Growing up in rural Africa: the living arrangements and socio-economic status of children in rural Malawi, Tanzania and South Africa

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Introduction

In sub-Saharan Africa children are growing up in an era of HIV/AIDS. HIV has increased adult and child mortality in sub-Saharan Africa (Timæus, 1998; Timæus & Jasseh, 2004; Zaba et al, 2005). There is considerable concern about the negative impact of parental illness and death on children's physical, emotional and social development and wellbeing. Studies have examined the impact of orphanhood on fostering and care patterns (Foster et al, 1995; Urassa & Boerma, 1997; Bicego et al, 2003), and education (Ainsworth et al, 2002; Bicego et al, 2003; Case et al, 2004).

To date, surveys such as Demographic and Health Surveys (DHS) and Multiple Indicator Cluster Surveys (MICS) have been the mainstay of evidence on the numbers and household circumstances of orphans. Several papers have analysed survey data to compare the levels, trends and differentials in orphanhood prevalence and living arrangements in sub-Saharan Africa (Grassly et al, 2004; Monasch & Boerma, 2004; Bicego et al, 2003).

However, such cross-sectional household surveys have limitations with respect to the validity of their estimates of orphanhood prevalence (Grassly et al, 2004). In the DHS, households sampled need at least one resident woman of reproductive age. Consequently, these surveys do not identify children living in households without such an adult, such as paternal orphans living alone with their fathers or children living in skipped-generation households. These surveys do not collect detailed data about the living and care arrangements of children, and being cross-sectional cannot be used to examine changes in the living arrangements or welfare of children following a parental death.

Longitudinal community-based studies provide a complementary source of data on orphanhood prevalence and living arrangements in geographically defined areas. Information about parental survival is prospectively identified through linkages between children and parents, as well as, repeated updates from direct questions about orphanhood status. In addition, detailed information is collected routinely about changes in living household membership, living arrangements, migration, and individual and household socio-economic status.

In this paper we compare data from three demographic surveillance systems and a retrospective cohort study in Malawi, Tanzania and South Africa. We examine the levels and patterns of orphanhood prevalence and incidence and describe the living and care arrangements of orphans and non-orphans. Historical and contemporary social, demographic and economic factors are important in shaping the pattern of the epidemic and the social arrangements of children and their families. We contextualise the data on living arrangements by exploring the similarities and differences in economic development, marriage, migration, mortality, and HIV prevalence in the three study populations. The paper also considers methodological issues arising from the study

designs that need to be considered in analyses and interpretation when comparing longitudinal data on orphans and their residential arrangements.

Methods

The data described in this paper were collected in three demographic surveillance systems (DSS) in Kisesa (Tanzania), Hlabisa (South Africa), and Karonga (Malawi); and a retrospective cohort study in Karonga. Detailed descriptions of the study areas and methods have been described elsewhere, these are summarised briefly in Appendix 1 (Boerma et al, 2002; Crampin et al, 2002; Urassa et al, 2001; Hosegood & Timæus, 2005)[1]. Before presenting the findings, we discuss three methodological issues that affect orphanhood and living arrangement data: the identification of parental survival status, missing data, and definitions of households.

(i) Identification of parental survival status

DSSs

In DSSs the survival status of parents can be established in two ways. First, where a child and their biological parent have both been registered by the DSS, their records are linked and their survival status is known as long as they remain under observation. Many children will be linked to mothers and fathers when they were registered as new births in the surveillance area. For older children, the link can be made when a parent is, or has been, a member of the same household. At subsequent time points, providing that parents are still registered in the system their survival status will be known. In the Kisesa-DSS, 78% of all children <18 years can be linked to their mothers and 56% to their fathers. In the Hlabisa-DSS, the proportions linked are 78% and 42% respectively, and in the Karonga-DSS, 92% and 81%. No site infers a child-father link from their spousal relationship with the child's mother to avoid erroneously linking men to non-biological children.

With respect to data on orphanhood, the data obtained through child-parent linkage is subject to several potential biases. Links cannot be made when children's parents are not themselves registered. Consequently, information from linkages are unavailable for children who in-migrate without their parents or whose parents were already dead at the time of registration. The percentage of linkages made to mothers is higher than those to fathers because of linkages made at birth and the higher percentage of mothers who are co-resident with their children. Consequently, paternal deaths are at a higher risk of being under-reported. The higher proportion of parent-child links are made for younger children (i.e. those registered at birth) than in children who were already living in the area at the time surveillance started or who in-migrated into the area. This would result in an under-estimate in orphanhood prevalence because orphanhood

[1] For clarity we use names for the data sources that differ from those given in published papers. The Africa Centre Demographic Information System or ACDIS is referred to as the Hlabisa-DSS. The Karonga Family Health Study or FHS is called the Karonga-Cohort. The Karonga Continuous Registration System or CRS is referred to as the Karonga-DSS. The TANESA cohort is referred to as the Kisesa-DSS.

incidence increases with age. In addition, using linkage data DSSs are unable to identify the deaths of parents who are no longer under observation following out-migration (Kisesa and Karonga DSSs) or after ending houshehold membership (Hlabisa-DSS). If mortality rates are different among migrant parents than resident parents then estimates of orphanhood incidence in resident child-parent pairs will be biased.

Fortunately, child-parent links are supplemented with direct questions about parental survival in all sites. All sites periodically ask questions about the survival status of parents for all registered children. For deceased parents, additional information may be collected about the date of death and the age of the parent at the time of their death. In the Hlabisa-DSS this data is collected when a child is registered and since 2004 is asked in every round. The direct orphanhood question was asked in the Kisesa-DSS of every child in the first round in 1994, and in rounds in 1998, 2002 and 2004. In the Karonga-DSS was asked for all children in the baseline census and subsequently when a child migrates within the surveillance area. Orphanhood questions are subject to possible biases. An 'adoption effect' may mean that orphans are reported as the natural children of their foster-carers. In addition, informants may not know whether a parent who is not living with his/her child (in the Hlabisa-DSS: is not a member of same household) has died.

The orphanhood status of children described in this paper combines both sources of information to establish the parental status of a child. However, in DSSs at time points after (and before) the orphanhood question has been asked, the parental status can only be accurately ascertained for children whose parent has already died or has been linked to them and followed by the DSS as a registered individual.

The retrospective cohort study

The Karonga-cohort study has a quite different design. Information was retrospectively collected in 1998-2000 about 197 HIV-positive and 396 matched HIV-negative adults who had been recorded in population surveys conducted in Karonga in the 1980s (Crampin et al, 2002)[1]. The survival of the 'index' adults was established, as well as information about their spouses and children. In this study children are therefore directly linked to the 'index' adults. However, children of 'index' adults are not representative of all children population given that the HIV-prevalence in the 'index' adult sample was higher than in all adults in the population in the 1980s and they must have had at least one parent alive to be included in the cohort. A strength of this cohort study is that parent-child linkages are virtually complete. On the other hand, the ten year gap between the baseline surveys and follow-up may mean that information about dates of parental death or past living arrangements are subject to recall bias.

[1] The first survey (called LEP-1) was carried out from 1979 to early 1985, and the second survey (LEP-2) from 1986 to 1989. Where data is used from these surveys rather than the cohort study or the more recent DSS, we refer to it as the Karonga-surveys.

(ii) Approaches to handling missing data on parental survival status

At any point in time, for a small proportion of children the survival status of one or both parents will not be known. The information may be missing because the data was not recorded during fieldwork or data entry, because an informant did not know, or because no link had been established between a child and a parent to provide another source of data.

In terms of bias introduced by handling missing parental status data, an important issue is whether these 'missing' parents are more or less likely to be dead. Where the data is missing due to recording omission we may assume that this was not influenced by the status of the parent. However, parents whose survival status is known by informants may have higher mortality. One may anticipate situations in which a parent has become separated from their child as a consequence of marital conflict arising from HIV positive disclosure, illness or sexual behaviour. In the context of HIV infection risk, Floyd et al (2005) have shown that in the Karonga-cohort, marital instability and migration was higher in couples where one or both partners was HIV positive. Differential social patterns associated with HIV status is important contextual information in settings where a large proportion of parental mortality is due to AIDS.

In estimating orphanhood prevalence a decision needs to be made as to how these children missing information about one or both parents should be included in the analyses. Such children could be included in the denominator but not in the numerator (i.e. treated as non-orphans), they could be excluded from the denominator, or could receive some other treatment. Each approach has limitations. Excluding such children completely would give higher orphanhood prevalence estimates than if they were assigned as non-orphans. Although if we think that they are more likely to be in reality orphaned, then the orphanhood prevalence may even through this approach be an under-estimated.

In this paper, each site has adopted an approach to handling missing data that is felt to best reflect whether the 'missing' status data arises from data errors, absence of child-parent linkages or informants. In the Hlabisa-DSS data, known single orphans who are missing the status of the other parent are included in estimates of single orphanhood but excluded from estimates of dual orphanhood.

(iii) Definitions of households

In this paper we also consider the living arrangements of children and consequently, the criteria used to define households are important. In Karonga and Kisesa, only individuals resident in the

study area are eligible for registration and follow-up. Thus, follow-up stops when a person migrates to live outside the area. The household roster will only include resident members. The Hlabisa-DSS adopts a different approach and permits both resident and non-resident household members to be registered in the DSS. The residency status of each individual is recorded separately and updated over time. Consequently, links between children and non-resident parents can be made in the Hlabisa-DSS as long as the parent is considered a member of a household in the study area.

Characteristics of study sites and their populations

In this section we highlight similarities and differentials in population characteristics within or between countries that we would expect to influence children' living arrangements: economic development, migration, marriage, adult mortality, and HIV levels and trends. In table 1 we present selected social and economic characteristics where available for each site.

Economic development

Of the three sites, Karonga in northern Malawi is the most remotely located from a large town or city. The Kisesa site is located 20km east of the regional capital Mwanza, along the main road to Kenya. The Hlabisa site is located about 50km from two large towns, Richard's Bay and Empangeni and lies on a national highway.

