HIV/AIDS, Poverty and Growth: Evidence from a Household Impact Study conducted in the Free State province, South Africa[1]

Booysen, F. le R. & Bachmann, M.

Centre for Health Systems Research & Development

University of the Free State, South Africa

Paper presented at the Annual Conference of the Centre for Study of African Economies (CSAE), St Catherine's College, Oxford, 18-19 March 2002

ABSTRACT

Households affected by HIV/AIDS bear a substantial burden of illness and death, and this is associated with more severe poverty. Many affected households rely heavily on social welfare grants, which imply that government will in future years be faced with increasing claims. Affected households also spend less on food than non-affected households. In the longer run, this may contribute to malnutrition, which means that it will be particularly important to investigate policy programs that can enhance the food security of affected households. The utilizing of savings and new borrowing appears to be a common strategy employed by affected households to cope with illness and particularly with a death in the household. The amount of savings utilized and money borrowed by affected households in the recent past are considerable. Hence, illness and death appear to put considerably strain on household finances. The danger of course in the longer run is that these actions will move households deeper into poverty as more resources are crowded out in favor of debt repayments in the absence of improvements in household income. Access to medical aid has been shown to be the single most important predictor of poverty status. This may suggest that wider access to affordable medical aid with certain minimum benefits and/or the introduction of a broad-based basic income grant or social security system offering minimal support may be important in mitigating the impact of the epidemic. Continued efforts at poverty reduction will therefore remain crucial, particularly insofar as education and employment has also been shown to offer protection to affected households having to cope with illness and death.

BACKGROUND AND PROBLEM STATEMENT

The HIV/AIDS epidemic poses a severe threat to the economies of developing countries, and those on the African continent in particular. South Africa, which is being affected fundamentally by the epidemic, is no exception. By the end of 1997 2,8 million people in South Africa were estimated to be living with HIV/AIDS. By 1999, this figure had increased to 3.5 million. The estimated prevalence of HIV/AIDS among the country's adult population (11.8%) is amongst the highest in the world (ILO, 2000). According to the Metropolitan-Doyle model, the number of South African living with HIV/AIDS will increase from 160 000 to almost one million between 2000 and 2010. The annual number of AIDS deaths is estimated to increase from 120 000 to between 545 and 635 thousand between 2000 and 2010 (Abt Associates, 2000: 8-9). The number of children younger than fifteen years orphaned by AIDS has been estimated to be 800 000 by 2005, rising to more than 1.95 million by 2010 (Abt Associates, 2000: 11). These infected individuals and affected children all belong to individual households and their deaths will have a significant impact on their families. Hence, the epidemic will have a considerably impact on households in South Africa.

Over the next ten to fifteen years, the epidemic has the potential to erode development gains made in past decades. As the disease takes its toll on the economically active population, production and demand are expected to decline, which will slow down economic growth and development. The disease will also have serious budgetary implications in terms of increased government expenditure on health care and social security, which will be aggravated by the decline in government revenue due to declining economic activity (Barnett and Whiteside, 1998; ILO, 2000).

Research into the socio-economic impact of HIV/AIDS on households and communities is crucial in guiding current and future policies and intervention strategies intended to absorb this impact. From an economic point of view, the primary impact of the disease manifests mainly among individual economic agents, i.e. individuals and households. An assessment of the socio-economic of HIV/AIDS would therefore have to start on this micro-level of analysis. To date no comprehensive, longitudinal study of the impact of HIV/AIDS on such a micro-level

of analysis has been conducted in South Africa. The likes of Arndt and Lewis (2000) have conducted an analysis of the macroeconomic implications of HIV/AIDS for South Africa. They estimate that the maximum differential between GDP growth rates over the period 1997-2010 will be 2.6 percentage points. Other country and cross-country studies on the macroeconomic impact of HIV/AIDS in Africa estimates the reduction in average GDP growth rates at between 0.3 and 4 percentage points (Dixon *et al*., 2002: 233). Yet, these macroeconomic models often fails to allow for the effects of a number of important microeconomic impacts which are endogenous to such model, amongst others that of asset sales and investments in human capital. This failure to a large extent derives from the lack of household level economic data with which to quantify these assumptions. Work on the macroeconomic model maintained by the Department of Finance faces similar constraints (Compernolle, 2000), as do macroeconomic models maintained by other consultancies. Hence, one aim of this research project is to inform economic growth analyses and studies on the macroeconomic impact of HIV/AIDS. This paper presents the main findings from the cross-section analysis of the data from the first panel that are important in achieving the former objective, as well as those findings that are important in explaining why poverty in combination with the HIV/AIDS epidemic seems to represent a major threat to the livelihood of households.

METHOD

The impact of HIV/AIDS on individuals and households was assessed by means of a cohort study of households affected by the disease, and compared with a control group of households unaffected by the disease. For this purpose, a six-monthly survey on the quality of life and the economics of affected and non-affected households was conducted. Interviews were conducted with one respondent only, namely the "person responsible for the daily organization of the household, including household finances". The survey was conducted in two local communities in the Free State province, one urban (Welkom) and one rural (QwaQwa), in which the HIV/AIDS epidemic is particularly rife. The results reported in this paper are based on a cross-section analysis of the data collected during the first phase of the project.

PROFILE OF SAMPLE POPULATION

Although the sample in certain instances closely reflects the socioeconomic profile of the national population (e.g. male/female distribution of the population), it in most cases differs distinctly from the general South African population. The profile of the sample of households included in this study can largely be attributed to the sampling design. Given that affected households were sampled from networks and/or organizations involved in counseling, home-based care and public health care and mainly in poorer communities, the sample does not include affected households that mainly utilize private health care services. Moreover, the study was conducted in one specific province (Free State) and in two selected sites only. However, the fact that South Africa's poor, predominantly African population face relatively high HIV prevalence rates and are particularly vulnerable to the epidemic and therefore dependent on support from the public service sphere, means that the findings and policy recommendations put forward in this paper are especially relevant to informing government's responses to HIV/AIDS, although it is only partly informative with regard to the implications of HIV/AIDS for poverty and growth.

KEY CONCEPTS FOR COMPARATIVE ANALYSIS

The results presented in the subsequent pages draw comparisons between households in terms of four stratifications of the data. These concepts and terminology can be defined as follows.

- **URBAN** versus **RURAL** comparisons: This refers to the distinction between households living in Welkom and households living in QwaQwa. Welkom is a relatively large urban settlement in the Goldfields in the Eastern Free State. QwaQwa is a former homeland, which is still governed mainly by traditional leadership in an area where communities reside in 42 smaller villages. The distinction therefore between urban/rural is based on the nature of governance structures in the two areas rather than the physical housing infrastructure characteristic of these areas. In QwaQwa, for example, the majority of the population resides in formal dwellings, yet the community remains a predominantly rural one.

- **AFFECTED** versus **NON-AFFECTED** comparisons: This refers to the distinction between interviewed households in which at least one person is known to be HIV-positive as opposed to interviewed households residing in close proximity in the affected households which was sampled as controls. The former households were recruited purposively from established networks and/or organizations in the two areas involved in HIV/AIDS. In the case of the latter households no one in these households is known to be HIV-positive insofar as testing could not be conducted, nor was any member of these households presently treated for tuberculosis or hospitalized for pneumonia in the month before the interview.

- **ILLNESS** versus **NO ILLNESS** comparisons: This refers to the distinction between households in which one or more members had been continuously ill in the month preceding the interview as opposed to households where no member had been continuously ill in the month preceding the interview.

- **DEATH** versus **NO DEATH** comparisons: This refers to the distinction between households in which one or more members had died in the six month preceding the interview as opposed to households where this was not the case.

STATISTICAL METHODS

Proportions of households (or household members) were compared between affected and unaffected households, and between Welkom and QwaQwa, using Pearson χ^2 or exact tests. Outcomes were where possible compared at both individual and household levels. Multiple logistic regression analysis was used to determine the independent influences of certain explanatory variables on selected outcomes related to morbidity, mortality and the socioeconomic impact of HIV/AIDS, adjusting for influential personal, household and area characteristics. Variables were retained in each model if they significantly improved the respective model. Logistic regression models with individual level outcomes were adjusted for clustering of outcomes at household level, using Stata statistical software. Intra-household correlation of each outcome was expressed as an intra-cluster correlation coefficient (ICC). The ICC is

the proportion of variance in the outcome accounted for by inter-household differences. Statistical significance was defined at the 5% level.

RESULTS

BURDEN OF ILLNESS AND DEATH

A comparison of the age of members of affected and non-affected households who were ill during the past month (Figures 1) shows that ill individuals in affected households were more likely to be between about 20 and 40 – the age band most at risk of HIV/AIDS. Similar age distributions were seen when those with and without diagnoses of infectious disease were compared.

