variation. In addition to national estimates, the published DHS reports show HIV prevalence levels for sub-national regions that correspond with either official district boundaries or broader geographic categories. For some countries, we had to recalculate region-level HIV prevalence to make the regional boundaries the same across survey rounds. Analysis at the regional level allows a more nuanced understanding of the epidemic. For instance, HIV prevalence varies across the seven regions of Kenya from a low of 4.9 per cent to a high of 15.1 per cent of the adult population. Even in a low-prevalence country, such as Ethiopia, the regional HIV-prevalence levels range from 0.2 to 6.0 per cent. Throughout our analysis, we used these sub-national variations to gain a better understanding of how the levels and composition of child fostering prevalence had changed over time, and how they were associated with HIV

While the HIV/AIDS pandemic is likely to be the largest single factor to affect child fostering across sub-Saharan Africa, other local crises may also have affected an individual country's supply and demand for child fostering. For example, Zimbabwe has been embroiled in an economic crisis since 2000 that has consequences for child fostering. Our analyses used a region-level fixed effect to account for these differences, but it is important to remember that while our focus was on HIV/AIDS, it is not the only factor influencing fostering.

Analysis

We defined a fostered child as any child who had been enumerated in a household roster but did not live with either biological parent, regardless of whether the parents were living or dead. We distinguished between orphan fostering—a child who did not live with either biological parent and at least one of whose parents had died— and non-orphan fostering— a child who did not live with either biological parent even though both parents were still alive. Our definition of non-orphan foster-children included those fostered for both crisis and non-crisis reasons. The DHS does not identify the reason for fostering, so we were unable to determine whether some fostering situations were more sensitive than others to changes in

the prevalence of orphan fostering. A shortcoming of the DHS is that it excludes children who are not members of a regular household. This includes vulnerable children who live in community orphanages, as well as children who live in school-based boarding facilities. In our analysis we did not correct for this bias, but we are conscious that our estimates of changes in child fostering did not fully capture the range of living arrangements for children not living with their biological parents.

We separated out the types of fostering to understand better the true relationship between an increase in orphan-related fostering and non-orphan child fostering. Where HIV prevalence is high and the level of orphans is growing, absolute child fostering can still increase over time, even if there is a competitive relationship between orphan and non-orphan fostering. Such an increase or plateau in child fostering levels says little about the opportunities for fostering that may have changed for children who are not orphaned. It was to avoid this distortion that we distinguished between orphan and non-orphan fostering.

We analysed the prevalence of child fostering by orphan status among children aged 14 and younger. All references to the level or prevalence of orphan fostering refer to the proportion of all children listed in the household roster who were orphans living in a fostered arrangement. Similarly, the level or prevalence of non-orphan fostering refers to the proportion of all children who had two living biological parents but were living in a fostered arrangement. If the survival status of one of the child's parents was unknown or missing, the child was included in the denominator of the analysis (for precedent, see Monasch and Boerma 2004), but was not included in either fostering category. If survival information was missing for both parents, the case was excluded from the analysis. For most countries included in the analysis, less than one per cent of children had at least one parent whose survival status was unknown. The highest levels are found in Kenya, where the survival status of a parent was unknown for slightly more than two per cent of all children in both survey rounds. Our analyses included the relationship between total orphanhood, single orphanhood, and double orphanhood and non-orphan fostering. Total orphanhood was defined as single orphanhood (one deceased parent) plus double orphanhood (two deceased parents).

The first stage of the analysis explored the descriptive relationship between orphan and non-orphan child fostering at the national and regional levels. We focused on changes in the composition of child fostering over time and how these changes might have been associated with levels of HIV prevalence. Unfortunately, repeated regional estimates of HIV prevalence were not then available through the DHS and therefore could not be used to examine how changes in child fostering were related to regional changes in HIV prevalence. That said, changes in HIV prevalence can provide only limited information about the relationship between the course of the epidemic and changes in orphanhood and child fostering. If the rate of new infections plateaus or declines over time, the prevalence of orphanhood and orphan fostering can continue to increase as previously infected adults develop AIDS and die. In light of these considerations, we interpreted the most recent cross-sectional estimate of adult HIV prevalence as an indicator of the severity and maturity of the epidemic in a given region. To this end, we created a categorical variable that classified each region as having 'Low prevalence' if HIV prevalence was under five per cent, 'Medium prevalence' if it was between five and ten per cent, and 'High prevalence' if it was more than ten per cent. Alternative specifications that used HIV prevalence of fifteen per cent or greater to distinguish high-prevalence regions (details not shown) did not substantially affect our conclusions.

The second stage of the analysis formally tested whether orphan and non-orphan fostering were competitive or accommodating processes. We used multi-level linear regression with

region-level fixed effects to examine the association between non-orphan and orphan fostering:

$$Y_{ri} = \alpha + \beta X_{ri} + \beta Z_{ri} + \beta X_{ri} * H_r + R + \varepsilon$$

where Y_{ri} is the percentage of all children who were fostered non-orphans at survey round i for region r, X_{ri} is the percentage of all children who were fostered orphans at survey round i for region r, Z_{ri} is the year at survey round i for region r, and H_r is a vector of the three categorical variables representing HIV prevalence among adults (aged 15–49) for region r measured at the most recent survey round. R is a region-level fixed effect, and ε is the remaining error term that reflects unobserved observation-level variance. The region-level fixed effect controlled for all unobserved, time-invariant region characteristics and removed region-level confounding that was time-invariant, linear, and additive. The Hausman endogeneity test, comparing a fixed-effects model to an alternative random-effects model for the full regression, was significant (chi square = 84.39, df=4); this test indicates that a correlation between the random intercept and the covariates was present in the random-effects model, confirming that a fixed- effects model was the appropriate specification (Rabe-Hesketh and Skrondal 2008).

Sub-national region was the unit of analysis, which meant there were 351 observations. We ran the regressions separately by category of HIV prevalence, in order to see whether different patterns in the association between orphan and non-orphan fostering appeared. The model described above pools all of the observations and uses the interaction between the prevalence of orphan fostering and the categories of HIV prevalence to determine whether the differences in pattern are statistically significant. These descriptive regressions gave us greater power to explore recent changes in child fostering. Unobserved time-invariant characteristics of each region were captured in the fixed-effects component of the model, allowing us to interpret the key regression coefficients as the average difference in the prevalence of non-orphan fostering that accompanies differences in orphan fostering within a region.

In addition to testing the association between orphan and non-orphan fostering, we also took into account whether an association existed between non-orphan fostering and the level of orphanhood within a region. When children have lost both of their parents, they must be fostered by another household or be provided for in some other way, such as in a community orphanage. However, across sub-Saharan Africa most orphaned children have one surviving parent (Monasch and Boerma 2004). Although the death of one parent creates a hardship for the household, it is possible that the children can remain with the parent who is still living. Thus, the pressures on the absorptive capacities of extended families may be greatest where the prevalence of double orphans is increasing, or may be more sensitive to the demand for orphan fostering than the level of orphanhood itself. Our last set of regressions investigated whether single and double orphanhood differed in their relationship to non-orphan fostering.

In addition to the multilevel regressions, we also conducted a standard decomposition of the change in the prevalence of non-orphan fostering from the earliest to the most recent survey (Preston et al. 2001). The decomposition partitioned the observed change in the prevalence of non-orphan foster children into change that was due to change in the prevalence of non-orphans and to change in the rate of fostering among non-orphans, and is expressed in the equation:

$$\Delta = (P^b - P^a)*(R^b + R^a)/2 + (R^b - R^a)*(P^b + P^a)/2$$

where Δ is the change in the proportion of non-orphan foster children, P is the proportion of children who were not orphaned at the earliest survey round a and most recent survey round b, and R is the rate of child fostering among non-orphaned children at survey rounds a and b.