All three study sites are described as rural. However, the term 'rural' requires some qualification. Definitions of rural and urban are difficult to standardise. Within each study site differences exist in population density, infrastructure and access to roads and services. All sites include one or more small trading centre or township. These are more densely populated and have a more developed infrastructure (electricity, water, sanitation) than most of the other area. They are more 'urban' in character, being formally demarcated and under a form of municipal rather than traditional tribal authority. In the areas immediately surrounding these urban centres, population density is often high with poorer infrastructure than in the urban settlement. These areas are generally described as 'peri-urban'.

In Karonga and Kisesa, people living outside the trading centres are primarily engaged in subsistence agriculture. In Hlabisa, although a rural area, few households rely on subsistence agriculture. The economic livelihoods of rural households have been shaped by the Apartheid-era restrictions on free movement and settlement, and South Africa's economic development and established labour migration system. Waged employment and government grants are the main sources of household income in Hlabisa.

Migration

Adult migration is a key process affecting the living arrangements of children. Descriptions of migration patterns in these study sites have been published elsewhere (Boerma et al, 2002; Urassa et al, 2001; Hosegood & Timæus, 2005; Hosegood et al, 2004b, Chirwa et al, 2005). Migration is recorded differently in the studies. The most comprehensive migration data is available in the Hlabisa and Karonga-DSS, where individual and household migrations are recorded and those occurring within the area are tracked. In the Kisesa-DSS, individual in and out-migrations are

recorded but not tracked. In the Karonga-cohort, only migration of individuals in the cohort out of the district was recorded.

Population mobility is high in all three sites and there are many similarities in the basic patterns of migration. Unfortunately, directly comparable data on migration in the three sites is not yet available and we draw upon previously published papers. Two types of migration are generally characterised. Circular migration, in which adults migrate because of work while retaining connections with their rural households through remittances and visits. Where adults are circular migrants, their children may remain as residents in the rural household and see their parents during holidays or short visits. The other type of migration is referred to as permanent. Here adults will end their membership of one household when they move to start or join another, for example, as a consequence of marriage. Children may accompany their parent(s) for example, as part of a household migration to a new house or following parental divorce. Both types of migration may be within the surveillance area or outside the area.

Children are also highly mobile in these study areas and may move independently from adults for reasons such as schooling and childcare. A decision to move a child because of childcare availability will however be often influenced by the presence or absence of parents.

In the Kisesa-DSS between 1994 and 1998, 10% of men and 12% of women aged 25-29 years moved each year (Boerma et al, 2002). Female migration rates are higher overall because of very high migration rates among women under 25 years. Migration rates were higher in the trading centre than in the rural area. In the Hlabisa-DSS, 25% of all household members are not resident with the household. Of household members aged 25-29 years, nearly 40% of men and 30% of women are resident elsewhere (Hosegood & Timæus, 2005). Recent population-based data is not available yet from the Karonga-DSS. Data from two total population surveys in the early 1980s and late 1980s found that 32% of individuals had moved between the two surveys (Chirwa et al, 2005). Approximately a quarter of the individuals seen in both surveys were found to have changed households over the five-year inter-survey interval. The highest rates of household change were in adolescents and young adults peaking at over 60% among girls aged 15-19 and 50% among males 20-24. More than 20% of children under 10 years of age in the first survey were found in a different household in the second.

In summary, we speculate that the extent of circular labour migration is lower in Karonga than in the other two sites given the difference in employment opportunities. The residential mobility of young men and women is high in all sites, as in that of children because of schooling and childcare.

Marriage

Marriage patterns appear to be very different in the three populations. Marriage rates are substantially lower in Hlabisa than in Karonga and Kisesa . Indicators of marriage are included in table 1 from the Karonga, Hlabisa and Kisesa-DSSs.

In the Karonga-cohort, Among the 'index' adults, the proportion reporting ever been married was 92% in women and 87% in men (Floyd et al, 2005). Although it should be noted that the definition of marriage was applied to people who had been formally married and those who had been in a relationship with a partner with whom they had had a child. In the 1996 Malawi Demographic and Health Survey (DHS), 83% of women and 67% of men aged 15-54 reported ever been married or were currently living together with a partner.

In Kisesa, of those aged 15-59 years, 47% of men and 70% of women were currently married, either monogamously or polygamously. In contrast to South Africa, in Kisesa virtually all couples in marital unions were living together in the same household. Divorce and separation is common in Kisesa. Almost half of ever married men and one third of ever married women had divorced at least once.

South Africa has undergone a long-term decline in marriage which has been attributed to a variety of social, economic and political processes including the labour migration system, the Apartheid-era controls on population movement and settlement, the cost of marriage, in particular that of 'lobola' or bride wealth, changes in values and norms around sexuality, extra-marital fertility, and gender relations (Preston-Whyte, 1978; Hosegood & Preston-Whyte, 2002). In the Hlabisa-DSS, 21% of men and women aged 18-59 were currently married in 2001. Marriage rates among Africans are lower in KwaZulu Zulu Natal than most other provinces in South Africa. In the 1998 South Africa DHS, 33% of women aged 15-49 years (all population groups) reported being currently married.

HIV prevalence

The HIV epidemics in Malawi and Tanzania began earlier than in South Africa and are considered to be at a mature stage. Monasch and Boerma (2004) present estimates for national HIV prevalence data based on antenatal sero-surveillance for Malawi and Tanzania from DHS and UNAIDS statistics. In Malawi, national HIV prevalence was 3% in the 1980s and 13% in the 1990s. In Tanzania, national HIV prevalence was around 4% in the late 1980s and 8% by 1999. In South Africa, the HIV epidemic has been more rapid and severe. National antenatal HIV prevalence rates rose from 0.8% in 1990 to 24.5% in 2000 (Karim & Karim, 1999; Department of Health, 2001).

HIV sero-prevalence data is available in all three study sites. In Karonga, HIV prevalence in adults was 0.1% in the early 1980s, 2% in the late 1980s and around 13% in the late 1990s (Crampin et al, 2003). In Kisesa, HIV prevalence in adults aged 15 to 44 years was 5.8% in 1994/5 and 6.6% in 1996/7 (Boerma et al, 2002). The HIV prevalence in Hlabisa in 2003/2004 among women aged 15 to 49 years was 27% and in men aged 15 to 54 years was 13% (Weltz, 2005). Age-specific peak HIV prevalence in Hlabisa was 51% in women aged 25-29 years and 43% in men aged 30-34 years (T.Weltz, personal communication).

Adult mortality

AIDS is currently the leading cause of adult death in all sites. In the Karonga-DSS, cause-specific mortality data for 176 adults aged 15-44 years who died between 2003-2005 shows that 60% of men and 66% of women died from AIDS (A.Jahn, personal communication). In 2000, 48% of all death in adults 15 years and older were due to AIDS in the Hlabisa-DSS (Hosegood et al, 2004a).

Findings

(i) Orphanhood levels and trends

Table 2 shows the proportions of children who have lost their mother, their father, both parents and either parent. In all sites all types of orphanhood prevalence increased between the early and later periods. The earliest estimate in the 1980s from the Karonga-population survey are the lowest estimates, around 3% of children were maternal orphans. At the end of the 1990s, maternal orphan prevalence was similar in Tanzania and South Africa (4-5%). In Malawi the proportions of orphans of all types doubled between the early and later periods, as did the maternal orphanhood rate in South Africa. Malawi and Tanzania probably had similar adult mortality patterns and orphanhood rates prior to impact of the HIV epidemic. In Tanzania, where national estimates of HIV prevalence are half (8% in 1999) than in Malawi (16% in 2000), the increase in orphanhood prevalence has been lower.

In all three sites, paternal orphan prevalence is approximately twice that of maternal orphan prevalence. The rates of paternal orphanhood are very high in South Africa (16%). Given that the level of double orphans is not elevated proportionally to Malawi and Tanzania, high rates of non-AIDS mortality of fathers may account for much of this excess mortality in fathers.

None of the point estimates presented in this paper directly matches the DHS year. In addition, the DHS data sourced are for children less than 15 years of age. This is important because overall prevalence is increased substantially by including 15-17 year olds because orphanhood prevalence increases by age. Since orphanhood prevalences have been increasing in the last decade we cannot comment on suggestions by Grassly et al (2004) that DHS under-estimate orphanhood prevalence (Grassly et al, 2004). Age comparable orphanhood prevalence data at the provincial or district level from the DHSs would be more informative.

Figures 1a,b – 3a,b, show the trends in maternal and paternal orphanhood by age for the three sites. As expected, at all time periods orphanhood increases with age. The general trend in the Kisesa-DSS is increasing orphanhood prevalence across the period, however, the trend is less consistent than found in the Hlabisa-DSS. Indeed, between 1994 and 1996 the levels appear to decline. It should be noted at this point that changes in the way that the data is collected may explain much of this lack of consistency. The orphanhood question was asked about all children in the baseline census and again in 1998. In between these surveys, the parental status of children who had migrated into the area would not be known if they were already orphaned or migrated in without their mother. The size of the peak in orphanhood in 1998 can be attributed to the identification of additional orphans in that census. In the Hlabisa-DSS, the orphanhood question was asked at baseline and when all children were subsequently registered and routine updates

were initiated in 2004. However, the period of observation is shorter in Hlabisa than in Kisesa In addition, children migrating within the study area are tracked assisting in greater ascertainment of parental survival.

(ii) Orphanhood incidence

From the longitudinal data we are able to calculate orphanhood incidence rates. In Tables 3,4 and 5, the incidence of orphanhood is shown for each site. In Tables 3 and 4 the second column presents the incidence of paternal deaths per 1000 person-years (py) among non-orphans in each age group. The third column presents the incidence of maternal deaths in among non-orphans, and the last column, the incidence of becoming a double orphan among non-orphans and single orphans. For non-orphans who lose a parent, the exposure period is calculated as the period between the start of follow-up and the exact date at which the parent died. For single orphans who become double orphans, the exposure is between the start of follow-up in the case of those identified as single orphans at enrolment and the exact date of death of the second parent. The longitudinal design of these studies allowed years of follow-up to be included for children who out-migrated, ended household membership or died. For the Karonga-cohort, the incidence data is presented in children of HIV-positive and HIV-negative index adults separately (Table 5).