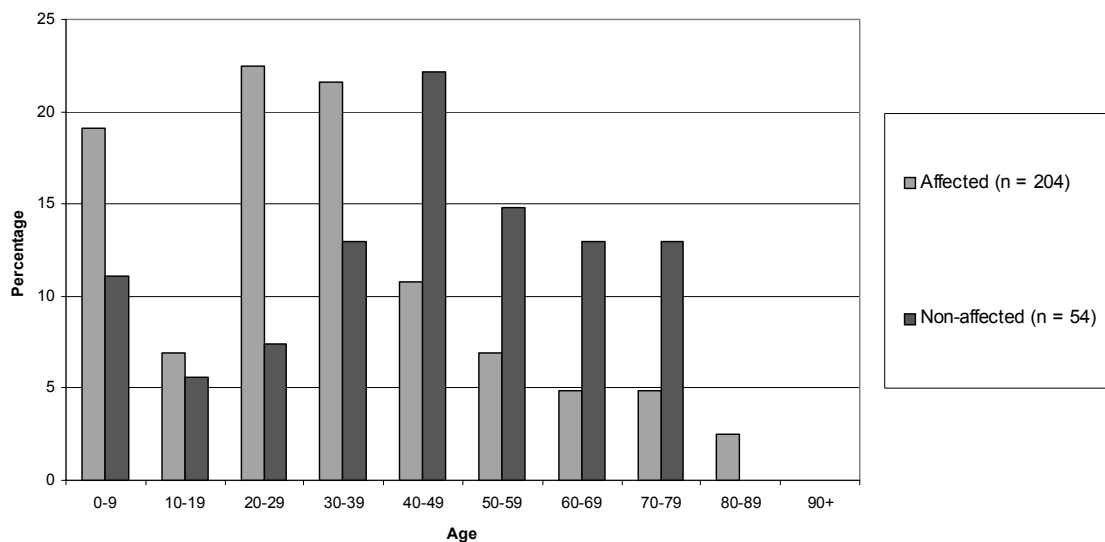**Figure 1: Age of ill individuals in affected and non-affected households**

Table 1 shows that the risk of illness was significantly higher in affected households in all age bands up to 50 years, and the odds ratio was highest in the age bands 5-10 years (OR=13) and 20-30 years (OR=11). The low P value for the age*affected status interaction term shows that age significantly modified the effect of HIV on risk of illness.

Table 1: Risk of illness in affected versus unaffected households by age band

Age band (years)	Number of persons in band	Odds ratio*	95% confidence interval
0 - <5	185	4.6	(1.7-12.5)
≥ 5 - <10	213	13.1	(1.7-101)
≥ 10- <20	454	4.7	(1.4-16.6)
≥ 20- <30	363	11.4	(4.0-32.4)
≥ 30- <40	268	6.4	(2.9-14.2)
≥ 40- <50	174	2.8	(1.3-6.2)
≥ 50- <60	110	1.9	(0.74-5.0)
≥ 60	138	1.5	(0.71-3.3)

* Log ratio value for inclusion of age*affected status interaction term in logistic regression model: P = 0.006.

The mean age of death was 35 (range 0-73, inter-quartile range 24-49) years. The following graph of the age distribution of deaths shows a peak around 35 years, again emphasizing the impact of HIV/AIDS on the supply of household labor (Figure 2).

Figure 2: Age at death for deaths occurring in affected households (n=42)
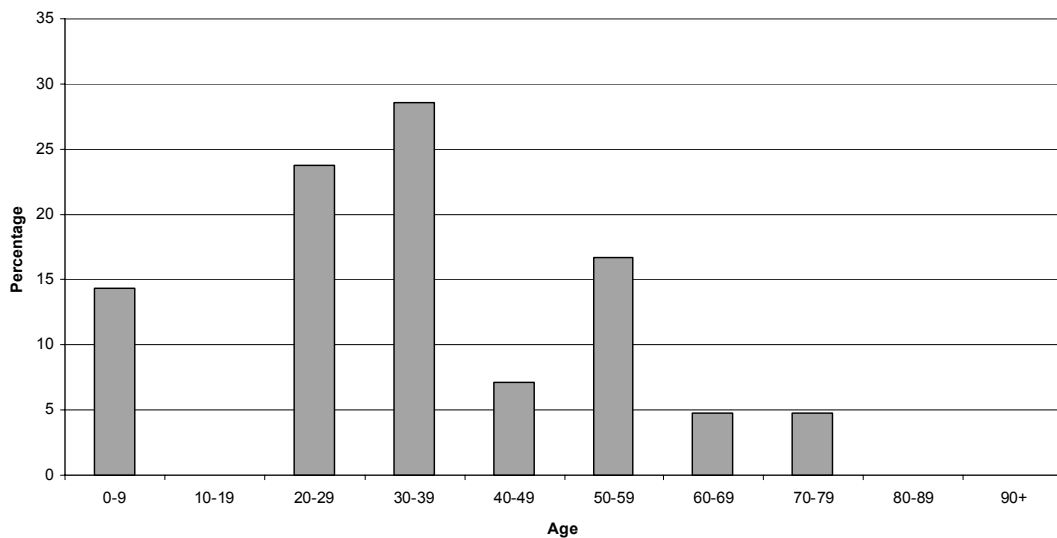
72% (182/253) of ill household members were cared for at home, the rest being hospitalized or ambulatory. Indicators of the burden on households are shown in Table 2. Being cared for at home was slightly more likely among those from affected households (75%) than from unaffected households (62%) households. The duration of being cared for at home appeared higher in affected households (median 20) than unaffected households (median 14), but this difference was not significant. Among the 177 for whom the logistical burden of home care was reported, caring for the ill person took a median of 4 hours per day. This took longer in affected households

(median 4) than in unaffected households (median 3) (P=0.06). Someone else accompanied almost 60% of ill household members that attended health services. Those from affected households were significantly more likely (68%) to be accompanied than those from unaffected households (37%).

Table 2: Caring for an ill household member at home

	Total		Affected		Unaffected		P*
Cared for at home. *n/N (%)*	182/253	(72)	149/200	(75)	33/53	(62)	0.08
Among those cared for at home:							
• Days of home care. *Median [range]*	19	[2-31]	20	[2-31]	14	[2-31]	0.43
• Hours per day caring for ill person. *Median [range]*	4	[1-24]	4	[1-24]	3	[2-12]	0.06
Accompanied ill person to health service. *n/N (%)*	151/256	(59)	131/192	(68)	20/54	(37)	<0.001

* Exact test for proportions, Wilcoxin ranksum test for medians.

Caring for an ill person led their caregivers to lose income in 5% (9/180) of cases; this percentage did not differ between affected and unaffected individuals (P=1.0). Among these 9 caregivers, the median number of working days lost over the past month was 7 (range 1-30). Carers came from outside the household in 12/83 (6.5%) cases. Only 5% (7/149) of those accompanying ill household members to health services lost income as a result, and this did not differ between affected and unaffected households (P=1.0).

The logistical burden of caring for the deceased during their fatal illness was as follows. Household members spent an average of 7.5 (range 2-24) hours per days providing care. In rural Zimbabwe, Woelk *et al*. (1996, as quoted in Topouzis, 2000) found the average time spent in caring for a bed-bound patient to be 38.5 hours per week, which nearly represents full-time employment. Thus, illness and death do exert considerable pressures on the supply of household labor in terms of the burden of caring, yet the direct economic cost of this loss of time appears to be low due to relatively high levels of unemployment in the sample population. Loss of income due to caring was however reported for only 2 (5% of 38) households. Care appeared to be provided mainly by unemployed household members: an average of 5 (range 2-10) working days was lost caring for them during the months before their death. Carers

were almost always relatives. This burden of care often falls heavily on female members of households, who normally care for the ill and their orphaned children, evidence of which was found in Uganda (UNDP, 1998).

LABOR SUPPLY: HOUSEHOLD SIZE AND STRUCTURE

AIDS deaths, which follow on AIDS morbidity, leads to a more permanent cutback in the labor supply of affected households, decreasing the future earning potential of the household (Bollinger and Stover, 1999a; Topouzis, 2000). Other impact studies have quantified this loss in terms of differences in household size, household structure and dependency ratios, which reflect changes in the composition of affected households.

Table 3: Supply of household labor and unemployment

	Welkom Affected	Welkom Non-affected	QwaQwa Affected	QwaQwa Non-affected	Total	Total Affected	Total Non-Affected	P
Average household size	5.6	4.6	4.5	4.1	4.7	5.1	4.3	0.002
Dependency ratio	36.5	32.0	34.3	34.0	34.2	35.4	33.0	0.310
Sample size (n)	*101*	*100*	*101*	*104*	*406*	*202*	*204*	

Affected households on average are slightly larger than non-affected household (Table 3). This suggests that affected households may in fact have a larger available supply of labor than non-affected households. However, the dependency ratio in affected households is higher than that in non-affected households, implying that households affected by HIV/AIDS in fact have a smaller supply of labor than non-affected households, with a larger proportion of the household consisting of children and elderly persons. These differences, though, are not statistically significant. The Kagera (Tanzania) and Rakai (Uganda) household impact studies, for example, reported marginal changes in dependency within households. The dependency ratio, which was 1.2 before the death of an adult, respectively increased to 1.4 (Kagera) and 1.5 (Rakai) following the death (Topouzis, 2000: 9). In rural Chiangmai in Thailand evidence has also been found of increasing dependency ratios. Households suffering an AIDS-death consist of 15% children younger than fourteen years and 25% elderly people, with the remainder being of prime working age. The percentage of elderly in households suffering AIDS-deaths were found to be higher and that of members of

prime working age lower than in households suffering non-AIDS deaths (UNAIDS, 1995; Wattana, 1996, as quoted in Parker *et al*., 2000: 44; Janjaroen, 1998).