Results

We present levels of fostering as a percentage of all children. For all countries, the percentage of all children younger than 14 who are non-orphan fostered is higher than the percentage who are orphan fostered, although in 11 regions orphan fostering is more prevalent than non-orphan fostering at the most recent survey round. Table 2 shows the prevalence of orphan and non-orphan fostering for each country at the first available and most recent surveys. At the first available survey, more than seven per cent of all children were non-orphan foster children in every country. The highest prevalence of non-orphan fostering was in Zimbabwe, where 14.2 per cent of all children were non-orphan foster children in 1994. In all countries, the prevalence of orphan fostering at the first survey was roughly one-half to one-third the level of non-orphan fostering.

By the time of the most recent survey, the difference between orphan and non-orphan fostering had narrowed in almost every country. The prevalence of non-orphan fostering declined in eight countries, whereas the level of orphan fostering declined in five. Only in Ghana did orphan fostering decline while non-orphan fostering increased. Orphan fostering increased while non-orphan fostering declined in four countries: Kenya, Tanzania, Zambia and Zimbabwe. In the remaining countries, changes in fostering increased the prevalence of orphan fostering relative to non-orphan fostering; this includes cases where the levels of each type of fostering declined but the decrease in non-orphan fostering was greater. Non-orphan fostering still exceeds orphan fostering in the most recent surveys, but in a few cases the difference is nominal.

Some of the biggest changes in orphan fostering are within the countries that have the highest levels of HIV prevalence. However, a country-level examination of these changes does not provide clear evidence of the relationship between the two types of child fostering. For example, non-orphan fostering declined at the same time that orphan fostering increased in high-prevalence Kenya, Tanzania, Zambia, and Zimbabwe, but in Malawi, where HIV prevalence is also high, both orphan and non-orphan fostering increased between survey rounds. Inconclusive evidence at the national level might, however, be masking more systematic changes occurring sub-nationally, where there are considerable within-country differences in fostering, orphanhood, and HIV patterns. We now shift our attention to the analysis of regional levels of child fostering.

Figures 1A and 1B show the prevalence of non-orphan fostering on the y-axis, and the prevalence of orphan fostering on the x-axis, for the earliest and most recent survey rounds respectively. Each observation in the Figures represents one of the 135 sub-national regions. From the linear trendline in Figure 1(a), it is clear that there is a weak positive correlation ($R = 0.2651$) between orphan and non-orphan child fostering at the first survey round. Most regions have orphan fostering levels below six per cent. The regions with the highest levels of orphan fostering are found in Burkina Faso and Ethiopia, countries that have maintained relatively low levels of HIV prevalence over time. It is also clear that there is substantial variation across regions within countries. For instance, two of the points with the lowest levels of non-orphan fostering are in Burkina Faso: while one region in the country has an orphan fostering level of less than two per cent, another has a level of more than six per cent.

When this Figure is replicated for the most recent round of surveys (Figure 1(b)), the overall level of correlation is similar. In the majority of observations, fewer than eight per cent of children are fostered orphans. However, a distinct group of regions where orphan fostering is high has emerged. Figure 1(b) separates the regions by HIV prevalence, revealing two distinct patterns. Regions with HIV prevalence higher than 10 per cent appear to have a very

different pattern from regions with lower levels of HIV prevalence. The linear trendline drawn through the regions with high HIV prevalence has a shallower slope than the trendline drawn through regions with lower prevalence. However, it is not immediately clear from the Figure whether the increases in orphan fostering in these high-prevalence regions are associated with a change in non-orphan fostering relative to the levels observed in the first survey round.

Figure 2 plots the relationship between regional HIV prevalence and the relative change in orphanhood between the two survey rounds. Unsurprisingly, there is a strong positive relationship between the two. Indeed, in the high-prevalence regions the proportion of children who are orphans has more than doubled between surveys, which leads to an increase in the level of orphan fostering in a region. Figure 3 charts the change in the prevalence of orphan fostering against the change in the prevalence of non-orphan fostering, with the regions distinguished by HIV prevalence. Were there a competitive relationship between orphan and non-orphan fostering, one would expect to see a negative association between changes in orphan fostering and changes in non-orphan fostering. In Figure 3 we see that in fact the changes in orphan and non-orphan fostering are largely uncorrelated ($R = -0.0377$). However, as in Figure 1(b), there seems to be a distinct pattern for regions where HIV prevalence exceeds 10 per cent. In the high-prevalence regions, there is the suggestion of a negative association such that increases in orphan fostering are associated with a decrease in non-orphan fostering.

Our multivariate analysis tests these relationships more formally. Table 3 presents the results of a series of fixed-effect linear regressions that examine factors associated with the prevalence of non-orphan fostering. The first model pools all observations across all sub-national regions and finds no association between the prevalence of orphan fostering and the prevalence of non-orphan fostering. There is, however, a significant negative association between the year in which a survey was collected and the prevalence of non-orphan fostering. This finding suggests a general trend towards lower levels of non-orphan fostering over time within regions. It is also important to note that in all models, unobserved region-level characteristics explain a greater proportion of the unexplained variance than unobserved observation-level traits within regions. The fixed-effect model specification controls for these unobserved, time-invariant region-level characteristics and examines the average differences across observations within regions.

The second model restricts the analysis to regions that were classified as having low HIV prevalence, or levels of less than five per cent. In this model there is a positive association between orphan and non-orphan fostering, although the association is not significant ($p = 0.116$). The third model restricts the analysis to regions with medium HIV prevalence, or levels of between five and ten per cent, while the fourth model is restricted to regions with high HIV prevalence, or levels higher than ten per cent. Across Models 3 and 4, the magnitude of the association between orphan and non-orphan fostering weakens and moves further away from significance. The coefficient for year of survey is significant at low levels of HIV prevalence only, although the magnitude of the association is largest in Model 4. This trend suggests that in regions that have experienced more severe HIV epidemics, there has been a secular trend towards lower levels of non-orphan fostering at the same time that the association between orphan and non-orphan fostering weakened relative to communities with lower levels of HIV prevalence.

The fifth model adds an interaction term between the three categorical levels of HIV prevalence and the prevalence of non-orphan fostering, in order to test whether the observed difference in the coefficients for orphan fostering across Models 2–4 is significant. Model 5 finds a marginally significant, positive association between orphan fostering and non-orphan

fostering. However, these patterns are offset by the significant negative association for the interaction between orphan fostering and level of HIV prevalence. In other words, regions with the same level of orphan fostering will vary in their level of non-orphan fostering according to the local intensity of the HIV epidemic. In Model 6, HIV prevalence is interacted with orphan fostering as a continuous variable. The results of this regression are very similar to the findings in Model 5, although with more robust significance for all coefficients. In order to verify these findings, we repeated the analysis for selected sub-groups. When the regression models are limited by the sex or age of children (results not shown), the same general pattern of association between non-orphan fostering, orphan fostering, and a region's category of HIV prevalence appears, which provides further support for our findings.

The identified patterns are best understood by studying Figure 4, which shows the predicted levels of non-orphan fostering by the prevalence of orphan fostering and categories of HIV prevalence (using Model 5), with year set to 2005. The interaction between HIV prevalence and orphan fostering is manifest in the different slopes of the three lines. The positive slope is for regions with low levels of HIV prevalence; increases in the prevalence of orphan fostering by one per cent are associated with a third of a percentage point increase in non-orphan fostering in these regions. The slope of the line is less steep in regions with medium levels of HIV prevalence, and slightly negative in regions with high levels of prevalence. Taking Models 4 to 6 together, we interpret our findings as suggesting that, while the association between orphan and non-orphan fostering in regions where HIV prevalence is high is significantly different from the association in low-prevalence regions, the association in high HIV prevalence regions is not significantly different from zero. It is important to keep in mind, however, the relative levels of orphan fostering found in our sample of sub-national regions. HIV category is not only an indicator of the burden of HIV in a community but also a marker for high rates of orphanhood, and therefore orphan fostering (see Figure 1b). Indeed, at the time of the most recent survey, the prevalence of orphan fostering was less than four per cent in 90 per cent of the regions where HIV prevalence was low, whereas it was higher than four per cent in all but one of the high-prevalence regions. In short, the HIV epidemic has increased orphan fostering in the most severely affected regions, whereas many of the regions that have low levels of HIV prevalence have actually experienced declines in both orphan and non-orphan fostering.