The incidence data reflects the levels of orphanhood prevalence in the three sites In Hlabisa maternal orphan incidence (14.2 per 1000 py) is much higher than in Kisesa (6.5 per 1000 py), as is paternal incidence although the difference is less large (Tables 4 and 5). The incidence increases by age group. The Karonga-cohort data reveals the size of excess maternal and paternal incidence in children born to HIV positive parents. The paternal incidence in children of HIV positive index adults is nearly seven times that of children of HIV negative index adults. While in the two groups, double orphan incidence is 27 per 1000 person years compared to only 2 per 1000.The incidence rates in the Hlabisa-DSS are higher than suggested by the contemporary orphanhood prevalence and this has important implications for projecting future trends.

(iii) Parental and child living arrangements

The data presented in table 6 describes the co-residential patterns of children with parents for all sites. In Malawi, the findings from the majority of non-orphans (79%) live with both parents while the situation in Tanzania and South Africa is different, 58% in the Kisesa-DSS and only 26% in Hlabisa-DSS. In all sites, the majority of children whose mothers are alive will live with their mothers, over 90% in Tanzania and Malawi. However, in South Africa, this percentage is lower (65%).

The percentage of children who live with their mothers after the death of their fathers is higher than when the reverse is the case. Seventy-seven percent of paternal orphans were living with their mother in the Karonga-cohort. The percentage of maternal orphans co-residing with their father was highest in the Karonga-cohort (68%) and around 40% in Kisesa-DSS and Hlabisa-DSS. In Tables 7-10 the characteristics of the households in which children live are shown separately for each site. In the Kisesa-DSS two time periods are shown, 1994 and 2003/4 (Table 8 and 9).

The definition of household membership used in the Hlabisa-DSS allows us to distinguish between parents who are resident with their child, those not resident with their child but members of the same household, those who is alive but not a member of the same household, and those who have died. Figure 3 demonstrates the additional information provided by this approach by describing the residential and household membership arrangements of fathers with non-orphan and maternal orphaned children. Fifteen percent of maternal orphans were not co-resident with their father although he was reported to be a non-resident member of their household.

Who else are children living with? Collecting detailed information about the relationship between each household member and all other members is complex, and like DHSs, apart from identifying parent-child relationships, DSSs collect information only about the relationship of the children to the head of household. The distribution of orphans and non-orphans by head of the household relationship is included in Tables 7-10. We find differences in headship of households both by orphanhood status and between the countries. In Kisesa and South Africa between 40-50% of dual orphans live in a household headed by their grandparent while this is uncommon in Karonga, where most live with another type of relative (62%). Maternal orphans are more likely to be living in a household headed by their father in Malawi than in Tanzania where a higher proportion of maternal orphans live with grandparents.

Using household-level data on age and sex it is possible to identify the presence of adults or older people who are living with the child, even if their relationship to the child cannot be accurately determined. One indicator of a potentially vulnerable living arrangement presented here is that no female adult aged 19-49 years is living with the child. In the Karonga-cohort, 29% of double orphans were not living with a woman in this age group. The same estimates in 2004 were 28% in the Kisesa-DSS and 19% in the Hlabisa-DSS.

(i) Child care arrangements

Information about caregiving for children is scarce in household surveys and demographic surveillance systems. Of the three sites, only the Hlabisa-DSS collects information about specific aspects of caregiving. From 2004, two questions on childcare were collected: Who is responsible for NAME'S day-to-day care? For younger children, this first question is phrased as 'Who is

responsible for washing and feeding the child?' and for older children: 'Who ensures that the child has eaten and goes to school?'. The second question asks specifically about financial involvement in schooling: 'Who is responsible for making sure that school fees and uniform are paid for?'. The findings are presented in Tables 11 and 12 by orphanhood status. The type of caregivers varies by age. Around half of non-orphans are cared for daily by people other than their mothers. The percentage of children cared for by grandparents is highest among maternal orphans in the youngest age group. But for older children, both non-orphans and orphans, other relatives are more likely than grandparents to be reported as the caregiver. Few fathers are reported to be the caregiver. The proportion of children reported to be caring for themselves ('self') increased with age among both orphans and non-orphans. More than half of all children in the oldest age group 15-18 years report being responsible for themselves. In non-orphans, the majority of children's school costs are paid by fathers (59%) and mothers (36%). However, for maternal orphans grandparents and others are more likely to pay for schooling than non-orphans, and a smaller proportion of maternal orphans receive support from their fathers (28%).

In the Karonga-cohort, information about the 'guardian' was asked about all children who had lived away from both their parents (Table 13). The term 'guardian' is not necessarily synonymous with that of 'caregiver'. Rather it may be the person who ensures that the child's needs are met rather than the person who actively meets them. Aunts and uncles are more likely to be the guardian of dual orphans while the majority of single parent orphans who live apart from the surviving parent are in the guardianship of a grandparent. In the absence of direct questions about guardianship or childcare, most studies impute information about childcare from the relationships of children to key members of the household, typically the household head.

Discussion

The findings from the longitudinal studies show clear evidence that orphanhood prevalence has increased in Malawi, Tanzania and South Africa over the last decade. The increases in level of mortality and large proportion of deaths due to AIDS in all sites, suggests that most of this increased orphanhood prevalence in attributable to the impact of the HIV. By 2004, more than one in ten orphans were double orphans, a consequence of sexual transmission of HIV between parents placing children at increased risk of losing both parents.

The rate and pattern of increase reflects the level and progression of the HIV epidemic and the increase in adult mortality in each country. Increases in adult mortality are moderate in the first 7-8 years after the start of the epidemic but thereafter mortality increases substantially in line with the HIV prevalence (Timæus & Jasseh, 2004). In Karonga, the long period for which HIV and orphanhood prevalence data are available provides a useful context against which to locate the findings from the other sites. The HIV epidemic started earlier in Malawi and Tanzania than in South Africa. In the Karonga-cohort, the orphanhood prevalence data from the 1980s, a period when the HIV epidemic in Malawi was in an early stage, are lower than observed in all sites in later years. The 1990s, saw large increases in HIV prevalence in Malawi, data from Karonga show increases from 2% in the late 1980s to around 13% in the late 1990s (Crampin et al, 2003). Data from the Malawi DHSs clearly evidence the way in which this rise in HIV prevalence affected adult mortality, with the probability of dying between ages 15 and 60 ($_{45}q_{15}$) in women rising from 28% in 1985 to 44% in 1995 (Timæus & Jasseh, 2004). Over the 16 year period between the estimates in the Karonga-cohort (1988) and the Karonga-DSS (2004), the consequences of the higher levels of adult mortality can be seen in the increase in the prevalence of double orphans from 0.3% to 2.2%.

While the HIV epidemic started later in South Africa than in Malawi and Tanzania, the epidemic has been more rapid and severe. Population-based sero-prevalence surveillance in the in the Hlabisa-DSS in 2003/4 has found that more than 50% of women aged 20-24 years are HIV positive. The levels of orphanhood prevalence in Hlabisa are very high mirroring the dramatic increases in adult mortality from the 1990s (Hosegood et al, 2004). In 2004, nearly a quarter of children under 18 years of age have lost at least one parent. The orphanhood prevalence in Kisesa appears to reflect consistently the levels and trends in HIV sero-prevalence and adult mortality in Tanzania compared with those in Malawi and South Africa. Paternal orphan prevalence is approximately double that of maternal orphan prevalence in all study sites. This finding is expected since on average fathers are older than mothers. In addition, there are age differentials in HIV infection and survival times for men and women. Men are infected at older ages than women and have shorter survival time post-infection in the absence of antiretroviral treatment.

An advantage of the DSS longitudinal data compared with cross-sectional surveys such as the DHS, is that the incidence of orphanhood can be calculated. The data have not been disaggregated by period and therefore we cannot comment on trends in orphanhood incidence. The availability of HIV sero-status for parents in the Karonga-cohort provides important evidence for the impact of parental HIV infection and orphanhood incidence. The incidence data also provides insights into the way in which the orphanhood prevalence trends will continue in the future given that sites are in different stages of the HIV epidemic. For children with one or both parents who are HIV positive at the time of their birth, 70% of surviving children will be paternal orphans and 50% maternal orphans, by age 15 years. By comparison, of children born to HIV-negative parents, 18% will be paternal orphans and 9% maternal orphans (Floyd et al, 2005). The orphanhood incidence estimates in the Hlabisa-DSS are much higher than suggested by the current orphanhood prevalence. If there is no change in the level of mortality and children born in 2004 were exposed to the current orphanhood incidence rates, by the age of 15-17 years, 25% will be maternal orphans and 35% paternal orphans. Such a projected estimate is crude but gives impetus to the urgent need to reduce adult mortality through treatment. The high levels of orphanhood incidence in Hlabisa are similar to those found by Watts et al (2005) in a cohort study in Zimbabwe, a country with a similarly high level of HIV prevalence.

The overall differences in the pattern of levels and trends between the three study sites agree with patterns reported by DHS in several comparative studies of orphanhood (Grassly et al, 2004; Monasch & Boerma, 2004; Bicego et al, 2003). However, our findings from DSSs support suggestions that orphanhood prevalence is under-estimated in DHS (Grassly et al, 2004). Several reasons have been postulated for why DHS surveys consistently underestimate orphanhood including the exclusion of children living in households without a resident adult of reproductive age and the adoption effect. The DSSs have several advantages in the study of orphanhood. All resident households in the area are registered regardless of composition. In addition, the repeated visits may facilitate the detection of children whose presence may be overlooked in single-visit surveys such as children who work for the household and school boarders. By talking to many informants over time, the adoption effect may also be minimised. The national estimates may mask differentials in orphanhood prevalence between provinces and rural/urban locations. A next step will be to examine the DHS orphanhood estimates by region and area type.

