The effects of household wealth on HIV prevalence in Manicaland, Zimbabwe

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Abstract

Background:
It remains unclear whether poverty or in fact wealth correlates with HIV risk, and to what extent. We analyse associations and trends between wealth and HIV infection rates while accounting for demographic factors using data over several rounds of a large population-based cohort study in Manicaland, Zimbabwe, over the period 1998 to 2011.

Methods:
Household-based wealth was estimated from summed asset ownership scores for 'sellable', 'non-sellable' and all assets combined. Multivariate logistic random-effects models were used to analyse associations between absolute wealth group and HIV infection risk after accounting for age, sex, education, marital and occupational status. Results were compared over several study rounds to investigate trends and dynamics.

Results:
Mean asset scores remained similar at around 0.37 up to 2007 but decreased to levels below 0.35 thereafter. Highest scores were observed in towns but the gap to other locations reduced over time, especially for sellable assets. Concurrently, adult HIV prevalence dropped steadily from 22.3% to 14.3%. Prevalence was significantly higher in women than men across absolute wealth groups, except in least poor women, and variation between groups narrowed over the years. We found no significant associations between wealth and HIV prevalence in men but lower prevalence in the wealthiest women at the beginning of the study. However, this trend became less and less important with each study round.

Conclusions:
Wealth appears to be associated with HIV infection risk at macro-level only. Individual-level trends were inconsistent or lacking which suggests that the epidemic is widely spread throughout wealth groups.

Keywords:
HIV prevalence, wealth, Zimbabwe

Introduction

There is a long-held belief that poverty has driven HIV epidemics around the world.[1] This is reflected in reports by the World Bank[2], the United Nations Joint Programme on HIV/AIDS (UNAIDS)[3], and scientific publications.[4-7] It is assumed that poverty results in adoption of high-risk sexual behaviours and hence increases the risk of acquiring HIV. Specific risky sexual practices that have been associated with poverty include earlier sexual debut[8,9] and reliance on transactional sex or sex work in order to recuperate a loss of earnings.[7,10]

However, other studies challenge the idea that poverty fuels the HIV epidemic and show that HIV prevalence can be higher in wealthier populations.[11-15] Wealthy individuals may engage in other risky sexual practices, such as more regular or casual sex partners,[1,14] and might survive longer due to better access to treatment and care and diet.[16] Furthermore, some studies suggest that relative wealth can be associated with higher HIV risk initially but may become a protective factor as the epidemic matures.[1,17-22]

Gender differences might play an important role in the poverty/wealth-HIV relationship since they may alter associations differently because to different associated risk behaviours. For example, while more women might get drawn into transactional sex due to increasing deprivation if becoming poorer, men may become less likely to afford paid sex due to decreased income.[23]

Zimbabwe has experienced one of the world's largest HIV epidemics but, in recent years, HIV prevalence has fallen steadily.[24] The country also has undergone dramatic economic changes over the past 15 years with escalating economic decline from the late 1990s culminating in record levels of hyper-inflation and the collapse of the local currency in 2008-2009 and a subsequent stabilisation in the economy. There is controversy as to whether the economic decline contributed to the HIV decline in the country.[25-29]

This paper analyses associations between household-related wealth and HIV infection risk and associated risk behaviours over time using data of a large population-based cohort study in Manicaland, Zimbabwe, over the period 1998 to 2011. The drastic economic changes during this time offer a unique chance to study their impact on household wealth and the decline in HIV prevalence.

Methods

Manicaland Study

The Manicaland HIV/STD Prevention Project (Manicaland Study) is a collaborative scientific research programme in the rural areas of eastern Zimbabwe which investigates trends in the spread of the HIV epidemic and its impact. Full details of the study can be found elsewhere.[29] In short, a large prospective population-based open cohort study was initiated in July 1998 covering 12 communities from four different study site types (towns, estates, roadside business centres [RBCs], and subsistence farming areas [SFAs]) in Manicaland province. Five rounds have been completed in 1998-2000 (round 1), 2001-2003 (round 2), 2003-2005 (round 3), 2006-2008 (round 4) and 2009-2011 (round 5).

Household census

In each round, all pre-existing and new households within the study area were registered in an initial household census and additional data were collected on household-related characteristics, such as demographic factors and household structure. Household asset information was also obtained for all new households at each round, while data on assets of follow-up households were collected at rounds 3, 4 and 5. Our analysis on household wealth focusses on rounds with asset information on new as well as follow-up households (i.e. omitting round 2).

Adult individual survey

Individual eligibility criteria varied over survey rounds and are described in more detail elsewhere.[29] Adults registered during the household censuses and eligible for an interview were requested to

answer questions on demographic and behavioural-related factors after written informed consent was obtained. In addition, dried blood spots were collected for anonymous HIV serotesting at each round. Testing was performed using highly sensitive and specific antibody dipstick assays.[29] To create more comparable datasets over survey rounds, only adults aged 15-44 years were used in the individual-level analyses presented here.