The regression models in Table 4 reveal the association between the prevalence of non-orphan fostering and orphanhood—as opposed to orphan fostering—and interactions with level of HIV prevalence. The first model shows no association between the prevalence of orphanhood and non-orphan fostering at any level of HIV prevalence. The second model similarly shows no significant association between non-orphan fostering and either single orphanhood, double orphanhood, or the interaction terms. Contrary to our expectations, the prevalence of double orphans does not seem to drive a relationship between orphan and non-orphan fostering at high levels of HIV prevalence.

Another consideration in examining the relationship between orphan fostering and non-orphan fostering is the changing opportunity for non-orphan fostering because of a reduction in the proportion of the child population who are non-orphans. If fewer children were at risk of non-orphan fostering because fewer children had two living parents, shifts in the prevalence of the non-orphan fostering would not necessarily represent a contraction in opportunities for non-orphan fostering. This may be a particularly important shift in countries where the level of orphanhood rapidly increased over time. In order to account for this shift in orphan composition of the population, we decomposed the change in non-orphan fostering from the earliest to the most recent survey within countries into its components: change resulting from the changing prevalence of non-orphans and change attributable to the

changing rate of non-orphan fostering (Table 5). In all but two countries, the vast majority of the change in non-orphan fostering is the result of a change in the rate at which non-orphans are fostered rather than to structural changes in the prevalence of children with two living parents. The two exceptions are Cote d'Ivoire, where there was very little change in non-orphan fostering between surveys, and Zimbabwe, where the prevalence of non-orphans fell most dramatically.

Discussion

In this paper we have examined the relationship between orphan and non-orphan fostering over time at the national and regional level in sub-Saharan Africa. We find that although non-orphan fostering is declining across many parts of the subcontinent, there is mixed evidence for our initial hypothesis. In areas of low HIV prevalence, orphan fostering and non-orphan fostering exhibit a weak positive association. When the level of orphan fostering increases or decreases in a region, non-orphan fostering tends also to change in the same direction, although at a lower rate.

In regions of medium and moderately high HIV prevalence, there is no evidence that orphan and non-orphan fostering are in competition. On the contrary, the findings suggest that extended families continue to absorb both types of foster children and that the level of non-orphan fostering is not sensitive to the level of orphan fostering. In these regions, many of which still have severe epidemics and rising numbers of orphans, orphan fostering does not appear to be reducing opportunities for non-orphan fostering. The fostering system in these communities seems to be adequately accommodating the growing demand for care, an impressive example of the absorptive capacity of households in the region. Shifts in the quality of child fostering may be a more legitimate concern in communities severely affected by HIV (Nyambedha et al. 2003). The outcomes of fostered children depend heavily on the reason for fostering and the quality of the new household (Case et al. 2004; Verhoef and Morelli 2007). Families may prioritize finding homes for as many children as possible, but the increased number of orphans may force families to stretch the resources available (Case et al. 2004; Heymann and Kidman 2009). The measures of fostering prevalence that we utilize in this study say little about the quality of that fostering, and it is reasonable to suspect that as the total level of fostering increases in communities, its quality will erode. There is already growing evidence that the quality of fostering has declined in numerous areas where the pressures of absorbing AIDS orphans have forced non-traditional and usually poorer-quality fostering relationships (Foster et al. 1995; Nyambedha et al. 2003; Beard 2005).

Although we find accommodating relationships between orphan and non-orphan fostering overall, our findings hint that a more competitive relationship may be emerging in the regions *most* affected by the HIV epidemic. Where HIV prevalence is particularly high, the evidence suggests that the two types of fostering start to become competitive, and levels of orphan fostering increase at what appears to be the expense of non-orphan fostering. We draw a few inferences from this finding. First, in high- prevalence regions, the ability of the extended family to absorb children in need of fostering may be hampered not only by the growth in the number of orphans but also by the deaths of adults who could potentially take in children to foster. Second, orphan fostering may be given preference over other types of fostering, and the high levels of orphans in the most affected regions may be starting to reduce fostering opportunities for other children.

Our findings are limited to DHS countries where HIV testing was conducted and which have had at least two surveys in which household data were collected on the survival of parents and their co-residence with children. These data restrictions forced us to exclude data from

several countries in southern Africa that have been most severely affected by the HIV epidemic but which have had only one recent DHS survey. We do not know how orphan and non-orphan fostering have changed over time in these countries, although the cross-sectional evidence suggests that a competitive association may be present. For example, the 2004 DHS in Lesotho (where national HIV prevalence is 24 per cent) shows that orphan fostering exceeds non-orphan fostering in five of the ten districts.

This study has a number of other limitations. The data used come from the DHS household schedule, which was administered in every household regardless of whether it included an age-eligible woman or man. Because the information was collected from households, the small minority of children who live in orphanages or at school boarding facilities were not included in our analysis. Additionally, the analysis was not able to account for flows of children across regions. Children are often sent from rural to urban areas and from urban to rural areas (Isiugo-Abanihe 1985; Foster et al. 1995; Ansell and Young 2004; Ansell and van Blerk 2004). To the extent that children flowed from one region to another to be fostered, errors will have occurred in our analysis of the relationship between HIV prevalence and types of fostering. It is difficult to assess how much this interregional fostering might have biased our results because relatively few studies have included information on the geographic origins and destinations of foster children. Akresh (2009) examined the destinations of children who were out-fostered from households in one province of Burkina Faso. He found that 61 per cent of children were fostered within a 25-mile radius of their parents' home and 24 per cent were sent to live in Ougadougou (the capital city located 50 miles away). It is difficult to know whether this distribution is generalizable to other countries in sub-Saharan Africa, although it suggests that most children are not fostered over large distances, and that even when children are fostered over regional boundaries, most remain in close proximity to their families of origin. A final limitation arises from the timing of the start of the HIV/AIDS, which has existed in many sub-Saharan countries since the early 1980s. While in most areas HIV incidence increased over the 1990s (Bongaarts et al. 2008), it is very likely that AIDS-related mortality had already started taking place at the time of the first survey in the regions most affected by the pandemic. This early mortality could have affected our baseline estimates of the relationship between orphan and non-orphan fostering.

The growth in the number of orphans as a consequence of the HIV/AIDS epidemic in much of sub-Saharan Africa has many consequences. One potential consequence of this trend is that, in overextended communities, opportunities for non-orphan fostering may be reduced owing to the increasing need to provide care for orphans. In many regions where HIV prevalence exceeds ten per cent, we find that the number of orphans has grown rapidly, leading to an increase in orphans fostered into new households. Yet we find limited evidence in our study of a decline in non-orphan fostering. Although the proportion of non-orphans fostered has declined in many of these areas, the changes have not followed a statistically significant pattern.