INCOME

Affected households are poorer than non-affected households, regardless of whether income is measured at the household or individual level or in adult equivalent terms (Table 4)[2]. The fact that affected households is generally larger than non-affected households means that less resources are being shared amongst a larger number of persons. Per capita and adult equivalent income in affected households represents only between 50% and 60% of the levels of income in non-affected households.

Table 4: Income and composition of income

	Welkom Affected	Welkom Non-affected	QwaQwa Affected	QwaQwa Non-affected	Total	Total Affected	Total Non-Affected	P
Average monthly household income (Rands)	1630	2692	948	1596	1727	1296	2147	0.001
Average monthly per capita income (Rands)	335	741	232	417	434	285	580	<0.001
Average monthly adult equivalent income (Rands)	614	1211	397	694	734	508	954	<0.001
Sample size (n)	*99*	*100*	*95*	*99*	*393*	*194*	*199*	
Composition of income (%):								
Employment income	58.4	67.4	31.1	41.4	49.8	45.0	54.5	0.040
Non-employment income	33.9	24.7	40.9	30.8	32.4	37.3	27.7	0.022
Remittance income	7.6	7.8	21.7	25.4	15.5	14.5	16.5	0.532
Total	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*	

Note: The sample sizes differ from the interviewed samples in Table 1 because data were not available for all households.

Elsewhere, households living in rural Chanyanya in the Kafue district in Zambia that were affected by chronic illness was to found to have an annual income 46% lower than households in the same area that were not affected by chronic illness (Mutangadura and Webb, 1999, as quoted in Topouzis, 2000: 18). Households in rural Thailand affected by an adult death saw household income drop by 70.7%, while total

---

[2] Estimates of household income and expenditure were adjusted for differences in household size by dividing total monthly income and expenditure by n^{α}, where n represents the number of household members and α an adjustment for household economies of scale (Filmer and Pritchett, 1998: 13). According to Lanjouw and Ravallion (1995) and Drèze and Sen (1997), a α coefficient of 0.6 represents an adequately robust and reliable adjustment for household economies of scale.

per capita income dropped by 68.4% (Kongsin *et al.*, 2000, as quoted in Parker *et al.*, 2000: 44). A study in the Ivory Coast reported that the household income of affected families was found to be half that of total average household income (Bechu, 1998, as quoted in Desmond *et al.*, 2000: 5).

There are also significant differences in the composition of household income. Affected households are more dependent on non-employment sources of income (which consists primarily of government grants but also amongst others includes the value of own produce consumed by the household), while a smaller proportion of their income consists on employment income. This is understandable given that affected households face higher dependency ratios, are more subject to morbidity and mortality and face higher unemployment levels. Differences between affected and non-affected households in the share of income originating from remittances are not that pronounced, although it is evident that households in QwaQwa are much more dependent on remittances than households in Welkom. Remittances make up between 20% and 25% of household income in QwaQwa.

EXPENDITURE

As in the case of income, affected households are also poorer than non-affected households when expenditure is used a measure of socio-economic status (Table 5), regardless of whether average monthly household expenditure is aggregate, per capita or adult equivalent terms. Although differences are not that pronounced in terms of total household expenditure, the fact that affected households are larger means that per capita and adult equivalent expenditure is between 60% and 70% of the levels of expenditure in non-affected households. It is also important to look at differences in expenditure on food, particularly insofar as lower levels of expenditure may impact negatively on the nutritional status of household members. In this study, affected households here spent less on food than non-affected households, with per capita and adult equivalent levels of expenditure on food representing between 70% and 80% of the levels of expenditure in non-affected households. In the longer run, this may contribute to malnutrition.

Table 5: Expenditure and expenditure patterns

	Welkom Affected	Welkom Non-affected	QwaQwa Affected	QwaQwa Non-affected	Total	Total Affected	Total Non-Affected	P
Average monthly household expenditure (Rands)	1178	1414	627	968	1045	900	1187	0.035
Average monthly per capita expenditure (Rands)	244	373	157	266	260	200	319	<0.001
Average monthly adult equivalent expenditure (Rands)	445	619	264	435	440	354	525	0.002
Sample size (n)	*99*	*100*	*101*	*104*	*404*	*200*	*204*	
Average food expenditure								
Average monthly food expenditure (Rands)	392	412	248	315	341	320	362	0.098
Average monthly per capita food expenditure (Rands)	80	104	63	92	85	71	98	<0.001
Average monthly adult equivalent food expenditure (Rands)	146	175	106	146	143	126	160	0.001
Sample size (n)	*97*	*99*	*98*	*103*	*397*	*195*	*202*	

Note: The sample sizes differ from the interviewed samples in Table 1 because data were not available for all households.

The impact of HIV/AIDS on nutritional status has been explored extensively in the household impact study the World Bank conducted in Tanzania. Here, increased consumption on health care and burials saw per capita food consumption drop by 16% amongst the poorest half of households affected by an adult death (Over, 1998: 10; Lundberg, *et al*., 2000). Stunting amongst AIDS orphans was higher than amongst other children (Lundberg and Over, 2000). Ainsworth and Dayton (2000) investigate the impact of adult deaths on the nutritional status of the elderly members of household, using body-mass-index (BMI) as an indicator of nutritional status. They report that adult deaths have no significant impact on the BMI of the elderly. In another research paper, Ainsworth and Semali (2000) investigate the impact of adult deaths on the health status of children aged under five, employing three measures of child health, namely child morbidity, and the two common measures of stunting and wasting, namely height-for-age and weight-for-height. They report that children in poorer households are the hardest hit by adult deaths (Ainsworth and Semali, 2000).

Equally important in terms of understanding the impact of HIV/AIDS on the economy are differences in expenditure patterns. Increased spending on medical care and

funerals crowds out other household expenditure, which may see a drop in expenditure on food and other basic needs. In Rwanda, for example, 73%, 82%, 86% and 57% of affected households could respectively not meet their clothing, housing, education and nutritional needs or could only do so with difficulty (Nandakumar *et al.*, 2000: 9). The death of an adult female in Zimbabwean households caused the consumption of most food items to decrease, with the drop in consumption being particularly pronounced in the case of meat, bread, milk and eggs (Mutangandura, 2000). In Kagera, the expenditure on food by the poorest half of households affected by an adult death fell by 32% in the short term (Lundberg *et al*., 2000). The share of total expenditure that households in Kagera district in Tanzania that were affected by an adult death spent on food and non-food items such as clothing were 16%, which is considerably lower that the 26% spent on it by non-affected households (Lundberg and Over, 2000). The following differences can be observed in the composition of regular monthly expenditure of the households included in this study (Figure 3). Affected households, in terms of the composition of household expenditure, allocate relatively MORE of their resources to food, health care and rent and LESS to education, clothing, personal items and durables when compared to non-affected households. Differences in the share of expenditure allocated to household maintenance and transport and relatively small and may not indicate significant differences in patterns of expenditure. Other impact studies have made similar findings. In the Ivory Coast, households with AIDS patients spent twice as much on health care as households without AIDS patients (Bechu, 1998, as quoted in Bollinger and Stover, 1999b: 2). In Kagera, the share of total expenditure that households affected by an adult death on average spent on medical care and funerals respectively amounted to 16% and 5.4%, compared to 2.6% and 0.6% in households without adult deaths (Lundberg and Over, 2000).

Figure 3: Composition of regular household expenditure

(a) Affected households
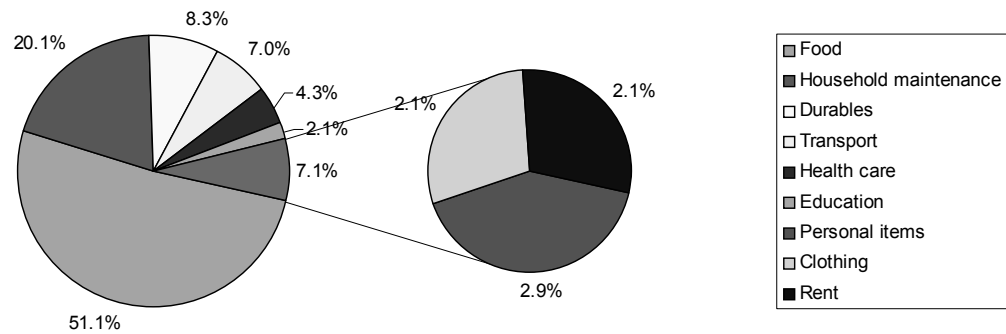
(b) Non-affected households
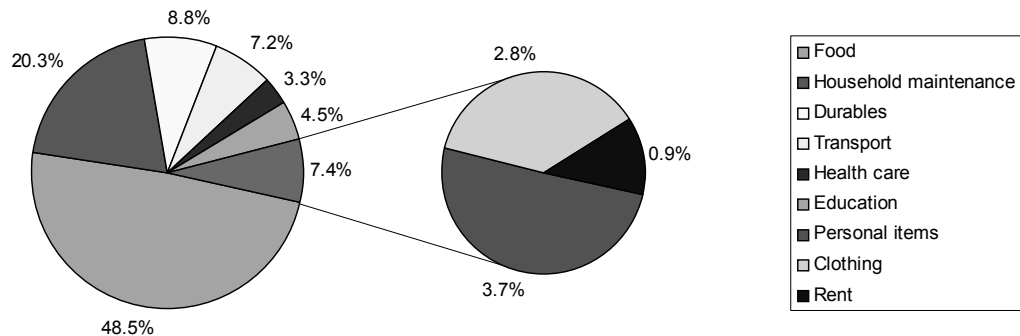
SAVINGS, DEBT AND REPAYMENT OF DEBT

In order to understand the financial responses of affected and non-affected households to changes in households economics, which is discussed in the subsequent pages, it is necessary to look at differences between affected and non-affected households in terms of current levels of savings, debt and repayment of debt.