A key finding of this study is the variation in the living arrangements of orphans and non-orphans in the three sites. Whether it is common for non-orphans to live with both parents or for maternal orphans typically to live with their father is determined by social, cultural and economic processes that appear to be more varied than was anticipated particularly between the Karonaga and Kisesa sites. Parental marriage and co-habitation patterns, and patterns of household formation and dissolution, are key to understanding the differences in children's living arrangements.

In Karonga, the majority (79%) of children whose parents are alive live with them both and, in Kisesa, the estimate is 58%. However, in Hlabisa-DSS only 26% of non-orphans live with both parents. This residential separation of parents from their children in well documented in South Africa. For rural parents, participation in the labour migration system with its prohibitions on children accompanying their parents, was facilitated by other members of rural households caring for their children. The ability of the Hlabisa-DSS to identify non-resident parents who are members of the same household as their child provides a more realistic view on the existence of social connections between such children and their parents. While only 30% of non-orphans were co-resident with their father, in a further 17% of non-orphans, the child's father was a non-resident member of the same household.

However, the lower rates of parental co-residency in Hlabisa than in the other sites cannot be attributed solely to parental labour migration. Union instability and non-co-habitation of unmarried couples will create a situation in which children are simply not able to live with both parents. The sites can be characterised as lying along a spectrum of marriage patterns, with Kisesa experiencing higher rates of marital instability than Karonga, and Karonga having near universal marriage. This is mirrored in children's living arrangements with parents both in orphans and non-orphans. While the anthropological literature places marriage as one of the central processes affecting household formation and survival in Africa, comparative studies about the living arrangements of orphans pay surprisingly little attention to differentials in marital co-habitation and prevalence of extra-marital births.

The social and/or physical separation of parents before death will play a role in determining what happens when one or both of them die. Our findings support the suggestion by Monasch and Boerma (2004) that the pattern of parent-child co-residence in non-orphans is a good predictor of the pattern in orphans. Following the death of a mother or a father, the majority of single parent orphans in Karonga live with their surviving parent. In Kisesa, the majority of paternal orphans live with their mother (58%) but only 30% of maternal orphans live with their father. In Hlabisa, both maternal and paternal orphans are more likely to be living in a household without their surviving parent than in the other sites.

Who else are children living with? Collecting detailed information about the relationship between each household member and all other members is complex, and like DHSs, apart from identifying parent-child relationships, DSSs collect information only about the relationship of the children to the head of household. The data for non-orphans further highlights the pluralism in social arrangements between these sites. In the Karonga-cohort, 91% of non-orphans lived in households headed by their father, the same estimates for the Kisesa-DSS (1994) were 66% and

only 38% in the Hlabisa-DSS (2004). Again, marriage and processes of household formation will be important determinants of the structure of households in which children are living. Maternal orphans are more likely to be living in a household headed by their father in Malawi than in Tanzania and South Africa where a higher proportion of maternal orphans live with grandparents. Factors that influence this will include the patterns of household formation, the patterns of marriage and the extent to which younger relatives (aunts and uncles) take responsibility for their siblings' children or whether this falls to grandparents. The decline in the importance of grandparents for older children will in part be attributable to fewer surviving grandparents. Further analyses of the DSS longitudinal data will be informative in understanding and comparing household dynamics and life-cycles, changes in household composition following adult death, as well as an understanding of the movement of children between households as a result of parental death.

In none of the study sites was there evidence that rising orphanhood prevalence has led to a substantial increase in the number of child-headed households. In Karonga-cohort, none were identified and only small numbers of such households in Hlabisa-DSS were confirmed upon validation. For children who found themselves in such a situation immediately following the death of one or both parents, the arrangement was typically a temporary one, changing as they moved to join other households or other adults joined them. This is an encouraging finding but one that raises questions about why it continues to figure prominently in discussions about the impact of HIV/AIDS on children and in policy strategies for orphans and vulnerable children. It also demonstrates the value of comparative research. By showing that child-headed households are not an emerging phenomenon in several countries, arguments for re-focusing policy efforts towards identifying other indicators of vulnerability are strengthened.

In this paper we present information about caregiving and guardianship that are not generally available in DHSs. This allows us to avoid making assumptions about caregivers from data on residential arrangements. For example, while it is often assumed that co-resident mothers are the primary caregiver, this may not be the case. In addition, the information about household membership of non-resident parents in Hlabisa-DSS, suggests important limitations about interpreting patterns of childcare based on the resident-only definitions of households used in many DSS and surveys. Labour migration of adults from rural households to other areas is a common pattern in Africa. Therefore, we need to be cautious when drawing inferences about parental involvement from data on residential arrangements. We suggest that the phenomena of stretched households and the well-established patterns of childcare responses by households to adult labour migration need to be considered when designing community screening tools to identify vulnerable children (Spiegel, 1987; Ross, 1996). For example, in extended households, households headed by grandparents may include a child's uncles and aunts and they may play

active caregiving roles. It will be important to take these analyses further and explore household typologies and children's living arrangements in more detail.

Caregiving data collected by the Hlabisa-DSS show that a high percentage of caregiving by people other than parents even among non-orphans. There has been much attention given in the literature about the role of grandparents, particularly grandmothers, in the care of orphans. However, the data suggest that caregivers of older orphans are more likely to be other relatives such as aunts. It also highlights the value of permitting older children to reporting caring for themselves. The Karonga-cohort study collected information about the guardians of children who were living in households with neither parent. The term '*guardian*' has the sense of being responsible for the child but does not necessarily equate to primary caregiver or foster parent. With the exception of dual orphans, this person was most likely to be a grandparent. We have deliberately avoided using the term 'fostering' in this paper since this is a term that is open to complex social and legal meaning and cannot be concluded from questions about caregiving.

We need to consider issues of interpretation and social desirability in collecting information about caregiving. The way in which caregiving is understood by fieldworkers and respondents will influence the responses given. For example, whether the respondent identifies the person who they feel is '*supposed*' to be responsible for the child rather than the person who actually performs the care tasks on a daily basis. Qualitative research by Montgomery et al (2005) in the Hlabisa area suggests that men's involvement in children's lives is under-reported due to strongly gendered social norms that inhibit the recognition and reporting of male participation in domestic tasks such as cooking and childcare. The data presented on school fees from the Hlabisa-DSS shows one dimension of caregiving in which fathers play a significant role. That fewer men were responsible for school fees of maternal orphans, echoes the residential arrangement patterns in Hlabisa where maternal orphans are less likely to be living with their fathers than non-orphans.

In the absence of data about caregiving many comparative studies of orphanhood have drawn upon data about the relationships to household heads. The anticipation being that closer kinship ties to the head, i.e. living in a household headed by parent, sibling or grandparent will mean more emotional and financial investment in the child than when the head has a more distant biological or social connection to the child. This however, is a poor proxy for caregiving, probably being more indicative of a 'guardianship' role. Nonetheless, the age and sex of the head of the household can be a useful discriminating indicator of household level socio-economic status (Case et al, 2005; Hosegood & Ford, 2003).

Comparative research on children using data from sites with longitudinal data provides many opportunities as well as challenges. Studies were designed independently and the same data are

not available from each site. Careful consideration needs to be given to the validity and interpretation of comparative findings. A study of child mortality pooled data from the Kisesa-DSS and Karonga-cohort with data from Uganda to estimate the excess risk of child mortality in HIV-positive mothers (Zaba et al, 2005). In seeking to describe children's living arrangements and understand the impact of orphanhood on children's lives, a pooled approach is less appropriate. The topic is more complex and, in contrast to the impact of HIV on child mortality, its effect on living arrangements cannot be assumed to be the same in all three sites. Rather we aim to gain understanding through contrasting the differences and similarities in specific population and social characteristics that are important. Our efforts to date have focused on seeking to make the data for each site broadly comparable and to understand data quality issues and biases that affect interpretations.

A large body of research is accumulating evidence of adverse effects of parental death on the survival and wellbeing of children in the study sites and elsewhere in Africa (Bicego et al, 2003; Case et al, 2004; Case et al, 2005; Zaba et al, 2005). However, the impact of orphanhood on both survival and wellbeing is influenced by many factors including the age at which the child is orphaned, which parent dies, household economic status, and the cause of parental death. For example, in Hlabisa, while HIV/AIDS dominates the burden of mortality, many parents, particularly fathers, will die from other causes. Twenty percent of all deaths in men 15-44 years are due to injuries and violence. In their study of the impact of adult death in Hlabisa, Hosegood et al (2004b) found that sudden deaths (injuries and homicide) are associated with a higher risk of household dissolution than other causes of adult death.

The patterns of orphanhood prevalence from these three sites present a worrying account of the impact of the HIV epidemic on the lives of children. Without interventions to reduce parental mortality, these rates will continue to rise. Using the ASSA2000 AIDS and Demographic model for South Africa, Johnson and Dorrington (2001) projected estimates of maternal orphanhood prevalence rising to 17% by 2014 and paternal orphanhood prevalence to 27%. Evidence about mortality, orphanhood trends and living arrangements from longitudinal population-based studies can provide useful data with which to further develop projection models and examine the estimates from censuses and cross-sectional surveys. In addition our findings show that there are wide variations in the patterns of children's living arrangements. These data can provide important contextual information for agencies designing screening and monitoring indicators for use in programmes targeting vulnerable children and households.