Our findings also suggest that there may be a tipping point for regions where HIV prevalence considerably exceeds ten per cent. We interpret this as evidence that in communities most afflicted by the HIV epidemic, households are reaching the limits of their absorptive capacity. Where adult mortality is high because of HIV, the capacity to respond to demands for orphan care in addition to providing other regular palliative care of the sick and dying may have limits, and an early expression of this limit to the absorptive ceiling may be a tighter market for non-orphan fostering. When households are caring for orphans, or anticipate caring for them in the future, they may be less willing (or able) to care for a child whose parents are still living. In the future, as the level of orphanhood continues to increase in the most affected regions, it is likely that levels of non-orphan fostering will

decline. The consequences of such a shift will depend on the types of fostering that are constrained. Where children are fostered for non-crisis reasons, such as to strengthen kinship ties or to have access to new educational opportunities, there may be negative consequences for social mobility and equality of access to resources. The consequences may be more extreme if fostering opportunities are reduced for children with sick and dying parents or from households where they cannot afford to be fed. On the other hand, our finding that the rates of fostering among non-orphans have decreased in some sub-national regions experiencing mature AIDS epidemics, but not in others, suggests that this may be true in certain circumstances only. More research would be required to discover the contextual dynamics of these shifts and their knock-on effects.

It is also possible—though we hope this is not the case—that the decline in non-orphan fostering in some regions is a proverbial canary in the coalmine, a harbinger of what is to come if the level of orphanhood continues to climb and the supply of orphans exceeds the absorptive capacity of households. While this may already be the case in some of the hardest hit communities in Zimbabwe (Gregson et al. 2007), the practice of non-orphan child fostering provides a type of buffer to cushion the approach of a limit to the ability of families to absorb orphans. Our findings lead us to suspect that non-orphan fostering will decline before orphans are turned away from households.

There is a large and somewhat conflicting literature on the effects of orphanhood on child well-being (Lindblade et al. 2003; Case et al. 2004; Ainsworth et al. 2005; Evans and Miguel 2007; Miller et al. 2007; Parikh et al. 2007; Beegle et al. 2010). To the extent that the quantity of fostering arrangements is being constrained in communities with the highest burden of infection, as shown in this study, and that the quality of arrangements is deteriorating in other communities, the educational and developmental prospects for out-fostered children (or children who would have otherwise been out-fostered) are likely to deteriorate. On the other hand, in most communities across sub-Saharan Africa orphan fostering would have to increase greatly before opportunities for non-orphan fostering would be reduced. Similarly, in most HIV-affected regions, there remains untapped capacity for households to take in those in need.

Acknowledgments

The authors would like to thank Tom Pullum for technical guidance, Christie Sennott for research assistance, and three anonymous reviewers for feedback on earlier versions of this paper. This work was supported in part by core funding from the NICHD to the Center for Demography and Ecology at the University of Wisconsin-Madison (R24 HD047873).

References

Akresh, Richard. Flexibility of household structure child fostering decisions in Burkina Faso. Journal of Human Resources. 2009; 44(4):976–997.

Ainsworth, Martha; Beegle, Kathleen; Koda, Godlike. The impact of adult mortality and parental deaths on primary schooling in north-western Tanzania. Journal of Development Studies. 2005; 41(3):412–439.

Alber, Erdmute. Grandparents as foster-parents: Transformations in foster relations between grandparents and grandchildren in northern Benin. Africa. 2004; 74(1):28–46.

Ankrah, E. Maxine The impact of HIV/AIDS on the family and other significant relationships: the African clan revisited. AIDS Care. 1993; 5(1):5–22. [PubMed: 8461361]

Ansell, Nicola; van Blerk, Lorraine. Children's migration as a household/family strategy: Coping with AIDS in Lesotho and Malawi. Journal of Southern African Studies. 2004; 30(3):673–690.

Ansell, Nicola; Young, Lorraine. Enabling households to support successful migration of AIDS orphans in southern Africa. AIDS Care. 2004; 16(1):3–10. [PubMed: 14660139]

Barnett, Tony; Blaikie, Piers. AIDS in Africa: Its Present and Future Impact. London: Belhaven Press; 1992.

Beard, Betty J. Orphan care in Malawi: Current practices. Journal of Community Health Nursing. 2005; 22(2):105–115. [PubMed: 15877539]

Beegle, Kathleen; De Weerdt, Joachim; Dercon, Stefan. Orphanhood and human capital destruction: Is there persistence into adulthood? Demography. 2010; 47(1):163–180. [PubMed: 20355689]

Bicego, George; Rutstein, Shea; Johnson, Kiersten. Dimensions of the emerging orphan crisis in sub-Saharan Africa. Social Science and Medicine. 2003; 56(6):1235–1247. [PubMed: 12600361]

Bledsoe, Caroline; Isiugo-Abanihe, Uche. Strategies of child fosterage among Mende grannies in Sierra Leone. In: Lesthaeghe, R., editor. Reproduction and Social Organisation in Sub-Saharan Africa. Berkeley: University of California Press; 1989. p. 442-474.

Bongaarts, John; Buettner, Thomas; Heilig, Gerhard; Pelletier, Francois. Has the HIV epidemic peaked? Population and Development Review. 2008; 34(2):199–224.

Caldwell, John C. The impact of the African AIDS epidemic. Health Transition Review. 1997; 7(Supplement 2):169–188.

Case, Anne; Paxson, Christina; Ableidinger, Joseph. Orphans in Africa: Parental death, poverty, and school enrollment. Demography. 2004; 41(3):483–508. [PubMed: 15461011]

Chirwa, Wiseman Chijere. Social exclusion and inclusion: Challenges to orphan care in Malawi. Nordic Journal of African Studies. 2002; 11(1):93–113.

Ciganda, Daniel; Gagnon, Alain; Tenkorang, Eric. Child and Young Adult Households in the Context of the AIDS Epidemic in Zimbabwe, 1988–2006. Paper presented at Annual Meeting of the Population Association of America; 2010; Dallas, Texas. 2010.

Coffee, Megan P.; Garnett, Geoffrey P.; Mlilo, Makalima; Voeten, Helene ACM.; Chandiwana, Stephen; Gregson, Simon. Patterns of movement and risk of HIV infection in rural Zimbabwe. Journal of Infectious Diseases. 2005; 191(Supplement 1):S159–S167. [PubMed: 15627226]

Eloundou-Enyegue, Parfait M.; Shapiro, David. Buffering inequalities: The safety net of extended families in Cameroon; Cornell Food and Nutrition Policy Program Working Paper No. 177; 2004.

Evans DK, Miguel E. Orphans and schooling in Africa: A longitudinal analysis. Demography. 2007; 44(1):35–57. [PubMed: 17461335]

Foster, Geoff; Shakespeare, Ruth; Chinemana, F.; Jackson, Helen; Gregson, Simon; Marange, C.; Mashumba, S. Orphan prevalence and extended family care in a periurban community in Zimbabwe. AIDS Care. 1995; 7(1):3–17. [PubMed: 7748908]

Frank, Odile. Child fostering in sub-Saharan Africa. Population Index. 1984; 50(3):445–445.

Glynn, Judith R.; Pönnighaus, Jörg; Crampin, Amelia C.; Sibande, Felix; Sichali, Lifted; Nkhosa, Prince; Broadbent, Philip; Fine, Paul EM. The development of the HIV epidemic in Karonga District, Malawi. AIDS. 2001; 15(15):2025–2029. [PubMed: 11600832]

Goody, Esther. Parenthood and Social Reproduction: Fostering and Occupational Roles in West Africa. Cambridge: Cambridge University Press; 1982.

Grant, Monica; Yeatman, Sara. Children's living arrangements and gendered parental support. Annual Meeting of the Population Association of America; 2008; New Orleans. 2008.

Gregson, Simon; Mushati, Phyllis; Nyamukapa, Constance. Adult mortality and erosion of household viability in AIDS-afflicted towns, estates, and villages in eastern Zimbabwe. JAIDS-Journal of Acquired Immune Deficiency Syndromes. 2007; 44(2):188–195.