Table 6: Savings, debt and repayment of debt

	Welkom Affected	Welkom Non-affected	QwaQwa Affected	QwaQwa Non-affected	Total	Total Affected	Total Non-Affected	P
Savings								
Average monthly household savings (Rands)	244	389	195	360	305	219	375	0.009
Sample size (n)	*46*	*61*	*51*	*57*	*215*	*97*	*118*	
Debt								
Average total household debt (Rands)	7374	15103	3355	3906	6780	5141	8448	
Sample size (n)	*48*	*43*	*60*	*63*	*214*	*108*	*106*	
Repayment of debt								
Average monthly household repayment of debt (Rands)	538	635	295	363	460	424	497	
Sample size (n)	*50*	*45*	*44*	*46*	*185*	*94*	*91*	

Note: The sample sizes differ from the interviewed samples in Table 1 because data were not available for all households.

Affected households save approximately 40% less than non-affected households on a monthly basis (Table 6). This is understandable insofar as affected households generally face higher unemployment burdens, have to divide household resources between a larger number of people, and also have to face illness and morbidity which requires yet further expenditure on health care and funerals. Non-affected households have considerably higher levels of current debt than non-affected households, which is understandable insofar as higher levels of income makes it possible for these households to borrow larger sums of money. However, there is no considerable difference between the monthly repayment of debt by affected and non-affected households, which means that the servicing of current debt puts a relative larger burden on affected than non-affected households, given their lower levels of income. This implies that affected households may in the longer run have little scope to utilize savings to cope with illness and morbidity, while borrowing to cope may push them even deeper into poverty.

COPING WITH CHANGES IN INCOME AND EXPENDITURE

Households generally have three alternatives in terms of coping with changes in income and expenditure, i.e. to borrow, to utilize savings, or to sell assets. According

to evidence from other household impact studies, affected households appear to first deplete their savings and assets before they borrow money in order to cope with the financial pressures described in the previous pages. Rural households in Thailand that were affected by an adult death first tried to cope with increased medical care expenses by employing their savings, after which they considered borrowing (Kongsin *et al*., 2000, as quoted in Parker *et al*., 2000: 44). In the subsequent paragraphs the differences between affected and non-affected households in terms of these financial responses are explored. The most frequent responses seem to be borrowing, followed by the utilization of savings and the sale of assets (Figure 4). This makes sense when considering that the households included in the sample are primarily poorer households with few assets and low income, which explains why a relatively small percentage of households utilized savings or sold assets.

Figure 4: Percentage of households that utilized savings, sold an asset, and borrowed in recent past
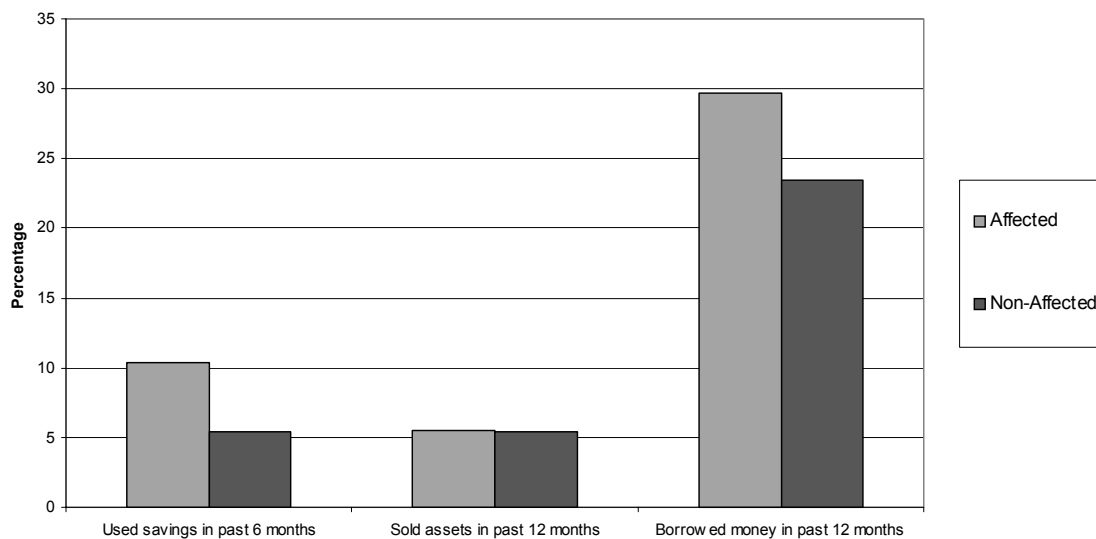
Note: The percentages of households utilizing savings, borrowing money or selling assets were calculated across the entire sample.

Households were also asked whether they received a lump-sum payment or inheritance following the death, which would make it possible for households to cope better with the effect of this death on household finances. However, only in 7% of cases (3/42 deaths) did affected households where a death had occurred indicate that they had received a lump-sum payment following the death. This is understandable

insofar as very few of the deceased actually was employed prior to their death and that most belong to poor households, which lessens the possibility of these persons benefiting from life insurance and/or employment benefits. Household received an inheritance following the death of the person in the case of 17% of deaths in affected households (7/42 deaths). However, the inheritance in most cases consisted of clothing and other belongings of the deceased. Even where money was inherited it was also of fairly low value, which means that it for the affected households in this sample present a relatively unimportant opportunity for coping with the impact of mortality. This may also explain why a relatively large proportion of households had to borrow, utilize savings or sell assets to cope with the changes in income and expenditure.

(i)   New borrowing

Adams *et al*. (1996) report that in both of the villages sampled in the Burkina Faso study, it was customary to take loans. Romano *et al*. (1996) found that affected households in the Philippines borrowed money from lending institutions and 'loan sharks' to finance medical costs. In rural Thailand, the average per capita value of the loan and debt that households took on to cope with the impact of an adult death on household finances respectively amounted to 28.4% and 118% of per capita household income (Kongsin *et al*., 2000, as quoted in Parker *et al*., 2000: 44), with 24% of these households borrowing from a revolving fund or cooperative (Pitayanon *et al*., 1997, as quoted in Desmond *et al*., 2000: 12). In Rwanda, 18% of affected households had to resort to borrowing in order to finance health care expenses, of which 64% borrowed from friends or neighbors and 16% from family (Nandakumar *et al*., 2000). In Kagera, however, households affected by adult deaths made limited use of credit (Lundberg and Over, 2000), perhaps because households lacked access to credit facilities and/or because households prefer to adopt alternative coping mechanisms. In this study, a slightly larger number of non-affected households have borrowed money in the twelve months prior to the survey compared to non-affected households (29.7% versus 23.5%)(Table 7). 72% and 25% of the affected household that borrowed money were respectively affected by illness and death, with only 25% and 2% of non-affected households respectively being affected by illness and death.

Table 7: Role of borrowing in risk management

	Welkom Affected		Welkom Non-affected		QwaQwa Affected		QwaQwa Non-affected		Total		Total Affected		Total Non-Affected		P
	No	%	No	%	No	%	No	%	No	%	No	%	No	%	
No Total	101	100	100	100	101	100	104	100	406	100	202	100	204	100	<0.001
Borrowed money in past 12 months	19	19	17	17	41	41	31	3	108	27	60	30	48	24	<0.001
- Affected by illness	*12*	*63*	*3*	*18*	*31*	*76*	*9*	*29*	*55*	*51*	*43*	*72*	*12*	*25*	<0.001
- Affected by death	*5*	*26*	*0*	*0*	*10*	*24*	*1*	*3*	*16*	*15*	*15*	*25*	*1*	*2*	
Sum borrowed relative to income and debt:															
Average amount borrowed (Rands)	3082		2623		581		713		1380		1373		1389		
- % of average annual household income	*15.3*		*11.6*		*20.7*		*6.9*		*14.2*		*18.9*		*8.5*		
- % of current total debt	*48.2*		*68.2*		*63.7*		*71.0*		*64.2*		*59.2*		*70.1*		

The purpose for which the households borrowed this money also suggests that the HIV/AIDS epidemic do play a role in causing household to take on increasing levels of debt (Figure 5). A larger proportion of responses by affected households indicated that the money was used to pay for funerals and medical expenses, whereas a larger proportion of non-affected households indicated that the money was used to pay for education, durables and clothing. Similar differences were uncovered in the comparison of regular expenditure patterns in affected and non-affected households.

The relatively high percentage of both affected and non-affected households that indicated that the money was required to pay for food also indicates that borrowing is a common way for households caught up in poverty to survive, with poverty and unemployment being relatively high in both communities. The danger of course in the longer run is that this will move households deeper into poverty as more resources are crowded out in favor of debt repayments in the absence of improvements in household income. The reality of this threat is clear when looking at the amount of money borrowed relative to the total current debt of these households. New borrowing on average represents 64% of current debt, with the respective percentages for the affected and non-affected groups of households being 59.1% and 70.1% (Table 5). This may be particularly devastating for households affected by illness and death caused by HIV/AIDS who also have to cope with medical expenses and funeral costs.