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Table 1: Characteristics of study populations

Malawi (Karonga DSS) 2004/5	
Number of registered individuals	*29,689*
Number of registered households	*5,838*
Household size:	Mean 5.3 (Standard deviation 2.8)
Female headed households	19%
Age of household head:	0.2% aged 15-18, 99.8% age 19+
% currently married adults 20 years and older	Males and females 52%
% never married adults 20 years and older	Males and females 9%
Tanzania (Kisesa DSS) 2003/4	
Total number of household members present	*26,759*
Number of registered households	*4,594*
Household size	Mean 7.0 (Standard deviation 4.4),
% currently married adults 18 years and older	Females 64%, Males 63%
% never been married adults 18 years and older	Females 30%, Males 13%[1]
Socio-economic status	
% households owning i) radio ii) vehicle	i) 38% ii) 2%[2]
% households living in urban area	22%
Tanzania GDP per head	US$120 in 1995[3]
South Africa (Hlabisa DSS) 2001	
Total number of registered household members	*89,132*
Total number of registered individuals	*86,469*
Number of registered households	*11,314*
Proportion of non-resident household members (male and female)	
0-17 years	13%
18-59 years	36%
60+ years	10%
All ages	23%
Household size	Mean 7.9 (Standard deviation 4.7),
Female headed households	27%
% currently married adults 18 years and older[4]	Females 21%, Males 24%
% never been married adults 18 years and older	Females 62%, Males 70%[5]
Total fertility rate	3.67
% of all adult deaths 18 years and older due to AIDS	48%
Socio-economic status	
Households with access to piped water	13%
Households with access to electricity supply	50%
Unemployed or actively seeking work	25% among those aged 15-65 years
% households owning a i) radio or hi-fi ii) vehicle	i) 80% ii) 14%

[1] Never married therefore does not include married/divorced or widowed.
[2] Household socio-economic data collected in 1994, quoted from Boerma et al (2002)
[3] Source: World development report 1996: from plan to market. (1996) Washington DC: World Bank quoted in Boerma et al (2002).
[4] Marital status and mortality data estimated for 2000 (Hosegood et al, 2004; Hosegood and Preston-Whyte, 2001)
[5] This includes never married people who report that they are currently engaged. The proportions of 18 year olds and older people who are never married and not engaged are 53% in women, 60% in men.

Table 2: Percentage of children under 18 years by orphanhood status

Country	Non-orphans	Mother dead[1]	Father dead	Both parents dead[2]	Either parent dead
South Africa					
Hlabisa-DSS 2000[3]	85.3 (27455)	4.4 (1438)	11.5 (3709)	1.2 (393)	14.7 (4723)
Hlabisa-DSS 2004	79.3 (17126)	8.9 (2128)	15.6 (3475)	2.8 (628)	20.7 (4477)
National DHS 1998[4,5]	88%	2%	9%	0.8%	-
Malawi					
Karonga-surveys 1988[6]	97% (57,435)	2.5% (1,535)	5.0% (3,121)	0.3% (159)	-
Karonga-DSS 2004	85.4% (12,713)	5.2% (780)	11.5% (1,721)	2.2% (325)	-
National DHS 2000	85%	5%	8%	2%	11%
Tanzania					
Kisesa-DSS 1998	90.7% (9332)	2.6% (264)	5.7% (587)	1.0% (101)	9.3% (952)
Kisesa-DSS 2004	87.9 (12824)	2.6% (432)	5.7% (1067)	1.0% (267)	12.1% (1766)
National DHS1996		3%	6%	1%	9%

[1] For all sites, the category 'maternal orphans' includes children whose mother is dead and double orphans whose mother and father are dead. orphans. The category 'paternal orphans' includes children whose father is dead and double orphans whose mother and father are dead.

[2] The category 'Both parents dead' is equivalent to the terms 'dual orphans' or 'double orphans'.

[3] The missing data in the Hlabisa DSS are handled in the following way:
Maternal orphans includes only children with known mother's status, regardless of whether father's status is known or not known.
Paternal orphans includes only children with known father's status, regardless of mother's status is known or not known.
Estimates of double orphans or either parent dead are calculated in children where both maternal and paternal survival status is known.

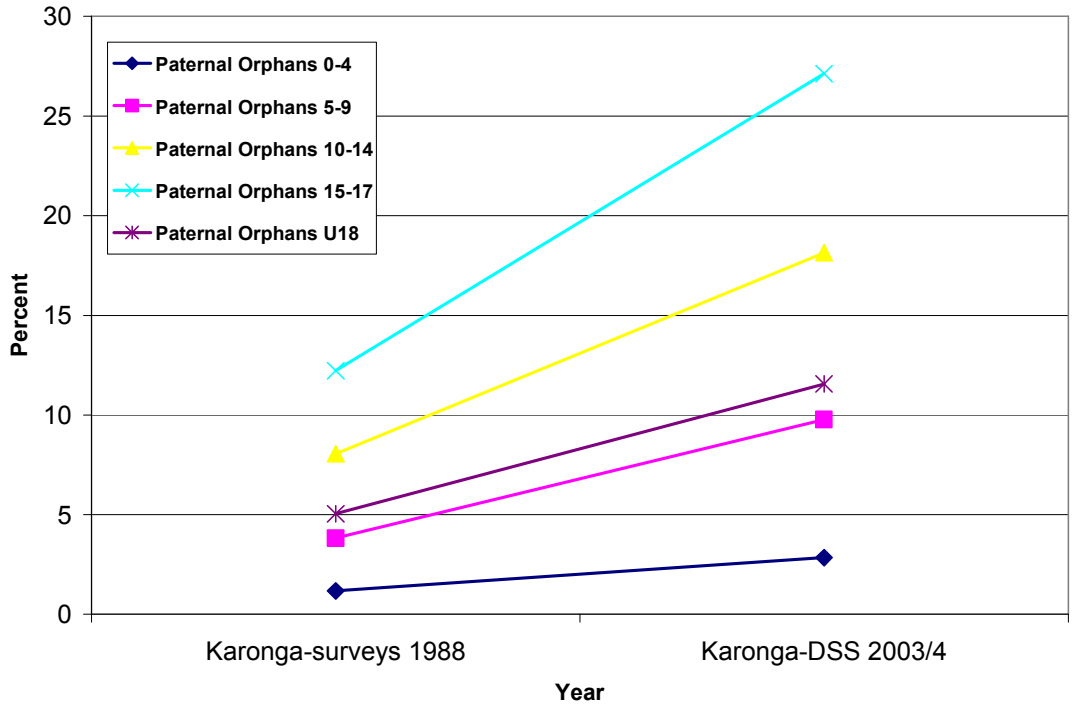
[4] The DHS estimates for South Africa are quoted in Grassly et al (2004), it is also in children under 15 years.

[5] All DHS estimates are shown for children under 15 years. DHS orphanhood estimates for Tanzania and Malawi are quoted in the DHS country reports for the year shown.

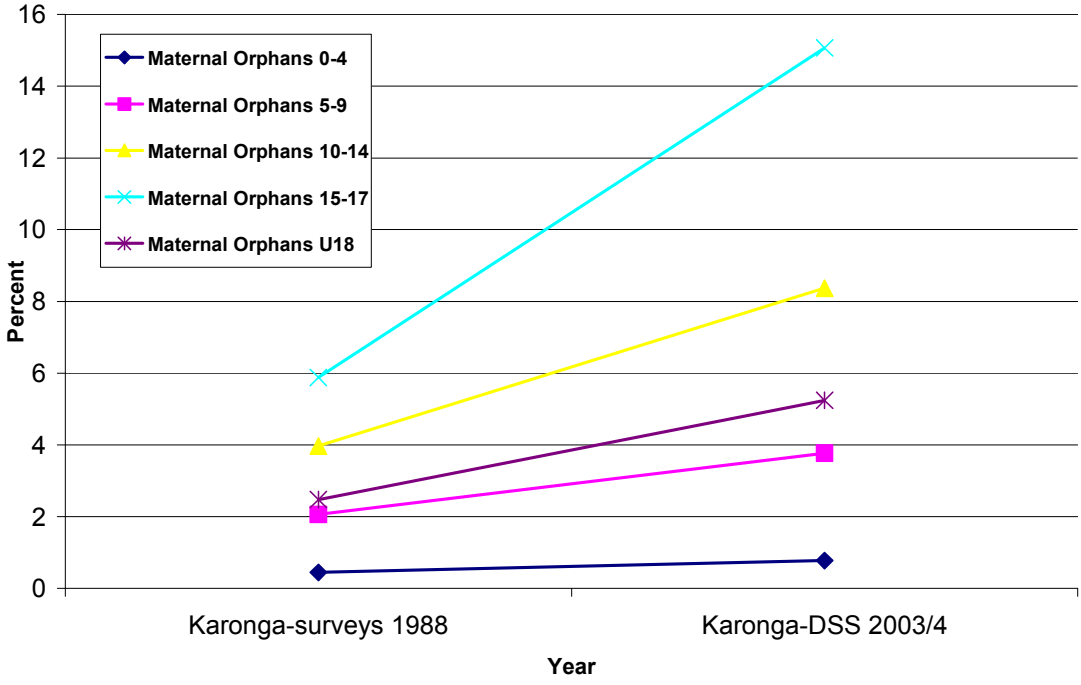
[6] The orphanhood estimates for the Malawi surveys and DSS are in children for whom parental and maternal survival status are known.