Heuveline, Patrick. Impact of the HIV epidemic on population and household structure: The dynamics and evidence to date. AIDS. 2004; 18(Supplement 2):S45–S53. [PubMed: 15319743]

Heymann, Jody; Kidman, Rachel. HIV/AIDS, declining family resources and the community safety net. AIDS Care. 2009; 21(Supplement 1):34–42. [PubMed: 22380977]

Hosegood, Victoria; Floyd, Sian; Marston, Milly; Hill, Caterina; McGrath, Nuala; Isingo, Raphael; Crampin, Amelia; Zaba, Basia. The effects of high HIV prevalence on orphanhood and living arrangements of children in Malawi, Tanzania, and South Africa. Population Studies. 2007; 61(3): 327–336. [PubMed: 17979006]

Hunter, Susan S. Orphans as a window on the AIDS epidemic in Sub-Saharan Africa: initial results and implications of a study in Uganda. Social Science and Medicine. 1990; 31(6):681–690. [PubMed: 2237511]

Isiugo-Abanihe, Uche. Child fosterage in West Africa. Population and Development Review. 1985; 11(1):53–73.

Lindblade, Kim A.; Odhiambo, Frank; Rosen, Daniel H.; DeCock, Kevin M. Health and nutritional status of orphans under 6 years old cared for by relatives in western Kenya. Tropical Medicine and International health. 2003; 8(1):67–72. [PubMed: 12535253]

Lloyd, Cynthia; Desai, Sonalde. Children's living arrangements in developing countries. Population Research and Policy Review. 1992; 11(3):193–216.

Lloyd, Cynthia; Blanc, Ann. Children's schooling in sub-Saharan Africa: The role of fathers, mothers, and others. Population and Development Review. 1996; 22(2):293–306.

Madhavan, Sangeetha. Fosterage patterns in the age of AIDS: Continuity and change. Social Science and Medicine. 2004; 58(7):1443–1454. [PubMed: 14759688]

Mason, Karen. Explaining fertility transitions. Demography. 1997; 34(4):443–454. [PubMed: 9545624]

McDaniel, Anthony; Zulu, Eliya. Mothers, fathers, and children: Regional patterns in child-parent residence in sub-Saharan Africa. African Population Studies. 1996; 11(1):1–22.

Miller, Candace Marie; Gruskin, Sofia; Subramanian, SV.; Heymann, Jody. Examining the situation of orphans during the AIDS epidemic. Social Science and Medicine. 2007; 64(12):2476–2486. [PubMed: 17442471]

Moehling, Carolyn M. Broken Homes: The 'Missing' Children of the 1910 Census. Journal of Interdisciplinary History. 2002; 33(2):205–233.

Monasch, Roeland; Boerma, J. Ties Orphanhood and childcare patterns in sub-Saharan Africa: An analysis of national surveys from 40 countries. AIDS. 2004; 18(Suppl 2):S55–S65. [PubMed: 15319744]

Morantz, Gillian; Heymann, Jody. Life in institutional care: The voices of children in a residential facility in Botswana. AIDS Care. 2010; 22(1):10–16. [PubMed: 20390476]

Nyambedha, Erick O.; Wandibba, Simiyu; Aagaard-Hansen, Jens. Changing patterns of orphan care due to the HIV epidemic in western Kenya. Social Science & Medicine. 2003; 57(2):301–311. [PubMed: 12765710]

Page, Hillary. Childrearing versus childbearing: Coresidence of mother and child in sub-Saharan Africa. In: Lesthaeghe, Ron, editor. Reproduction and Social Organisation in Sub-Saharan Africa. Berkeley: University of California Press; 1989. p. 401-441.

Parikh, Anokhi; DeSilva, Mary Bachman; Cakwe, Mandisa; Quinlan, Tim; Simon, Jonathan L.; Skalicky, Anne; Zhuwau, Tom. Exploring the Cinderella myth: Intrahousehold differences in child wellbeing between orphans and non-orphans in Amajuba District, South Africa. AIDS. 2007; 21(Suppl 7):S95–S103. [PubMed: 18040170]

Poonawala, Shamseh; Rachel, Cantor. Children Orphaned by AIDS: A Call for Action for NGOs and Donors. Washington D.C: National Council for International Health; 1991.

Powell, G.; Chinake, T.; Mudzinge, D.; Maambira, W.; Mukutiri, S. Children in residential care: The Zimbabwe experience. Harare: Zimbabwe Ministry of Public Service, Labour and Social Welfare/ UNICEF; 2004.

Preston, Samuel H.; Heuveline, Patrick; Guillot, Michel. Demography: Measuring and Modeling Population Processes. London: Blackwell Publishing Ltd; 2001.

Rabe-Hesketh, Sophia; Skrondal, Anders. Multilevel and Longitudinal Modeling Using Stata. 2nd ed.. College Station, Texas: Stata Press; 2008.

Reniers, Georges. Divorce and remarriage in rural Malawi. Demographic Research. 2003:175–206. Special Collection 1.

Ryder, Robert W.; Kamenga, Munkolenkole; Nkusu, Muniaka; Batter, Veronique; Heyward, William L. AIDS orphans in Kinshasa, Zaire: Incidence and socioeconomic consequences. AIDS. 1994; 8(5):673–679. [PubMed: 8060547]

United Nations Children's Fund. Statement by UNICEF representative Bjorn Ljungqvist, HIV/AIDS orphans survey findings conference; UNICEF; April 8, 2003; New York City, New York. 2003.

United Nations Children's Fund. A guide to monitoring and evaluation of the national response for children orphaned and made vulnerable by HIV/AIDS. New York: UNICEF; 2005.

UNICEF, UNAIDS, and PEPFAR. Children affected by AIDS: Africa's orphaned and vulnerable generations. New York: UNICEF; 2006.

United Nations Children's Fund. Africa's Orphaned and Vulnerable Generations: Children Affected by AIDS. New York: United Nations Children's Fund; 2006.

Urassa, Mark; Boerma, J. Ties; Ng'weshemi, Japheth ZL.; Isingo, Raphael; Schapink, Dick; Kumogola, Yusufu. Orphanhood, child fostering and the AIDS epidemic in rural Tanzania. Health Transition Review. 1997; 7(Supplement 2):141–153.

van Blerk, Lorraine; Ansell, Nicola. Children's experiences of migration: moving in the wake of AIDS in southern Africa. Environment and Planning D: Society and Space. 2006; 24(3):449–471.

Vandermeersch, Celine. Child fostering under six in Senegal in 1992–1993. Population. 2002; 57(4/5): 661–688.

Verhoef, Heidi; Morelli, Gilda. "A child is a child": Fostering experiences in northwestern Cameroon. Ethos. 2007; 35(1):33–64.

Yeatman, Sara. HIV infection and fertility preferences in rural Malawi. Studies in Family Planning. 2009; 40(4):261–276. [PubMed: 21151844]

Zimmerman, Frederick J. Cinderella goes to school - The effects of child fostering on school enrollment in South Africa. Journal of Human Resources. 2003; 38(3):557–590.