Prior ethical approval was granted by Medical Research Council of Zimbabwe, Biomedical Research and Training Institute's Institutional Review Board, and Imperial College Research Ethics Committee.

Socioeconomic status

Individual socio-economic status was estimated from data on asset ownership of households of residence. Summed asset ownership scores were created from the available variables in the household questionnaire, for all assets combined and separately for 'sellable' and 'non-sellable' assets.[28,30] 'Sellable' assets included radio, television, bicycle, motorbike and car, while water and electricity supply, toilet facilities, housing structure and floor type were considered as 'non-sellable' assets.

For calculation of the summed asset ownership scores, ordinal asset variables were transformed into values between 0 and 1, whereby 0 represents the lowest and 1 the highest possible category. For example, a score of 0 was assigned to a natural type floor (e.g., sand), 0.5 for a rudimentary type (e.g., planks), and 1 for finished floors (e.g., cement). The values of all (transformed) variables were summed and divided by the total number of assets to create the summed asset ownership scores. The absolute wealth of a household was based on equally spaced cut-offs of the overall asset score distribution at 0, 0.2, 0.4, 0.6 and 0.8 and relative wealth on the quintiles of the distribution. Household-wealth scores were merged to individual survey data to determine associations with HIV infection risk.

Statistical analysis

Household-level analyses were conducted to assess trends in wealth over time. Panel data regression models with fixed random effects, accounting for heterogeneity in residual variance, and robust variance estimators were fitted to take into account that part of the data stem from the same households observed at multiple rounds and, hence, are not independent. Quadratic B-spline functions of the survey year with knots set at 1998, mid-2005 and 2011 were employed to assess for non-linear time trends. Analyses were conducted for combined, sellable and non-sellable summed asset ownership scores and separately for each study site type.

Associations between wealth and HIV serostatus by survey round were measured for men and women separately using multivariate logistic regression analyses. The analyses took into account possible clustering at household-level whereby multiple people of different risk profiling may live within the same household and therefore have the same wealth. Age, educational level, marital status and study site type were included as confounding factors. In addition, models were adjusted for individual occupation with current unemployment as baseline and professional labour, unskilled labour in the informal sector, and unskilled labour in other sectors as categories. The results of the above analyses were compared over the different rounds to assess for trends and dynamics over time.

All analyses were conducted in Stata/SE 12.1 for Windows.

Results

Household-level analysis

The total number of enumerated households in the household census increased from 8374 at the initial round in 1998-2000 to 14728 in 2009-2011. The participation rate of households in the questionnaire-based household survey was always high (over 90%) but decreased somewhat over time. Incomplete asset-related information varied between 2.0% and 0.2% and affected households were excluded from analyses. This resulted in a total number of households with complete asset ownership estimates of 8201 at round 1, 9360 at round 3, 12309 at round 4, and 13335 at round 5.

At all rounds, the summed asset ownership score roughly followed a normal distribution which was slightly skewed to the right by visual assessment of histograms and Q-Q plots. The initial score was 0.369 which remained similar until 2007 but dropped significantly below 0.350 in 2009-2011. Possession of sellable assets decreased steadily since 2003 while possession of non-sellable assets increased until 2008 but fell significantly after 2009 (Figure 1A).

Summed asset ownership scores for all assets combined (Figure 1B), but also separately for sellable (Figure 1C) and non-sellable assets (Figure 1D), showed similar trends over time between towns and RBCs but much higher scores were observed in towns with a maximum combined asset score of above 0.45 in 2007. RBCs ranked second in the combined asset score but became last (together with SFAs) between 2001 and 2005, due to losses in housing structure and floor type, and third thereafter. After a period of increase in the mean asset score in SFAs till 2003, household wealth decreased over time to the lowest observed combined asset score at around 0.315. The most unaltered trends over time were observed in estates with a slow but steady increase in assets until 2007, which was driven by non-sellable assets only, and a small decline thereafter due to a reduction in sellable assets. In 2011, the gap in the amount of sellable assets owned between the different study site types was much smaller than at the start of the survey in 1998 and the formerly significant differences between estates, RBCs and SFAs had disappeared (Figure 1C).

Specific assets may have contributed to the trends in asset ownership scores between survey site types and rounds. Assets that varied the most were radios and types of toilet facility. For site types, there was a significant decrease in the number of households owning a radio (contributing to the negative trend in sellable assets) from 53.2% in 1998-2000 to 25.2% in 2009-2011 and an increase in the number of households with private flush or Blair toilets (contributing to the positive trend in non-sellable assets) from 50.7% to 60.9%. However, decreasing proportions in radio ownership were most pronounced in the most rural areas (RBCs and SFAs). Trends in other assets were not as consistent and distinct.