Figures 1a and b: Prevalence of paternal and maternal orphanhood in the Karonga-surveys and DSS

a) Paternal orphans

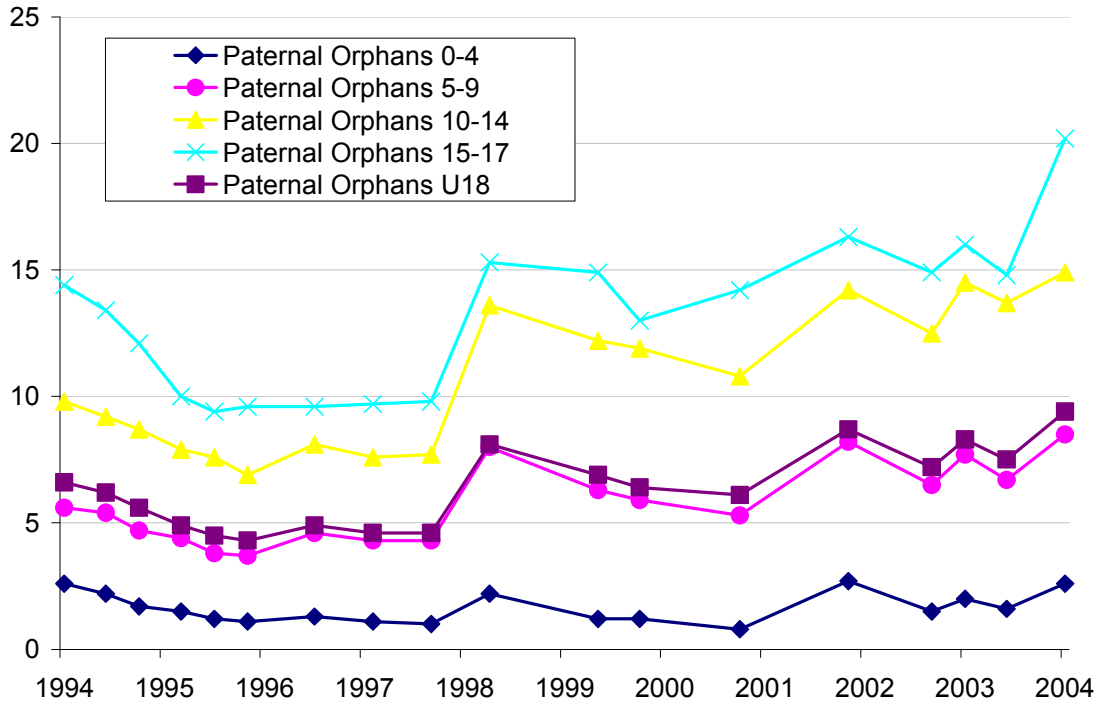


b) Maternal orphans

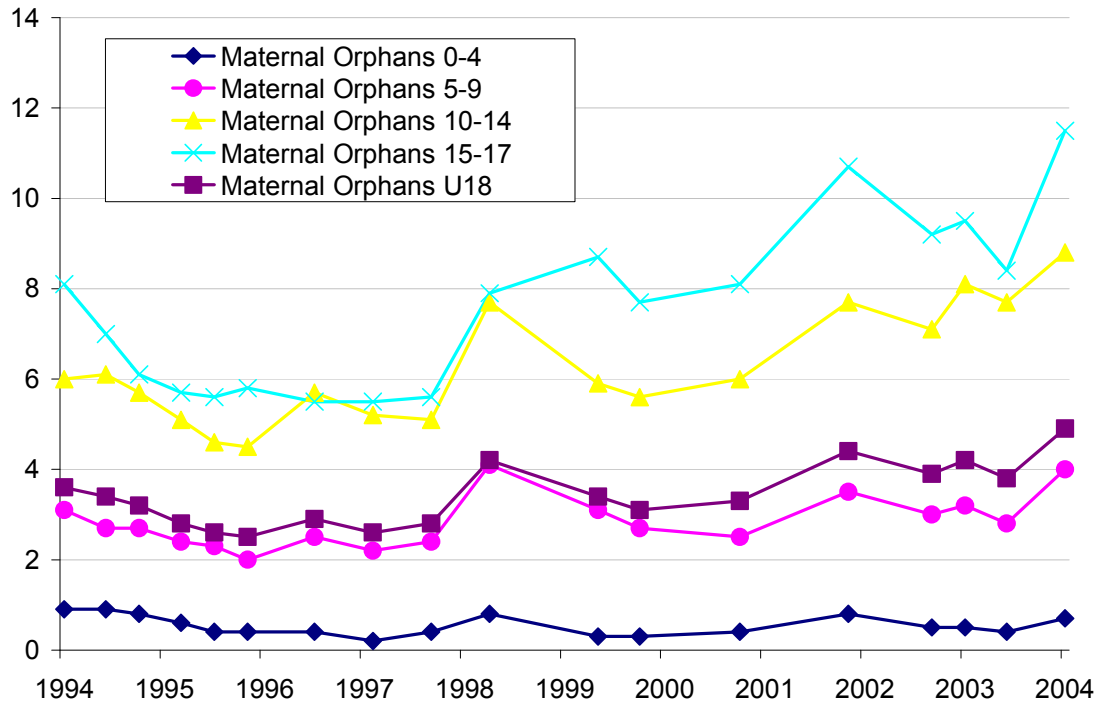


Figures 2a and 2b: Prevalence of paternal and maternal orphanhood in the Kisesa-DSS

a) Paternal orphans

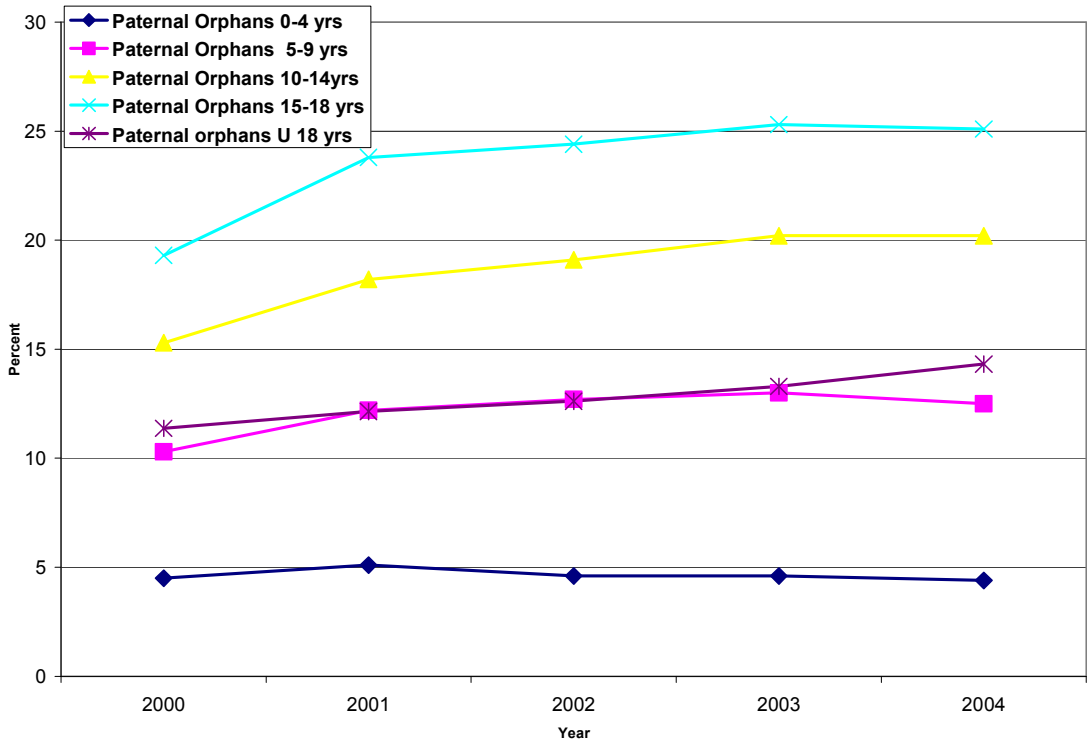


b) Maternal orphans

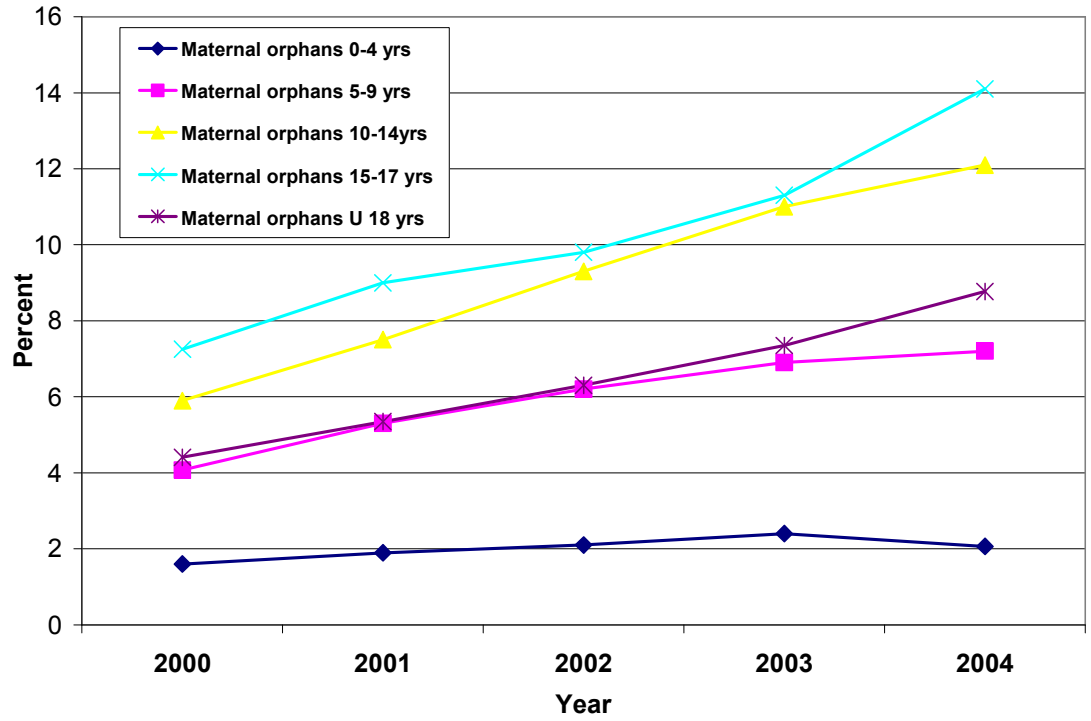


Figures 3a and 3b: Prevalence of paternal and maternal orphanhood in the Hlabisa-DSS[1]

a) Paternal orphans



b) Maternal orphans



[1] In the data presented in these figures children for whom their parental status was not known are assigned as non-orphans rather than excluded from the denominator.