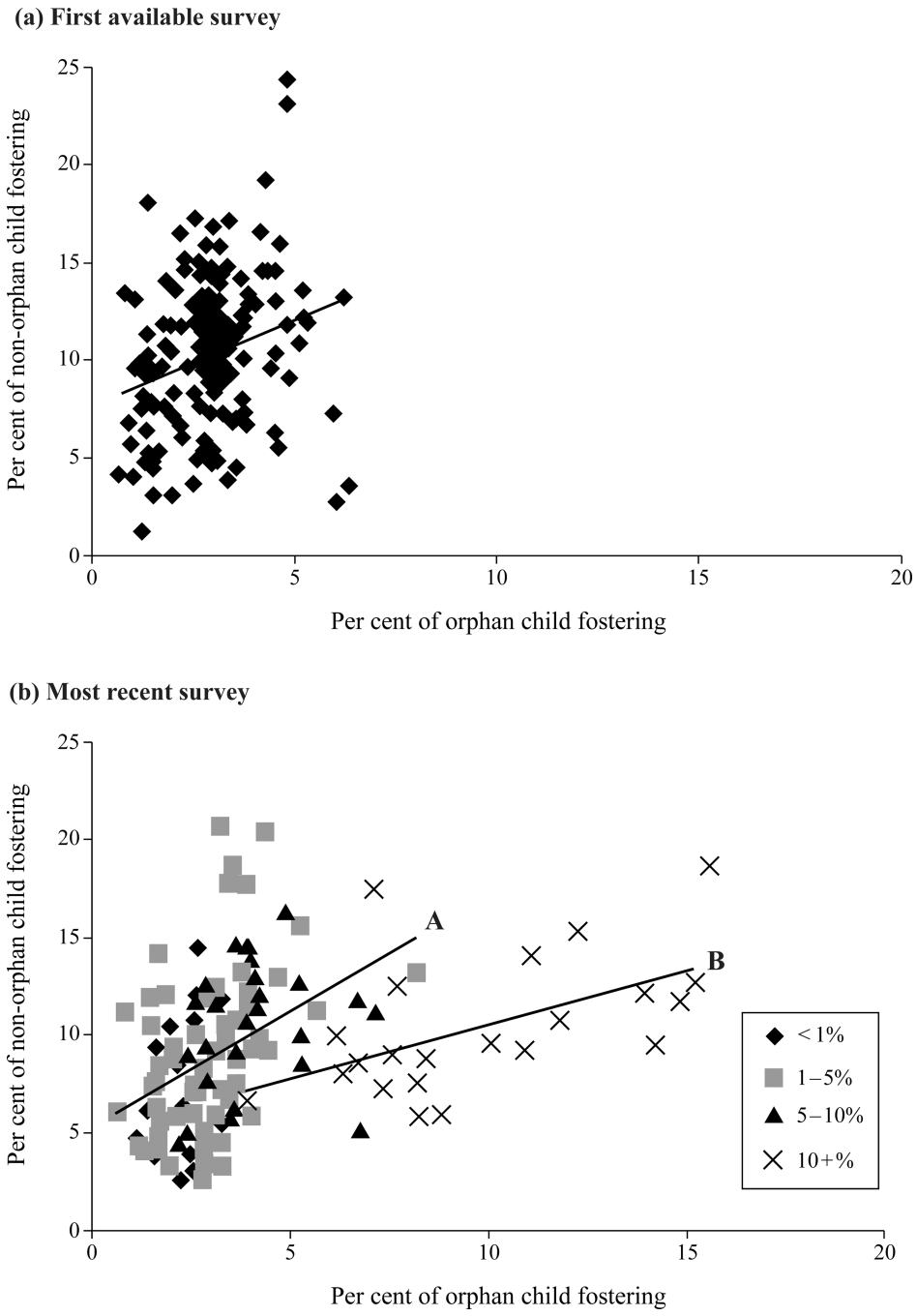

Figure 1.

Prevalence of non-orphan fostering by orphan fostering in sub-national regions of 14 countries in Sub-Saharan Africa, 1990s–2000s sub-national regions

Source: As for Table 1

Note: In Figure 1(b), Line A is the linear trend line for regions where HIV prevalence is less than ten per cent. Line B is the linear trend line for regions where HIV prevalence is greater than ten per cent.

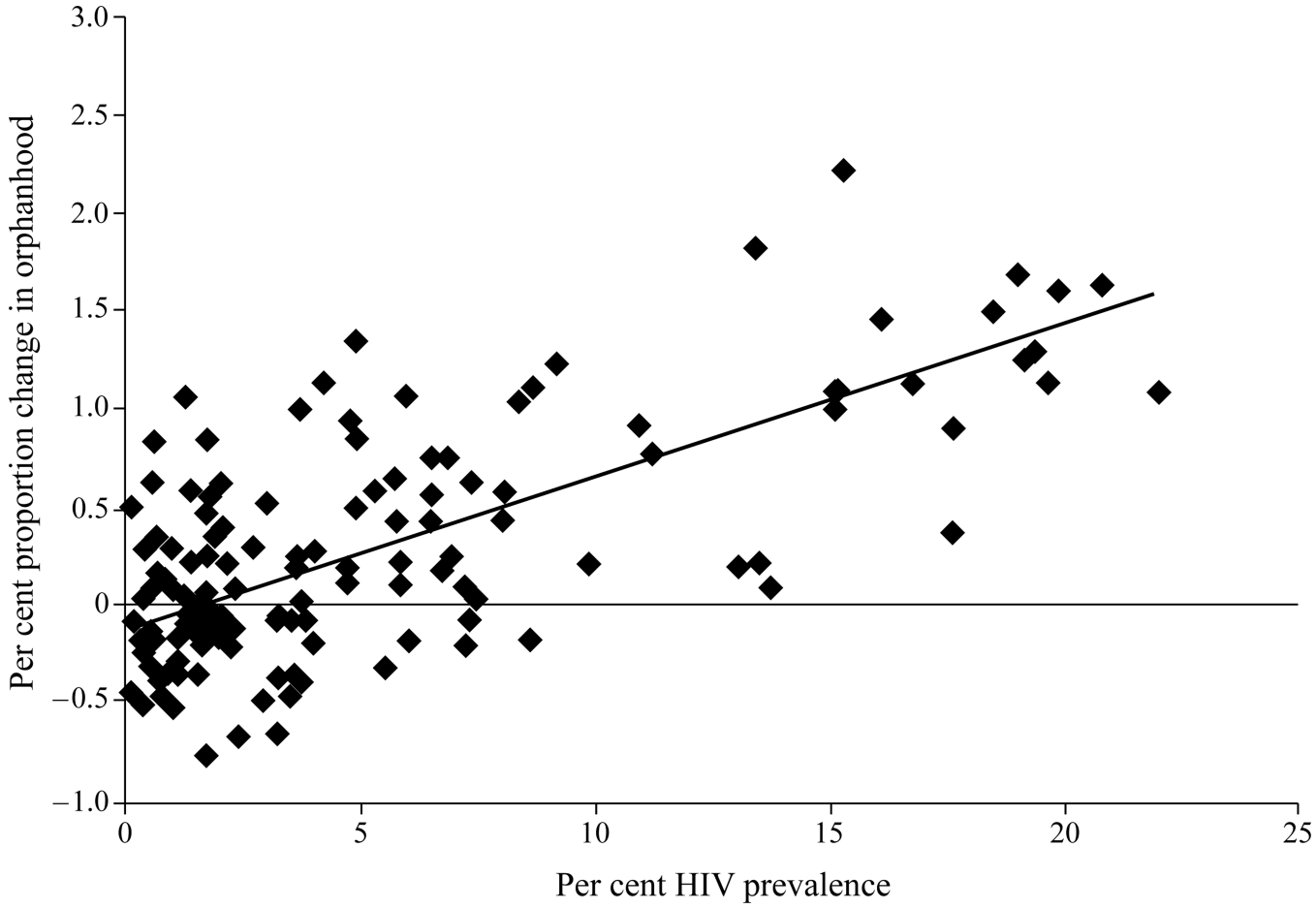

Figure 2.
Proportional change in orphanhood between surveys by HIV prevalence, sub-national regions of 14 countries in Sub-Saharan Africa, 1990s–2000s
Source: As for Table 1