Figure 5: Purpose for which households borrowed money

(a) Affected households
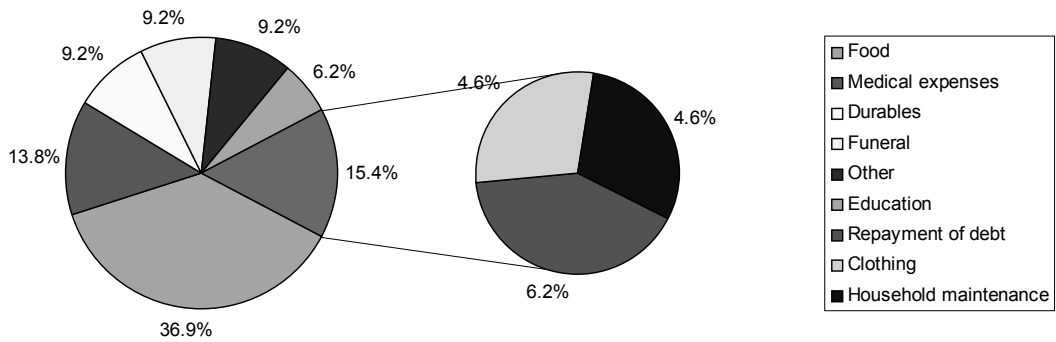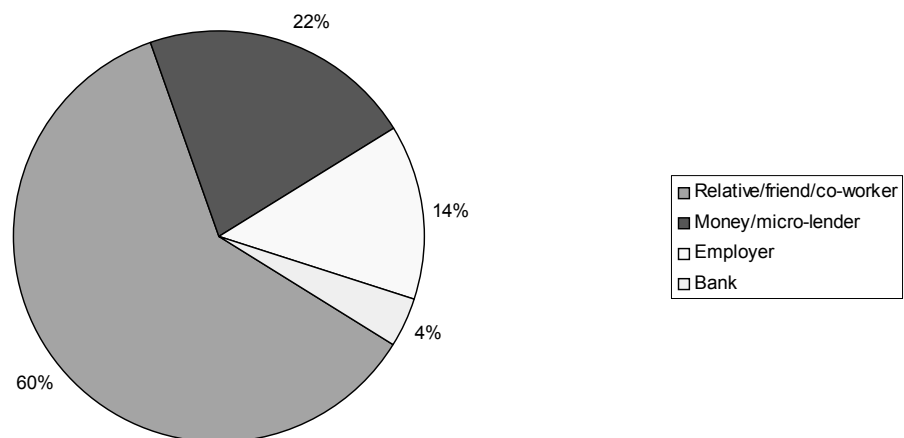

(b) Non-affected households
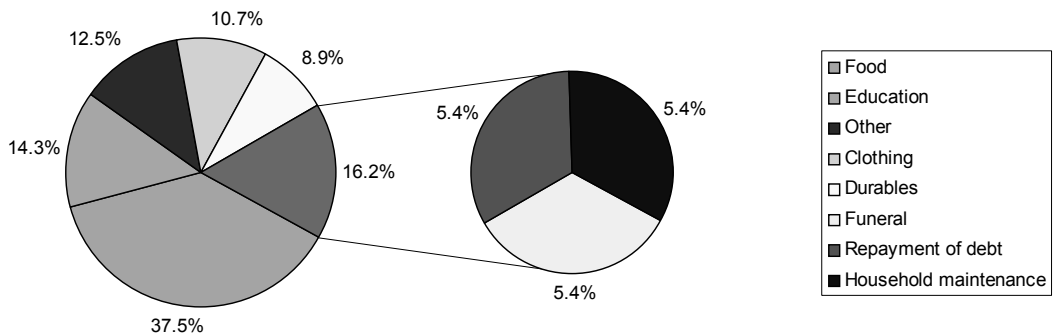
In more than 60% of cases money was borrowed from relatives and friends, while just more 20% of loans were obtained from money- or micro-lenders (Figure 6). This was the case in both affected and non-affected households. In the case of non-affected households, who generally face lower levels of unemployment, a considerably larger share of households borrowed from their employer compared to affected households.

Figure 6: Source of borrowing

(a) Affected households
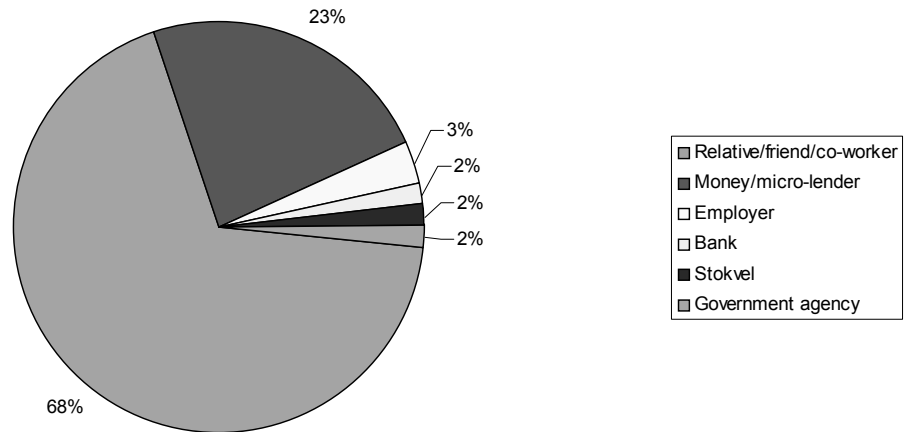
(b) Non-affected households

(ii)   Utilization of savings

A common strategy that affected household employ in coping with HIV/AIDS is to utilize available savings. Adams *et al.* (1996) found in Burkina Faso that most households in their study used any available cash or savings to pay for medical expenses. In the Rakai district in Uganda, affected household employed most of their savings to pay for health care and funerals (Menon *et al.*, 1998, as quoted in Bollinger

and Stover, 1999b: 2), while 60% of rural household in Thailand that had experienced an adult death used their savings to finance their medical care costs (Pitayanon *et al*., 1997, as quoted in Desmond *et al*., 2000: 12). In this study, just more than 50% of households indicated that they are currently saving, with a larger percentage of households in non-affected households (58%) currently saving than was the case in affected households (48%)(Table 8). A larger percentage of affected households (11%) have in the six months prior to the interview utilized savings than was the case in non-affected households (5%).

Table 8: Role of savings in risk management among household that utilized savings

|	Welkom Affected		Welkom Non-affected		QwaQwa Affected		QwaQwa Non-affected		Total		Total Affected		Total Non-Affected		P
	No	%	No	%	No	%	No	%	No	%	No	%	No	%	
Total no	101	100	100	100	101	100	104	100	406	100	202	100	204	100	
No currently saving	46	46	61	61	51	50	57	55	215	53	97	48	118	58	
No used savings	11	11	6	6	10	10	5	5	32	8	21	10	11	5	<0.001
- Affected by illness	*8*	*78*	*1*	*17*	*8*	*80*	*0*	*0*	*17*	*53*	*16*	*76*	*1*	*9*	<0.001
- Affected by death	*5*	*46*	*0*	*0*	*5*	*50*	*0*	*0*	*10*	*31*	*10*	*48*	*0*	*0*	
Sum used relative to current savings and average income:															
Average amount of saving used (Rands)	2247		808		5172		3020		3037		3710		1814		
- No. of months of current savings used	*20*		*4*		*22*		*6*		*15*		*21*		*5*		
- % of average annual household income	*14.8*		*3.7*		*18.7*		*8.9*		*13.1*		*16.7*		*5.8*		

When looking at the percentage of households that utilized savings that were affected by morbidity and mortality and the use made of these savings, it is evident that HIV/AIDS plays an important role in causing affected households to utilize savings. 76% and 48% of households that utilized savings were respectively affected by illness or by death, compared to 9% and 0% of non-affected households.