Table 3: Incidence of orphanhood in children - (Tanzania - Kisesa)

	Paternal orphans		**Maternal orphans**		**Dual orphans**	
	(95% CI)	py (1000)	(95% CI)	py (1000)	(95% CI)	py (1000)
Age						
<1	8 (5.8-11.6)	4.1	2.7 (1.7-4.6)	5.9	-	4.1
1-4	8.2 (6.9-9.8)	22.9	3.4 (2.7-4.3)	30.9	0.3 (0.1-0.7)	22.0
5-9	10.4 (8.8-12.4)	22.7	6.8 (5.7-8.1)	29.4	0.7 (0.4-1.5)	22.7
10-14	15 (12.8-17.7)	17.9	9.8 (8.2-11.7)	21.6	1.7 (1.1-2.9)	17.9
15-17	15 (12.3-18.5)	8.4	10 (8-12.6)	10.0	1.8 (1.1-3.4)	8.4
All ages	11.2 (9.8-12.9)	75.1	6.5 (5.6-7.5)	97.9	0.9 (0.6-1.5)	76.8

Table 4: Incidence of orphanhood in children (South Africa – Hlabisa 2000-2004)

	Incidence (per 1000 py)					
	Paternal orphans		Maternal orphans		Dual orphans	
	(95% CI)	py (1000)	(95% CI)	py (1000)	(95% CI)	py (1000)
Orphan status at baseline						
Non-orphans	15.5 (14.8-16.1)	142.7	14.2 (13.6-14.7)	168.3		
Paternal orphans	-		-		27.7 (25.5-30.2)	19.7
Maternal orphans	-		-		35.5 (31.2-40.3)	6.6
Non-orphans & single orphans					4.0 (3.7-4.3)	159.8
Age						
0	4.0 (2.8-5.7)	8.0	5.1 (3.8-6.8)	9.2	0.4 (0.2-1.2)	9.2
1-4	10.7 (9.6-11.8)	32.9	9.8 (8.8-10.8)	37.9	1.0 (0.7-1.4)	37.9
5-9	14.9 (13.8-16.1)	41.3	14.6 (13.5-15.7)	47.7	3.2 (2.7-3.8)	46.2
10-14	18.8 (17.4-20.2)	38.7	17.8 (16.6-19.1)	46.2	5.9 (5.2-6.7)	42.6
15-17	22.3 (20.4-24.3)	21.8	16.4 (15.0-18.0)	27.2	8.1 (7.1-9.4)	24.0

Table 5: Incidence of orphanhood in children (Karonga-cohort)

	Paternal			*Maternal*			*Double*		
age group	***Rate***		***RR***	***Rate***		***RR***	***Rate***		***RR***
(years)	***HIV+***	***HIV-***		***HIV-***	***HIV+***		***HIV+***	***HIV-***	
<1	***46***	***9.1***	***5.0***	***31.6***	***3***	***10.6***	***6.5***	***0***	*/*
1-4	***61.7***	***8.5***	***7.3***	***24.8***	***2.3***	***10.7***	***6.7***	***0***	*/*
5-9	***71.9***	***12***	***6.0***	***52.4***	***7***	***7.5***	***21.6***	***1.8***	***12.0***
10-14	***110.4***	***17.5***	***6.3***	***59.3***	***9.3***	***6.4***	***39.3***	***3.3***	***11.9***
15-17	***122.3***	***19.6***	***6.2***	***88***	***9.8***	***9.0***	***59.3***	***3***	***20.0***
0-17	***82.2***	***12.8***	***6.0***	***50.9***	*6.2*	***8.2***	***27***	***1.7***	***16.6***
	Predicted percentage of surviving children who are orphans								
Age									
1	*4*	*0.9*		*3*	*0.3*		*0.6*	*0*	
5	*25*	*4*		*12*	*1*		*3*	*0*	
10	*48*	*10*		*32*	*5*		*13*	*0.6*	
15	*70*	*18*		*50*	*9*		*29*	*3*	
18	*79*	*22*		*62*	*12*		*41*	*3*	

Table 6: Co-residency with parents by orphanhood status

Parental survival status and co-residency[1]	*South Africa – Hlabisa*		*Malawi – Karonga-DSS*[2]		*Malawi – Karonga-survey (1988)*		*Tanzania – Kisesa (1994)*	
	n	*%*	*n*	*%*	*n*	*%*	*n*	*%*
Both parents alive and resident	4458	21.2	8,240	79	43,286	79.2	5208	58
Both parents dead	595	2.8	59	0.6	83	0.2	61	1
Both parents alive but not co-resident	3768	17.9	443	4.2	2,266	4.2	2	0
Mother dead, father alive and resident	214	1.0	89	0.9	648	1.2	79	1
Mother dead, father alive but not resident	890	4.2	64	0.6	376	0.7	115	1
Father dead, mother alive and resident	1797	8.5	447	4.3	1,722	3.2	285	3
Father dead, mother alive but not resident	768	3.7	140	1.3	427	0.8	143	2
Mother alive and resident, father alive but not resident	7935	37.7	709	6.8	4,166	7.6	2642	29
Father alive and resident, mother alive but not resident	598	2.8	250	2.4	1,681	3.0	424	5
Total	21023	100.0	10,441	100	54,655	100	8959	100

[1] The samples presented in this table exclude children for whom the survival status of both parents was not known.

[2] These estimates refer to children <15 years old.

Table 7: Households characteristics of children <15 years by orphanhood status (Karonga-cohort, 1988)

	Non-orphan		Paternal orphan		Maternal orphan		Double orphan	
	%	n	%	n	%	n	%	n
Living with parents								
Both parents	86[1]	553	0	0	0	0	0	0
Mother only	6	39	77	70	0	0	0	0
Father only	5	33	0	0	68	19	0	0
Neither parent	**3**	19	**23**	21	**32**	9	**100**	21
		644		91		28		21
Relationship to household head[2]								
Father	**91**	584	**0**	0	**61**	17	**0**	0
Mother	**1**	7	**40**	36	**0**	0	**0**	0
Grandparent	**4**	25	**30**	27	**18**	5	**29**	6
Other relative	**4**	25	**30**	27	**11**	3	**62**	13
Non-relative	**0**	0	**1**	1	**11**	3	**10**	2
		641		91		28		21
Age of household head (years)								
19-29	2	15	1	1	7	2	19	4
30-39	35	227	19	17	7	2	10	2
40-49	33	214	30	27	39	11	33	7
50-59	19	122	21	19	32	9	10	2
60-82	**10**	63	**30**	27	**14**	4	**29**	6
		641		91		28		21
Sex of household head								
Male	98	626	47	43	89	25	81	17
Female	**2**	15	**53**	48	**11**	3	**19**	4
		641		91		28		21
Household head female >60 years old								
No	99	637	92	84	96	27	86	18
Yes	**1**	4	**8**	7	**4**	1	**14**	3
		641		91		28		21
Male adult aged 19-49[1] in household								
Yes	**82**	528	**44**	40	**68**	19	**81**	17
No	18	113	56	51	32	9	19	4
		641		91		28		21
Female adult aged 19-49 in household								
Yes	**98**	626	**91**	83	**71**	20	**71**	15
No	2	15	9	8	29	8	29	6
		641		91		28		21
Household assets[2]								
Score ≤3	36	226	54	49	46	13	14	3
Score >3	**64**	403	**46**	42	**54**	15	**86**	18
		629		91		28		21
Housing quality[3]								
Score ≤2	58	353	54	49	54	15	38	8
Score >2	**42**	260	**46**	42	**46**	13	**62**	13
		613		91		28		21

[1] Note this the age range for Karonga-cohort presented here is 19-49 years, for Hlabisa and Kisesa it is 18-49 years.

[2] Possessions are scored according to their relative values. Scores for individual items were summed. Higher scores imply more and/or more valuable possessions.

[3] The construction of walls, floor and windows were scored according to building materials and the component scores were summed. Higher scores imply more solid/expensive constructions.

Table 8: Households characteristics of children by orphanhood status, Kisesa-DSS 1994 baseline survey

Household characteristics	Non-orphan		Paternal orphan		Maternal orphan		Double orphan	
	%	n	%	n	%	n	%	n
Living with parents								
Both parents	62%	5784		-				
Mother only	18%	1724	57%	391				
Father only	6%	529		-	31%	112		
Neither parent	14%	1297	43%	291	69%	255	100%	101
Household head's relationship to child								
Father	66%	6187		-	38%	127		
Mother	6%	590	47%	312		-		
Grandparent	21%	1946	27%	182	38%	128	44%	43
Other relative	6%	587	25%	166	23%	77	53%	51
Non-relative	0%	22	1%	6	2%	6	3%	3
Age of household head (years)								
<29	9%	828	14%	94	10%	37	15.8%	16
30-39	27%	2525	16%	109	16%	60	15.8%	16
40-49	28%	2562	28%	188	20%	72	15.8%	16
50-59	20%	1812	20%	136	19%	71	15.8%	16
60+ years	17%	1550	23%	154	35%	127	36.6%	37
Sex of household head								
Male	85%	7928	49%	334	80%	293	68%	69
Female	15%	1407	51%	348	20%	74	32%	32
Household head female >60 years old								
No	96%	8934	94%	644	81%	298	84%	85
Yes	4%	401	6%	38	19%	69	16%	16
Male adult aged 18-49 in household								
Yes	82%	7635	71%	481	24%	89	85%	86
No	18%	1700	29%	201	76%	278	15%	15
Female adult aged 18-49 in household								
Yes	94%	8734	85%	577	26%	95	72%	73
No	6%	601	15%	105	74%	272	28%	28

Table 9: Households characteristics of children by orphanhood status, Kisesa-DSS, 2003/2004

Household characteristics	Non-orphan		Paternal orphan		Maternal orphan		Double orphan	
	%	n	%	n	%	n	%	n
Living with parents								
Both parents	63%	7975						
Mother only	20%	2530	53%	656				
Father only	4%	528			25%	158		
Neither parent	13%	1693	43%	579	75%	484	100%	236
Male adult aged 18-49 in household								
Yes	79%	10249	62%	771	74%	478	71%	168
No	21%	2744	38%	464	26%	164	29%	68
Female adult aged 18-49 in household								
Yes	91%	11635	83%	1020	76%	487	75%	176
No	9%	1091	17%	215	24%	155	25%	60

Table 10: Households characteristics of children by orphanhood status, Hlabisa-DSS