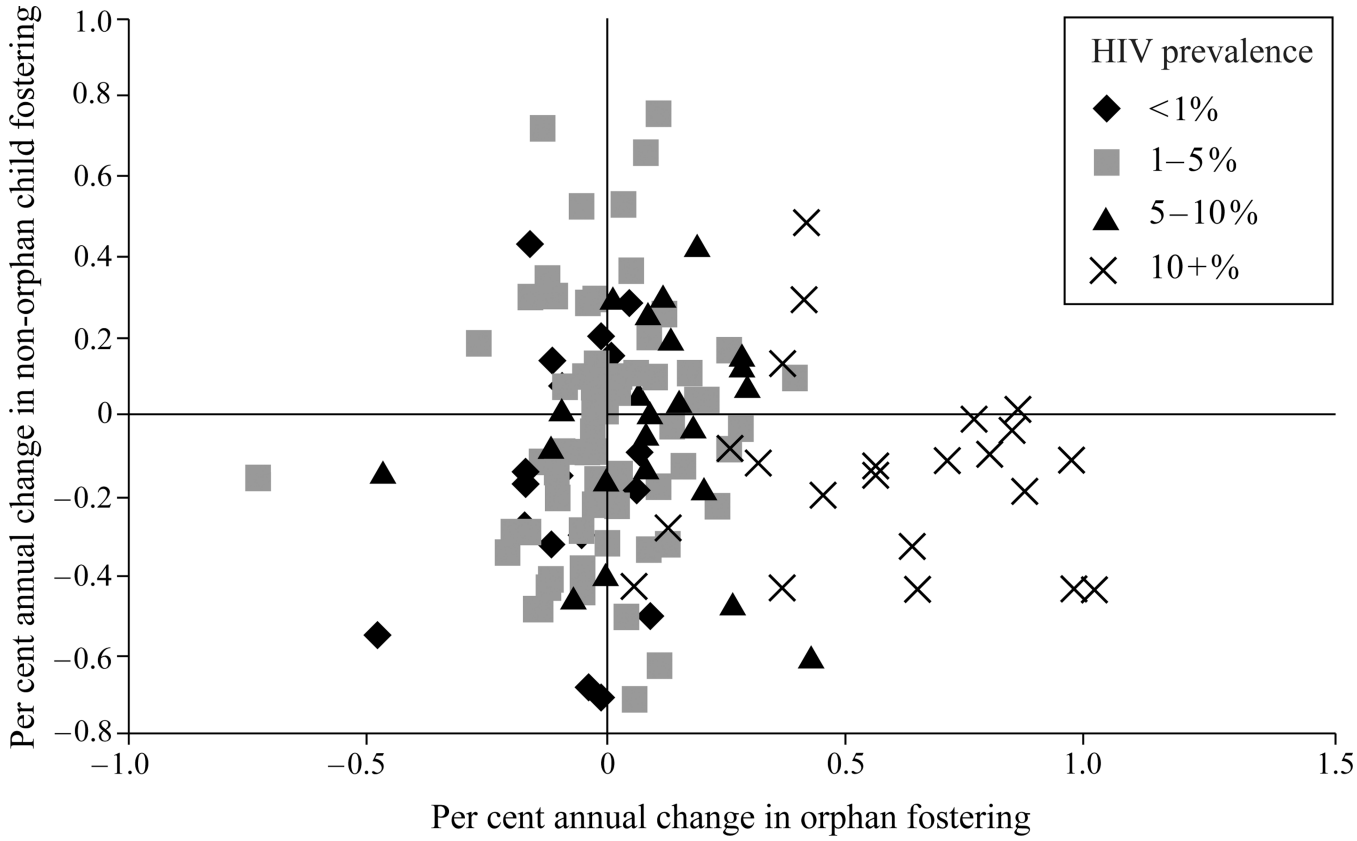

Figure 3.
Annual change in prevalence of non-orphan fostering by annual change in prevalence of orphan fostering, sub-national regions of 14 countries in sub-Saharan Africa, 1990–2000s, with regions distinguished by HIV prevalence at most recent survey
Source: As for Table 1

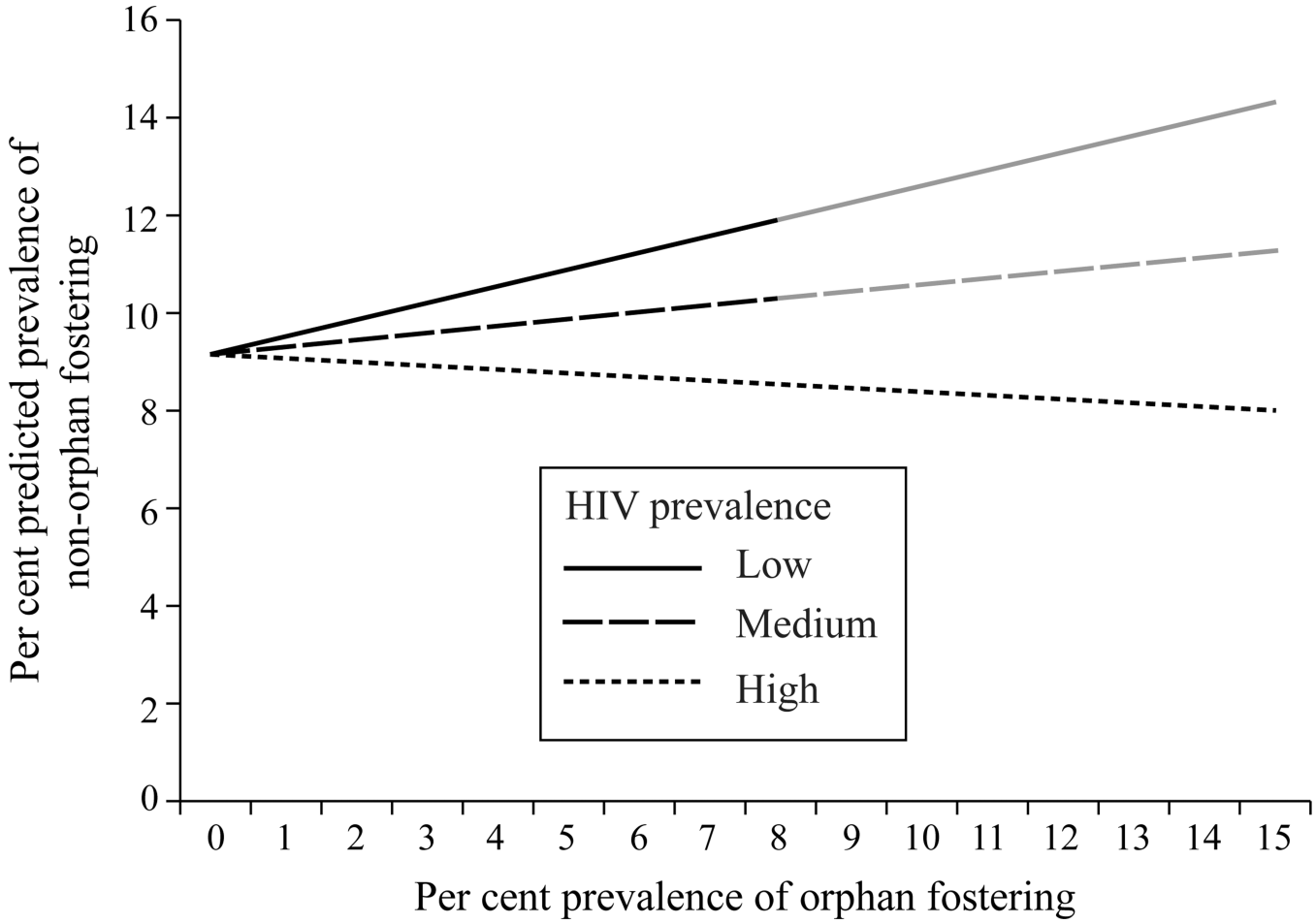

Figure 4.
Predicted prevalence of non-orphan fostering by HIV prevalence and level of orphan fostering in 2005, sub-national regions of 14 countries in sub-Saharan Africa
Note: Black lines indicate the observed range of orphan fostering prevalence for regions within each category of HIV prevalence; the grey lines indicate predicted values outside the range of observed values.
*Source:*As for Table 1

Table 1

Characteristics of DHS samples used for a study of the relationship between fostering and HIV prevalence in sub-Saharan Africa, 1990s–2000s