Figure 7: Purpose for which households utilized savings

(a) Affected households
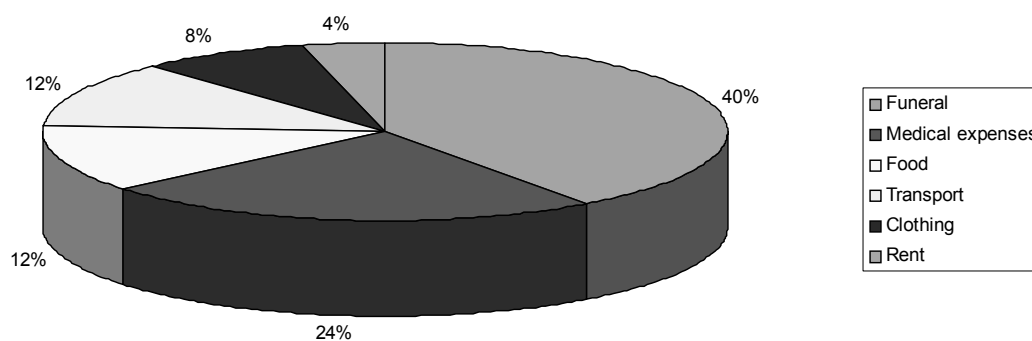
(b) Non-affected households
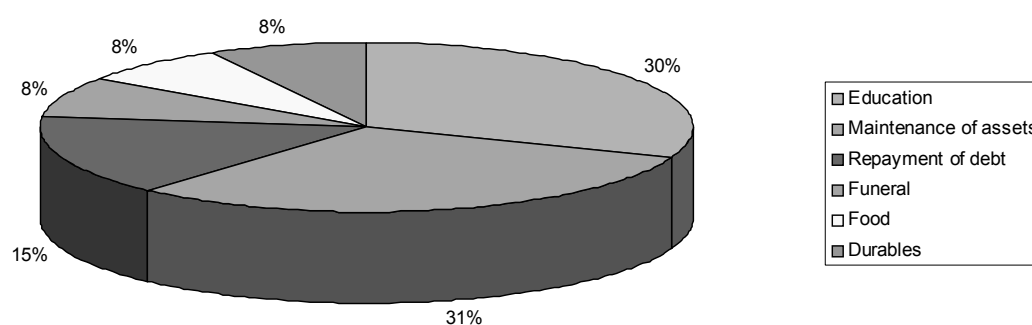
The two purposes for utilizing savings sited most often by affected households were to pay for funerals (40% of responses) and medical expenses (24% of responses), followed by food and transport (each with 12% of responses)(Figure 7). In non-affected households in turn the most often sited reasons for utilizing savings were to pay for education and the maintenance of houses and vehicles (30.8% of responses each).

The magnitude of dissaving is considerable, particularly when looking at the amount used relative to the average current level of monthly saving of these households. Affected households on average utilized twenty-one months of savings, whereas non-affected household only utilized five months of current savings (Table 8). This differential is not that pronounced when comparing households affected and not affected by morbidity, but are even more pronounced when looking at households that have been affected by mortality. Households in which a death occurred in the six months prior to the survey utilized thirty-eight months of current savings.

(iii)   Sale of assets

Another common coping mechanism adopted by households is the sale of assets (Bonnel, 2000; Topouzis, 2000). In the few East African countries where household impact studies have been conducted the drop in asset ownership in affected households ranged between 40% and 60% (Mutagandura *et al*., 1999, as quoted in Topouzis, 2000: 14). Rugalema (1999, as quoted in Topouzis, 2000: 14) report that 39 of the 52 AIDS-afflicted households in a Tanzanian village had sold one or more assets in direct response to AIDS morbidity. A large proportion (41%) of households in rural Thailand also sold land to cope (Pitayanon *et al*., 1997, as quoted in Desmond *et al*., 2000: 12; Pitayanon *et al*., 2000), whilst 24% of Zimbabwean households affected by an adult female death sold assets to cope with the death (Mutangadura, 2000). In the case of this study, only a very small percentage of households sold assets in the twelve months prior to the survey (5.5% compared to 5.4% in affected and non-affected households)(Table 9). The small number of assets owned by the average household (3.3) explains why only very few households were able or willing to exercise this financial response to crises. In fact, households may generally prefer to first borrow money or utilize savings before opting to dispose of their assets. Yet, the fact that the value of the proceeds from the sale of assets relative to household income in affected households is much higher than in the case of non-affected households (90% versus 10 %) may imply that proceeds from asset sales represent a very substantial financial coping mechanism.

Table 9: Role of assets in risk management

|	Welkom Affected		Welkom Non-affected		QwaQwa Affected		QwaQwa Non-affected		Total		Total Affected		Total Non-Affected		P
	No	%	No	%	No	%	No	%	No	%	No	%	No	%	
No Total	100	100	99	100	101	100	104	100	404	100	201	100	203	100	
Sold assets in past 12 months	3	3	2	2	8	8	9	9	22	21	11	6	11	5	<0.001
- Affected by illness	*1*	*33*	*0*	*0*	*5*	*63*	*4*	*44*	*10*	*46*	*6*	*55*	*4*	*36*	0.007
- Affected by death	*1*	*33*	*0*	*0*	*2*	*25*	*0*	*0*	*3*	*14*	*3*	*27*	*0*	*0*	
Average proceeds from sale (Rands)		1250		350		1513		1380		1317		1441		1193	0.009
- % of average annual household income		*8.0*		*4.2*		*125.8*		*11.8*		*50.4*		*90.4*		*10.3*	0.001
Asset ownership:															
Average asset index (maximum 13)		3.2		3.8		2.8		3.3		3.3		3.0		3.5	0.003
Type of assets sold:															
Household appliances	3	75	0	0	4	44	6	60	13	52	7	54	6	50	
Vehicles	1	25	1	50	0	0	3	30	5	20	1	8	4	33	
Livestock	0	0	0	0	1	11	0	0	1	4	1	8	0	0	
Furniture	0	0	1	50	3	33	0	0	4	16	3	23	1	8	
Other	0	0	0	0	1	11	1	10	2	8	1	8	1	8	
Total	*4*	*100*	*2*	*100*	*9*	*100*	*10*	*100*	*25*	*100*	*13*	*100*	*12*	*100*	

Unlike in the case of new borrowing and the utilization of savings, the reasons these assets were sold for do not outright suggests that HIV/AIDS plays an important role in causing affected households to sell assets (Figure 8). Amongst affected households the primary reasons for selling an asset was to service debt (42.9%), to pay for food (28.6%) or to pay for a funeral (14.3%). In the case of non-affected households the most often sited reasons for selling an asset was to pay for food (64.3%) and education (14.3%). However, this may only indicate that affected households that do sell assets actually do so to pay for expenses they can no longer afford since having to pay for medical expenses and funerals from available resources.

Figure 8: Reason for which households sold assets

(a) Affected households
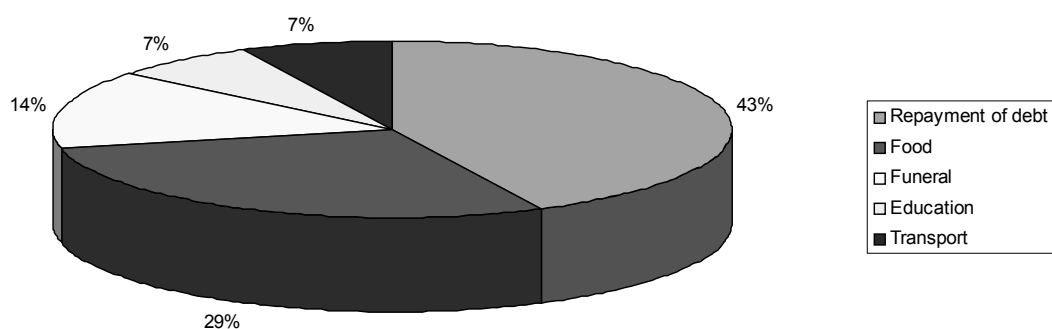
(b) Non-affected households
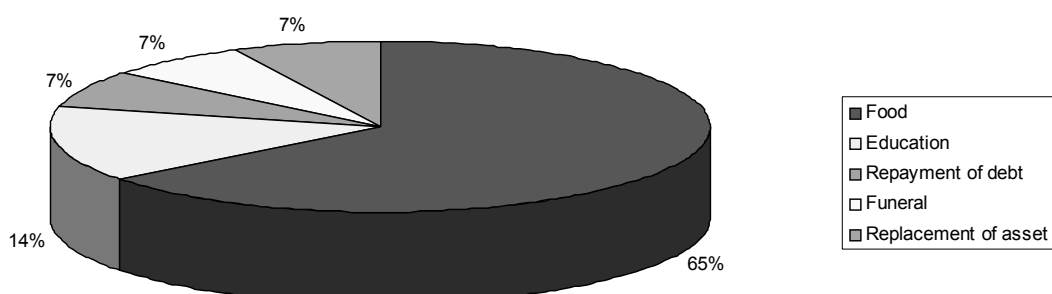
Households primarily sold household appliances, which represent more than 50% of the type of assets sold (Table 9). The specific type of appliances sold by households consisted of stoves (5), television sets (3), refrigerators (2), radios or sound systems (2) and a video machine. One affected household in QwaQwa sold some cattle. Three affected households sold furniture compared to one non-affected household, while three non-affected households sold vehicles compared to one affected household. The latter differences between the type of assets sold by affected and non-affected households is understandable insofar as non-affected households have been shown

elsewhere to be relatively richer than affected households, implying that they may own more expensive type of assets. Evident as well from the nature of assets sold by households is that these assets in most cases (with the exception of the sale of cattle by one household) are of a non-productive nature, i.e. these are not assets the household require to in the short term sustain their livelihoods. However, the loss of any asset means that the wealth of that particular household is depleted, in the process making it more difficult to in the longer term cope with the impact of the epidemic. The sale of household appliances and other assets may of course also in the longer run have implications for household labor, with households requiring more labor and/or time to prepare meals, which may in turn have implications for the supply of household labor for other activities and the schooling of children.

(iv)   Regression analysis

It can be assumed that non-poor households will be better able to cope with the impact of HIV/AIDS. HIV/AIDS may also cause households to move into and out of poverty as they are affected by illness and death resulting from the epidemic. Hence, it is important to attempt to arrive at a better understanding of the most important predictors of the most common outcomes of financial crises at the household level, i.e. the need to borrow money, to utilize savings and/or to sell assets. Stepwise logistic regression analysis was used for this purpose, with the four different outcome variables indicating whether a household has employed any one or either one of these financial coping mechanisms. The analysis was performed across the entire sample of households. Meaningful models could only be estimated in the case of two of the four outcome variables, namely whether or not households with current savings had to utilize some of their savings in the six months prior to the interview (outcome A) and whether or not households employed any of the three financial coping mechanisms of borrowing, utilization of savings or sale of assets (Outcome B). These results point to the following as important predictors of differences in the ways that households deal with the economic impact of HIV/AIDS.