Household characteristics	Non-orphan		Paternal orphan		Maternal orphan		Double orphan	
	%	n	%	n	%	N	%	N
Living with parents								
Both parents	26.6	4458		n/a		n/a		n/a
Mother only	47.3	7935	70.1	1797		n/a		n/a
Father only	3.6	598	n/a	n/a	19.4	214		n/a
Neither parent	22.5	3768	29.9	768	80.6	890		n/a
	100	16759	100	2565	100.0	1104		595
Household head's relationship to child								
Father	38.0	7956	0.0	0	20.8	282	0.0	0
Mother	4.0	839	45.7	1191	0.0	0	0.0	0
Grandparent	42.0	8795	27.9	728	47.4	642	43.6	240
Other relative	11.8	2481	20.8	541	26.9	364	45.7	252
Non-relative	4.1	869	5.6	146	4.9	67	10.7	59
	100.0	20940	100.0	2606	100.0	1355	100.0	551
Age of household head (years)								
<29	2.3	444	5.4	142	3.5	47	15.1	86
30-39	15.1	2891	20.0	529	11.5	156	13.0	74
40-49	30.9	5944	32.4	856	24.7	335	18.0	102
50-59	23.5	4510	18.2	481	22.9	310	16.7	95
60+ years	28.2	5426	23.9	632	37.5	508	37.2	211
Sex of household head								
Male	75.3	14463	35.5	938	66.7	904	53.3	303
Female	24.7	4752	64.5	1702	33.3	452	46.7	265
Household head female >60 years old								
No	88.8	17068	87.5	2311	81.1	1100	76.2	433
Yes	11.2	2147	12.5	329	18.9	256	23.8	135
Male adult aged 18-49 in household								
Yes	61.4	11812	53.7	1422	64.8	879	61.4	350
No	38.6	7426	46.3	1225	35.2	478	38.6	220
	100.0	19238	100.0	2647	100.0	1357	100.0	570
Female adult aged 18-49 in household								
Yes	89.8	17278	87.5	2317	74.4	1010	74.7	426
No	10.2	1960	12.5	330	25.6	347	25.3	144
	100.0	19238	100.0	2647	100.0	1357	100.0	570
Household assets								
Score ≤3	19	5251	22	322	22	769	22	129
Score >3[1]	81	22278	78	1149	78	2725	78	448

[1] The asset score presented for the Hlabisa-DSS is based on the total number of assets owned by the household. Assets found to be significantly associated with poverty based on household per capita income such as primus stoves have been excluded.

Figure 3: Father's household co-membership and co-residency with their children for non-orphans and maternal orphans, Hlabisa-DSS (2004)

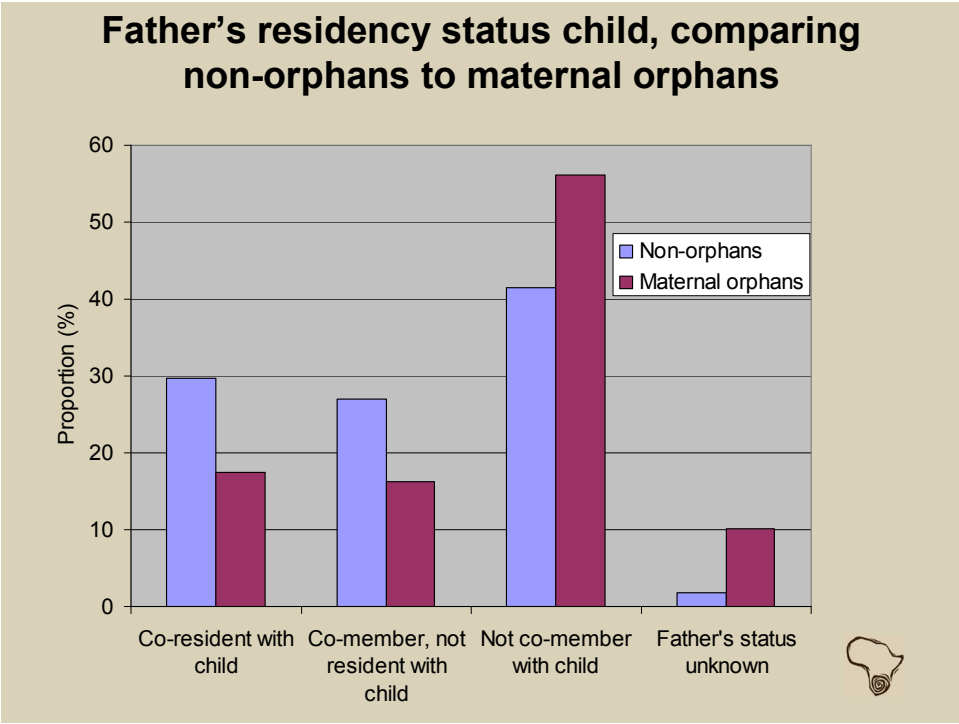


Table 11: Percentage of carers responsible for day-to-day care of children by orphanhood status and age (South Africa, Hlabisa-DSS)[1]

	Mother		Father		Grandparent		Domestic worker		Other relative		Self		Total[2]
	n	%	n	%	n	%	n	%	n	%	n	%	n
Non-orphans	7645	49.3	91	0.6	1614	10.4	305	2.0	2131	13.7	3724	24.0	
Maternal orphans	0	0	13	1.2	271	25.3	7	0.7	367	34.3	412	38.5	
Paternal orphans	784	36.9	0	0	181	8.5	18	0.9	357	16.8	786	37.0	
Dual orphans	0	0	0	0	92	21.0	2	0.5	151	24.4	194	44.2	
All children	8429	44.0	104	0.5	2158	11.3	332	1.7	3006	15.7	5116	26.7	
Non-orphans													
0-4	3060	76.5	25	0.6	528	13.2	122	3.1	256	6.4	0	0	3998
5-9	2668	56.4	31	0.7	674	14.3	123	2.6	687	14.5	5470	11.6	4730
10-14	1655	36.6	23	0.5	361	8.0	51	1.1	767	17.0	1660	36.8	4517
15-18	262	11.6	12	0.5	51	2.3	9	0.4	421	18.6	1510	66.7	2265
Maternal orphans													
0-4	0	0	3	4.5	34	50.8	1	1.5	29	43.3	0	0	67
5-9	0	0	4	1.5	102	38.5	4	1.5	109	41.1	46	17.4	265
10-14	0	0	4	0.85	115	24.6	1	0.2	157	33.6	191	40.8	468
15-18	0	0	2	0.7	20	7.4	1	0.4	72	26.7	175	64.8	270
Paternal orphans													
0-4	120	71.9	0	0	29	17.4	4	2.4	14	8.4	0	0	167
5-9	291	56.5	0	0	6	1.2	81	15.7	75	14.6	515		
10-14	292	32.6	0	0	76	8.5	8	0.9	169	8.9	351	39	896
15-18	81	14.8	0	0	14	2.6	0	0	93	17.0	360	65.7	548
Dual orphans													
0-4	0	0	0	0	5	50.0	0	0	5	50.0	0	0	10
5-9	0	0	0	0	32	34.0	1	1.1	43	45.7	18	19.2	94
10-14	0	0	0	0	39	19.8	1	0.5	58	29.4	99	50.3	197
15-18	0	0	0	0	16	11.6	0	0	45	32.6	77	55.8	138

[1] In Hlabisa the question is:
Who takes responsibility for the day-to-day care of [NAME]?
This is described to informant with age-relevant examples:
Who is responsible that the child is fed? (younger children)
Who checks to see whether the child needs shoes? (older children)

Table 12: Percentage of people responsible for ensuring that school uniform and fees are paid by orphanhood status and age (South Africa, Hlabisa-DSS)

	Mother		Father		Grand-parent		Other relative		Self		Total[1]
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%	Freq
Non-orphans	4205	37.0	5680	50.0	837	7.4	628	5.5	6	0.05	11357
Maternal orphans	0	0	280	30.3	377	40.8	265	28.7	1	0.1	924
Paternal orphans	1429	78.5	0	0	186	10.2	205	11.3	1	0.05	1821
Dual orphans	0	0	0	0	146	38.9	229	61.0	0	0	375
All children	5634	38.9	5960	41.2	1546	10.7	1327	9.2	8	0.1	14477
Non-orphans											
0-4	202	43.7	204	44.2	33	7.1	21	4.6	0	0	462
5-9	1726	39.5	2092	47.9	376	8.6	172	3.9	2	0.05	4368
10-14	1726	39.5	2092	47.9	376	8.6	172	3.9	0	0	4439
15-18	1592	35.9	2253	50.8	310	7.0	284	6.4	3	0.14	2088
Maternal orphans											
0-4	0	0	2	25.0	4	50.0	2	25.0	0	0	8
5-9	0	0	56	23.5	104	43.7	77	32.4	0	0	238
10-14	0	0	132	29.9	192	43.4	117	26.5	1	0.2	442
15-18	0	0	90	38.1	77	32.6	69	29.2	0	0	236
Paternal-orphans											
0-4	26	86.7	0	0	2	6.7	2	6.7	0	0	30
5-9	393	81.9	0	0	51	10.6	36	7.5	0	0	480
10-14	643	76.3	0	0	102	12.1	97	11.5	1	0.11	843
15-18	367	78.4	0	0	31	6.6	70	15.0	0	0	468
Double-orphans											
0-4	0	0	0	0	1	50.0	1	50.0	0	0	2
5-9	0	0	0	0	38	45.2	46	54.8	0	0	84
10-14	0	0	0	0	66	36.9	113	63.1	0	0	179
15-18	0	0	0	0	41	37.3	69	62.7	0	0	110

[1] Information was only available for 79% of the population in 2004.

Table 13: The percentage of children living away from both parents in the Karonga-cohort, Malawi by type of guardian (%)

Guardian	Non-orphan %	Maternal orphan %	Paternal orphan %	Dual orphan %
Grandparent	54	80	61	31
Aunt/uncle	20	20	13	46
Sibling	13	0	23	4
Cousin	2	0	0	4
Other relative	10	0	3	15
Unspecified	2	0	0	0
Total	100 (n=61)	100 (n=10)	100 (n=31)	100 (n=26)