Country[1]	Year		Number of survey rounds	Number of regions	HIV prevalence at most recent survey[1]	Range of regional HIV prevalence	
	First available survey	Most recent survey				Minimum	Maximum
Niger	1992	2006	3	8	0.7	0.3	1.7
Senegal	1992	2005	2	10	0.7	0.4	2.2
Benin	1996	2006	3	6	1.2	0.3	2.7
Ethiopia	2000	2005	2	11	1.4	0.2	6.0
Mali	1995	2006	3	8	1.5	0.6	1.9
Burkina Faso	1992	2003	2	13	1.8	0.1	3.7
Ghana	1993	2003	3	10	2.2	1.0	3.7
Cote d'Ivoire	1994	2005	2	10	4.7	3.2	5.8
Cameroon	1991	2004	3	10	5.5	1.7	8.7
Kenya	1993	2003	3	7	6.4	4.0	15.1
Tanzania	1992	2004	3	20	7.0	2.0	13.5
Malawi	1992	2004	3	3	11.8	6.5	17.6
Zambia	1992	2001	3	9	15.6	8.3	22.0
Zimbabwe	1994	2005	3	10	18.1	15.1	20.8

[1] Listed in order from lowest to highest national HIV prevalence.

Source: Demographic and Health Surveys

Popul Stud (Camb). Author manuscript; available in PMC 2013 November 01.

Table 2

Prevalence of orphan and non-orphan fostering, children aged 0–14 years old. Fourteen selected countries in sub-Saharan Africa, 1990s–2000s

Country[1]	Prevalence of orphan fostering			Prevalence of non-orphan fostering		
	First available survey	Most recent survey	Change	First available survey	Most recent survey	Change
Niger	3.1	2.4	−0.8	9.8	7.8	−2.1
Senegal	2.1	2.7	0.6	9.9	10.6	0.7
Benin	2.9	2.5	−0.4	11.4	8.9	−2.6
Ethiopia	3.3	3.0	−0.3	7.6	5.9	−1.7
Mali	1.8	2.1	0.3	7.1	7.3	0.2
Burkina Faso	2.9	2.6	−0.3	7.4	6.0	−1.3
Ghana	2.9	2.8	−0.1	11.5	13.4	1.9
Cote d'Ivoire	2.7	3.4	0.8	12.9	12.9	0.0
Cameroon	2.5	3.5	1.0	11.6	12.1	0.5
Kenya	1.5	4.2	2.7	8.1	7.1	−1.0
Tanzania	2.6	3.7	1.1	10.0	9.8	−0.2
Malawi	3.9	7.1	3.2	10.4	11.0	0.6
Zambia	3.5	7.7	4.2	10.7	8.4	−2.3
Zimbabwe	3.9	12.5	8.6	14.2	13.1	−1.1

[1] Listed in order from lowest to highest national HIV prevalence

Note: Children for whom survival status of one parent is unknown are coded as a separate category of children, but contribute to the denominator of these estimates.

Source: As for Table 1

Popul Stud (Camb). Author manuscript; available in PMC 2013 November 01.

Popul Stud (Camb). Author manuscript; available in PMC 2013 November 01.

Table 3

Linear regression estimates of prevalence of non-orphan fostering with fixed effects for sub-national regions of 14 countries in Sub-Saharan Africa, 1990s–2000s

	Pooled Sample (1)		Low HIV Prevalence (2)		Medium HIV Prevalence (3)		High HIV Prevalence (4)		Pooled sample with interactions (5)		(6)	
	β	S.E.	β	S.E.	B	S.E.	B	S.E.	B	S.E.	B	S.E.
Prevalence of orphan fostering	0.003	0.08	0.34	0.21	0.09	0.32	0.05	0.14	0.34+	0.20	0.40*	0.20
Interaction terms												
Prevalence of orphan fostering * Medium HIV Prevalence									−0.20	0.34		
Prevalence of orphan fostering * High HIV Prevalence									−0.42+	0.22		
Prevalence of orphan fostering * HIV Prevalence											−0.03*	0.12
Year of survey	−0.06*	0.02	−0.05+	0.03	−0.04	0.06	−0.15	0.10	−0.06*	0.02	−0.06*	0.02
Constant	128.90**	48.77	114.92+	59.96	93.62	117.95	318.07	196.00	120.26*	49.85	122.8**	48.4
N	361		220		75		66		361		361	
Number of countries	14		11		7		5		14		14	
Number of regions	135		87		26		22		135		135	
Average observations per region	2.7		2.5		2.9		3		2.7		2.7	
Between region variance	3.75		3.76		3.05		3.38		3.85		3.88	
Within region variance	2.07		2.19		2.04		1.66		2.06		2.05	
Intraclass correlation	0.77		0.75		0.69		0.81		0.78		0.78	
F-test, u_i=0	7.47***		6.61***		6.16***		11.16***		7.08***		7.60*****	

*** p<0.001

** p<0.01

* p<0.05

+ p<0.10

Source: As for Table 1

Table 4

Linear regression estimates of prevalence of non-orphan fostering with fixed effects for sub-national regions of 14 countries in Sub-Saharan Africa, 1990s–2000s

	(1)		(2)	
	β	S.E.	β	S.E.
Prevalence of orphanhood	−0.001	0.09		
Interaction terms				
Orphanhood*Medium HIV Prevalence	−0.11	0.17		
Orphanhood*High HIV Prevalence	−0.06	0.11		
Prevalence of single orphanhood			0.05	0.10
Interaction terms				
Single orphanhood * Medium HIV Prevalence			−0.30	0.22
Single orphanhood * High HIV Prevalence			−0.08	0.19
Prevalence of double orphanhood Interaction terms			−0.41	0.37
Double orphanhood * Medium HIV Prevalence			0.87	0.65
Double orphanhood * High HIV Prevalence			0.28	0.46
Year of survey	−0.05 +	0.03	−0.05 +	0.03
Constant	102.82 *	49.89	101.82 *	50.44
N	361		361	
Number of countries	14		14	
Number of regions	135		135	
Average observations per region	2.7		2.7	
Between region variance	3.89		3.94	
Within region variance	2.07		2.07	
Intraclass correlation	0.78		0.78	
F-test, u_i=0	7.86 ***		7.84 ***	

*** p<0.001

** p<0.01

* p<0.05

+ p<0.10

Source: As for Table 1

Table 5

Decomposition of change in the prevalence of non-orphan fostering between earliest and most recent DHS survey of 14 countries in sub-Saharan Africa, 1990s–2000s

Country[1]	Overall difference in non-orphan fostering	Difference due to change in non-orphan prevalence	Difference due to change in rate of fostering	% Overall change due to prevalence	% Overall change due to rate
Niger	−2.05	0.07	−2.12	−3.4	103.4
Senegal	0.72	−0.18	0.91	−25.6	125.6
Benin	−2.57	−0.03	−2.54	1.2	98.8
Ethiopia	−1.67	0.08	−1.75	−4.8	104.8
Mali	0.15	0.00	0.16	−2.0	102.0
Burkina Faso	−1.31	0.02	−1.33	−1.3	101.3
Ghana	1.88	0.07	1.81	3.6	96.4
Cote d'Ivoire	−0.01	−0.13	0.12	1332.1	−1232.2
Cameroon	0.46	−0.27	0.72	−58.4	158.4
Kenya	−1.01	−0.34	−0.67	33.8	66.2
Tanzania	−0.20	−0.06	−0.14	29.3	70.7
Malawi	0.57	−0.55	1.13	−96.8	196.8
Zambia	−2.34	−0.79	−1.55	33.7	66.3
Zimbabwe	−1.08	−2.14	1.06	198.9	−98.9

[1]Listed in order from lowest to highest national HIV prevalence

Source: As for Table 1