Table 10: Predictors of economic strategies for coping: Logistic regression models

Explanatory variable	Odds ratio	95% confidence interval	P
A. Outcome: Household utilized savings			
Expenditure (by decile)	1.533	1.279-1.838	<0.001
Age of household head (per ten years)	0.749	0.544-1.033	0.079
Number of recent deaths in the household	6.100	2.397-15.523	<0.001
Someone in the household has access to medical aid	0.158	0.040-0.615	0.008
Dependency ratio	0.982	0.964-1.001	0.070
Summary statistics: n = 403, LR chi2 = 48.03 (P < 0.0001), pseudo R^2 = 0.215.			
B. Outcome: Household borrowed money, utilized savings or sold an asset			
Expenditure (by decile)	1.074	0.991-1.163	0.079
Urban versus rural	2.578	1.631-4.074	<0.001
Household size	1.165	1.055-1.286	0.002
Age of household head	0.820	0.696-0.965	0.017
Number of recent deaths in the household	1.917	0.995-3.691	0.052
Summary statistics: n = 403, LR chi2 = 35.16 (P < 0.0001), pseudo R^2 = 0.068.			

Households were more likely to have utilized savings when having experienced a larger number of recent deaths. In households where one or more persons had access to medical aid it was less likely that savings would be utilized (Table 10). Households were also more likely to have utilized savings when expenditure was higher, implying that upward pressure on household expenditure may force households to utilize current savings to as to pay for medical and funeral expenses in particular. Households were also more likely to utilize savings in cases where households were headed by younger persons, implying that households headed by younger persons may be more vulnerable to the epidemic. In the last instance, the utilizing of savings was more likely where the dependency ratio was lower, which makes sense insofar as adults in households with fewer children and/or elderly members may be forced to work less insofar as they themselves have to care for the ill or dying, thus putting increasing pressure on household finances. Alternatively, a lower dependency ratio means that a household have fewer members that may qualify for and receive government grants, thereby implying that the smaller non-employment income accruing to such households makes it more likely that households will have to utilize savings to copy with changes in household income and expenditure caused by illness and death.

Any financial coping strategy (i.e. borrowing, utilize savings and the sale of assets) were more likely to have been exercised in households where a larger number of deaths had occurred in the recent past, in households where expenditure on average was higher and in households headed by younger persons (Table 10). Coping financially in one or more of these ways was also more likely in rural than in urban areas, which is understandably given that rural areas are generally considerably poorer than urban areas, as is evident from the differences in expenditure and income levels in Welkom and QwaQwa. The outcome was also more likely as household size increases, which makes sense insofar as a larger household have relatively more expenditure needs than a smaller household, thus making it necessary to borrow, utilize savings or sell assets if households cannot cope with changes in household income and expenditure.

POVERTY AND HIV/AIDS

As a result of the impact of HIV/AIDS on household economics, poverty is likely to deepen as the epidemic takes its course. The above aspects of the socio-economic impact of HIV/AIDS combine to create a vicious cycle of poverty and HIV/AIDS in which affected households are caught up. As adult members of the household become ill and are forced to give up their jobs, household income will fall. To cope with the change in income and the need to spend more on health care, children are often taken from school to assist in caring for the sick or to work so as to contribute to household income. Because expenditure on food comes under pressures, malnutrition often results, while access to other basic needs such as health care, housing and sanitation also comes under threat. Consequently, the opportunities for children for their physical and mental development are impaired. This acts to further reduce the resistance of household members and children (particularly those that may also be infected) to opportunistic infections, given lower levels of immunity and knowledge, which in turn leads to increased mortality (Bonnel, 2000: 5-6; Wekesa, 2000). Households headed by AIDS widows are also particularly vulnerable, because women have limited economic opportunities and traditional norms and customs may see them severed from their extended family and denied access to an inheritance (UNDP, 1998). In many third world situations, therefore, HIV/AIDS exposes already vulnerable, resource-poor households to further shocks. Much of the published

analysis following from the Kagera household study has argued that household wealth and access to public services are very important in protecting households from the impact of HIV/AIDS. Impact was found to only be significantly worse in households affected by adult deaths compared to ones with no adult deaths when controlling for differences in socio-economic status (Ainsworth *et al.*, 2000; Ainsworth and Dayton, 2000; Lundberg and Over, 2000).

In this study, affected households have also been shown to be poorer than non-affected households, both in terms of income and expenditure and regardless of whether income or expenditure is measured at the household, per capita and adult equivalent level. In order to further explore this aspect of the socioeconomic impact of HIV/AIDS at the household level logistic regression was performed with poverty status as outcome. An outcome of one indicates that a household is not poor, with poverty status determined relative to the R800 per month household income employed by the Department of Local Government in providing assistance to indigent households regarding basic service delivery. A poverty status of zero indicates that a household is poor, i.e. monthly household income falls below the R800 level. The analysis was performed employing both income and expenditure as a proxy of standard of living, i.e. setting the poverty status of households relative to both their income and expenditure. Although researchers generally take expenditure to present a better proxy of standard of living than income, results are reported here for both the income- and expenditure-based outcome measures. One can of course explore the analysis with alternative poverty lines, however due to constraints of time this paper has not explored this issue. Included in the stepwise logistic regression analysis as explanatory variables were urban/rural residence, affected/non-affected status of the household, gender and age of the household head, presence or not of illness or death in the household, total number of years of schooling, number of employed members in the household, access to medical aid, and the household size and dependency ratio. Based on the results, the following appears to be the most important protective factors of poverty status.

Table 11: Predictors of poverty status: Logistical regression models

Explanatory variable	Odds ratio	95% confidence interval	P
A. Outcome: Average household income does not fall below R800 per month			
Urban versus rural	0.567	0.336-0.959	0.034
Male versus female head of household	0.600	0.349-1.033	0.066
Dependency ratio	1.014	1.002-1.025	0.016
Household not affected by illness	1.735	1.025-2.937	0.040
Household has access to medical aid	16.604	3.730-73.914	<0.001
Total years of schooling (single years)	1.468	1.236-1.743	<0.001
Number of employed persons in the household	6.016	3.666-9.873	<0.001
Summary statistics: n = 392, Wald chi2 = 189.23 (P < 0.0001), pseudo R^2 = 0.351.			
B. Outcome: Average household expenditure does not fall below R800 per month			
Number of employed persons in the household	1.939	1.319-2.850	0.001
Male versus female head of household	0.648	0.393-1.070	0.090
Total years of schooling (single years)	1.575	1.326-1.870	<0.001
Household not affected by illness	1.864	1.134-3.064	0.014
Household has access to medical aid	15.043	5.581-40.548	<0.001
Age of head of household (single years)	0.808	0.669-0.976	0.028
Summary statistics: n = 403, Wald chi2 = 152.79 (P < 0.0001), pseudo R^2 = 0.279.			

The single most important predictor of poverty status is access to medical aid (Table 11). Households with access to medical aid respectively were 16 and 15 times more likely to not be poor if poverty status is determined relative to household income and expenditure. There are a number of plausible explanations for this relationship. On the one hand, medical aid may help households affected by illness and/or death to avoid medical expenditures, which could make higher expenditures at a later stage affordable. However, medical aid coverage may also simply be a marker for having a good job, which implies higher income and expenditure. Alternatively, medical aid cover to lower income earners often excludes dependents, meaning that it only protects households if the breadwinner falls ill. Follow-up surveys and the further analysis of this dataset will help elucidate this causal pathway.

In both cases, households not affected by illness was more likely to not be poor, as was households headed by males rather than females, households sharing a larger number of years of schooling between its members, and households with a larger number of employed members. However, the odds ratio for the gender of the head of household was not statistically significant different from one in both cases. Certain explanatory variables featured in the income-based analysis but not in the expenditure-based analysis and vice versa. Where poverty status was based on

household income, households in urban areas, where unemployment rate are generally lower than in rural areas, was less likely to be poor. In addition, households with larger dependency ratios were slightly more likely not to be poor, which may imply that households with more children and older persons find it easier to cope with illness and death insofar as potentially economically active household members do not have to care for ill persons, which may result in a loss of income to the household. In the case of the expenditure-based analysis of poverty outcomes, households headed by younger persons were more likely not to be poor, which may indicate that households headed by older persons, which may more likely consist of orphans and a large number of extended family members, are more likely to not have adequate resources so as to be classified as non-poor.

DISCUSSION

A limitation of the study is that the HIV status of each household member was not known for certain, and the index cases were not identified for reasons of confidentiality. HIV/AIDS status was clearest for those reported to have received a diagnosis of HIV/AIDS, and probably comprised a large proportion of those diagnosed with tuberculosis and pneumonia. Given the high prevalence of HIV infection in these populations, it is likely that at least 10% members of "unaffected" households were HIV-positive but had not to our knowledge had been tested or reported. The various comparisons between "affected" and unaffected households therefore probably underestimate the true differences attributable to HIV/AIDS.

Another limitation is the cross-sectional design of this first part of the cohort study. This means that directions of effect, e.g. between socioeconomic and health-related variables, could not be determined with confidence. Follow-up of these households and individuals will more validly distinguish between antecedent risk factors and subsequent outcomes. One cause for concern is that with deaths having recently occurred in a fifth of affected households, some of these households may no longer contain anyone infected with HIV. However the effects of their deaths are likely to persist in many cases.

Affected households, although larger than non-affected households, actually face more severe resource constraints insofar as household resources have to be shared between larger numbers of mostly economically inactive persons than is the case in non-affected households.

Affected households spend less on food than non-affected households, with per capita and adult equivalent levels of expenditure on food representing between 70% and 80% percent of the levels of expenditure in non-affected households. In the longer run, this may contribute to malnutrition amongst household members. This also means that it will be particularly important to investigate policy programs that can enhance the food security of affected households, e.g. by offering access to food parcels at counseling and support organizations or via home-based care initiatives and/or by capacitating households to where possible grow basic foodstuffs for own consumption.

Difference in expenditure patterns are equally important in terms of understanding the impact of HIV/AIDS on the economy. Affected households, in terms of the composition of regular household expenditure, allocate relatively MORE of their resources on food, health care and rent and LESS to education, clothing, personal items and durables when compared to non-affected households. Similar patterns emerge when comparing the composition of regular household expenditure in affected households that have experienced an illness or recent death to affected households that have not yet had to cope with illness or death. Particular important in terms of these results is the apparent crowding out of expenditure on education, personal items and durables in affected households in favor of expenditure on health care and food.

The utilizing of savings and new borrowing appears to be a common strategy employed by affected households to cope with illness and particularly with a death in the household. The sale of assets is a less common strategy mainly due to households being relatively poor and asset ownership being relatively low. The type of assets sold by households was also mainly of a non-productive nature, implying that the sale of assets have not necessary severely affected the livelihood of affected households. However, the amount of savings utilized and money borrowed by affected households in the recent past are considerably when respectively expressed relative to current

savings and total debt, or relative to average household income. Hence, illness and death appear to put considerably strain on household finances. The danger of course in the longer run is that these actions will move households deeper into poverty as more resources are crowded out in favor of debt repayments in the absence of improvements in household income. On a macroeconomic level, this also has implications for the overall level of domestic savings, which may decline, and the level of interest rates, which may increase in the face of increasing defaults on debt, particularly in the micro-credit industry where household often access credit.

Affected households are poorer than non-affected households, regardless of whether income or expenditure is employed as measure of standard of living or whether income or expenditure is measured at the household or individual level or in adult equivalent terms. The fact that many households rely heavily on social welfare grants as an important source of income furthermore implies that government will in future years be faced with increasing claims as the epidemic takes its course. Access to medical aid has also been shown to be the single most important predictor of poverty status. This may suggest that wider access to affordable medical aid with certain minimum benefits and/or the introduction of a broad-based social security system offering minimal support may be important in mitigating the impact of the epidemic. However, because of the possible alternative explanations for this relationship, the issue requires further analysis of this dataset and the data to be collected in subsequent panels. Continued efforts at poverty reduction are also likely to remain important insofar as education and employment has been shown to offer protection to affected households having to cope with illness and death.

In summary, therefore, the paper shows that households affected by HIV/AIDS bear a substantial burden of illness and death, and that this is associated with more severe poverty. Subsequent follow-up of these households over three years will provide further information on health and socio-economic trends, and will further elucidate the complex causal relationships involved.

REFERENCES

Abt Associates, 2000. *The Impending Catastrophe: A Resource Book on the Emerging HIV/AIDS Epidemic in South Africa*. Johannesburg: Henry J. Kaiser Family Foundation.

Adams, A., Hien, M. & Sauerborn, R., 1996. Household Strategies to Cope with the Economic Costs of Illness. *Social Science and Medicine* 43(3): 291-301.

Ainsworth, M. & Dayton, J., 2000. *Is the AIDS epidemic having an impact on the coping behaviour and health status of the elderly? Evidence from Northwestern Tanzania*. Washington, DC: World Bank.

Ainsworth, M. & Semali, I., 2000. *Impact of Adult Deaths on Children's Health in Northwestern Tanzania*. World Bank Policy Research Working Paper No. 2266. Washington, DC: World Bank.

Ainsworth, M., Beegle, K. & Koda, G., 2000. *Impact of adult mortality on primary school enrolment in Northwestern Tanzania*. Washington, DC: World Bank.

Arndt, C. & Lewis, J.D., 2000. Macro Implications of HIV/AIDS in South Africa: A Preliminary Assessment. *South African Journal of Economics* 68(5): 856-887.

Barnett, T. & Whiteside, A., 1998. *Guidelines for Preparation and Execution of Studies of the Social and Economic Impact of HIV/AIDS*. Geneva: UNAIDS.

Bollinger, L. & Stover, J., 1999a. *Economic Impact of AIDS in South Africa*. Johannesburg: Futures Group International.

Bollinger, L. & Stover, J., 1999b. *Economic Impact of AIDS*. Johannesburg: Futures Group International.

Bonnel, R., 2000. *Economic Analysis of HIV/AIDS*. Paper presented at the African Development Forum, Addis Ababa, 3-7 December.

Compernolle, P., 2000. *Presentation to USAID Workshop on Research into the Economic Impact of HIV/AIDS in South Africa*, September 4th, Pretoria, South Africa.

Desmond, C., Michael, K. & Gow, J., 2000. *The Hidden Battle: HIV/AIDS in the Family and Community*. Health Economics & HIV/AIDS Research Division (HEARD), University of Natal, Durban.

Dixon, S., McDonald, S. & Roberts, J., 2002. The Impact of HIV and AIDS on Africa's Economic Development. *British Medical Journal* 324: 232-234.

Drèze, J. & Srinivasan, P.V., 1997. Widowhood and Poverty in Rural India: Some Inferences from Household Survey Data. *Journal of Development Economics* 54: 217-234.

Filmer, D. & Pritchett, L., 1998. *Estimating Wealth Effects without Expenditure Data - or Tears: An Application to Educational Enrollments in States of India*. World Bank Policy Research Working Paper No. 1994. Washington, DC: Development Economics Research Group (DECRG), The World Bank.

International Labour Organisation, 2000. *HIV/AIDS: A Threat to Decent Work, Productivity and Development*. Geneva: International Labour Office.

Janjaroen, S., 1998. *Impact of AIDS on household composition and consumption in Thailand*. European Union HIV/AIDS Programme in Developing Countries. Brussels: European Commission.

Lanjouw, P. & Ravallion, M., 1995. Poverty and Household Size. *Economic Journal* 105: 1415-1434.

Lundberg, M. & Over, M., 2000. *Transfers and Household Welfare in Kagera*. Washington, DC: World Bank.

Lundberg, M., Over, M. & Mujinja, P., 2000. Source of Financial Assistance for Households suffering an Adult Death in Kagera, Tanzania. *South African Journal of Economics* 68(5): 947-984.

Mutangadura, G.B., 2000. *Household welfare impacts of mortality of adult females in Zimbabwe: Implications for policy and program development*. Paper presented at the AIDS and Economics Symposium, Durban, 7-8 July.

Nandakumar, A.K., Schneider, P. & Butera, D., 2000. *Use of and Expenditures on Outpatient Health Care by a Group of HIV Positive Individuals in Ruanda*. Bethesda, MD: Partnership for Health Reform Project, Abt Associates Inc.

National Treasury, 1999. *Medium Term Expenditure Framework*. Pretoria: Government Press.

Over, M., 1998. Coping with the impact of AIDS. *Finance and Development* 35(1): 22-24.

Parker, W., Kistner, U., Gelb, S., Kelly, K. & O'Donovan, M., 2000. *Economic Impact of HIV/AIDS in South Africa and its Implications for Governance: A Bibliographic Review*. Johannesburg: CADRE & USAID.

Pitayanon, S., Kongsin, S. & Janjareon, W.S., 1997. Economic Impact of HIV/AIDS Mortality on Households in Thailand. In Bloom, D. & Godwin, P. (eds). *The*

Economics of HIV/AIDS: The Case of South and South East Asia. Delhi: Oxford University Press.

Romano, E., Aplasca, M.R. & Monzon, O.T., 2000. *Coping mechanisms of families, households of HIV-infection AIDS patients*. Paper presented at XI International AIDS Conference, Vancouver, 7-12 July.

Statistics South Africa, 2000. *Measuring poverty*. Pretoria: Statistics South Africa.

Topouzis, D., 2000. *Measuring the Impact of HIV/AIDS on the Agricultural Sector in Africa*. Paper presented at the African Development Forum, Addis Ababa, 3-7 December.

UNAIDS, 1995. *Report from a Consultation on the Socio-Economic Impact of HIV/AIDS on Households*. Available: http://www.unaids.org.

UNDP, 1998. *Socio-economic Impact of HIV and AIDS on Rural Families in Uganda: An Emphasis on Youth*. Study Paper No. 2 HIV and Development Programme. New York: UNDP.

Wekesa, E., 2000. Impact of HIV/AIDS on child survival and development in Kenya. *AIDS Analysis Africa* 10(4): 12-14.