The overall reduction in household wealth based on the combined asset score was not due to a general decrease in assets across all absolute wealth groups but arose mainly from a shift in households formerly ranked in the third group towards the second absolute wealth group (Figure 2, left-hand side). The proportion of households assigned to other absolute wealth groups remained fairly stable over time except in 2009-2011 during which more households in the poorest absolute wealth group were observed than in any other round. While the distribution of sellable assets became more positively skewed over time (a reduction in sellable assets), the distribution for non-sellable assets remained more or less constant (Figure 2, right-hand side). Due to small sample sizes in the fifth absolute wealth group, it was combined with the fourth into a single group of highest absolute wealth in all subsequent analyses.

Individual-level analysis

HIV prevalence, in individuals aged 15-44 years and without missing socio-economic data, decreased steadily over time from 18.2% to 10.7% and from 25.5% to 16.8% in men (Table 1) and women (Table 2), respectively. This trend was also observed when analysed separately by study site type but in the rural areas (SFAs and RBCs), there was a non-significant increase in male HIV prevalence in the last two survey rounds.

Over the years, the proportion of the population with secondary education or higher increased from 62% in 1998-2000 to 81% in 2009-2011, but the ranking between study site types remained constant with highest to lowest proportions in RBCs, SFAs, towns, and estates. Individuals with higher educational level tend to live in wealthier households with an average asset score of 0.358 as compared to 0.285 and 92% among those of highest absolute wealth having at least secondary education but only 68% among those of lowest wealth in 2009-2011. HIV infection risk was significantly lower for the higher educated at all times.

Throughout the survey rounds and for both sexes, living in a town was significantly associated with highest HIV risk in multivariate models accounting for educational level as well as other demographic factors, except in 2009-2011 where no significant difference could be observed to rural areas in men.

Absolute wealth

In men, the variation in HIV prevalence between absolute wealth groups narrowed over time (Table 1). Male prevalence reduced significantly between 1998-2000 and 2009-2011 in all wealth groups, except in men of highest wealth, and the reduction was larger in the poorer groups. Multivariate logistic regression analyses showed that there was no significant association between male HIV status and wealth at all rounds after controlling for confounding. However, there appeared to be a non-significant increase in HIV prevalence by wealth in 2009-2011. The lack of association was also observed when analysing separately for sellable and non-sellable assets.

HIV prevalence in women was significantly higher than in men at all rounds for the first, second and third absolute wealth group, but not for the highest group (Table 2). Between 1998-2000 and 2009-2011, the variation in prevalence between groups narrowed and significant decreases were observed in all absolute wealth groups with largest and second largest reductions in the first and highest group, respectively. Multivariate logistic regression models showed that women of highest wealth were at lowest risk of infection throughout all rounds (Table 2), but significant differences with the first (poorest) wealth group were only found in 1998-2000. In 2009-2011, women of moderate wealth (second and third absolute wealth group) were significantly positively associated with higher HIV risk compared to those of poorest wealth. Analyses for sellable assets showed that women in the third absolute group were significantly less likely to be HIV positive than those in the first group up to 2005, as well as women of highest wealth in 1998-2000 and 2006-2008. For non-sellable assets, women of highest wealth also showed non-statistically significant negative associations with prevalence.

Occupation type

Being unemployed was associated with lowest HIV prevalence in men in 1998-2000 and second lowest in men from 2003 onwards (with other unskilled labour being lowest) and in women at all rounds. However in multivariate models, no clear pattern between infection risk and occupation type was observed over time with ORs for unskilled labour (informal and other) varying between negative, positive and no association. The only consistent trend was found in professional/skilled labour which was negatively associated with the outcome in men but only significantly until 2008.

Further analyses of individuals over time showed that these inconsistencies are likely to be due to high transitions between occupation types. Omitting occupation from the multivariate models has only marginal effects on the results of the remaining parameters and does not affect significance in the absolute wealth groups.

Discussion

Household wealth (estimated from asset ownership) in Manicaland, Zimbabwe, was highest in towns and lowest in SFAs. In most locations, household wealth dropped significantly to levels below or around those observed at the beginning of the study in 1998 after a peak in 2007, which was around the height of the economic crisis in the country. This shows that, on average, households in the survey area were rather unshaken by the economic decline in the late 1990s and the first years after 2000 and could improve their wealth score, by mainly acquiring non-sellable assets (especially improving toilet facilities), or at least keep their status quo. However, shortly before the peak in deflation in 2008/2009, people were increasingly forced to trade sellable assets and could no longer afford to improve their homestead resulting in the decline of wealth. The most rural areas (SFAs) appeared to be affected by these effects several years earlier than the other study locations.

Our findings suggest that wealth is associated with HIV infection risk only at macro level. While it is apparent that HIV prevalence is higher the higher the wealth of the study location, individual-level trends were absent for men and were limited and inconsistent over time for women. This suggests that the HIV epidemic is widely spread through all socio-economic groups and that household-based wealth does not determine individual infection risk after accounting for demographic factors such as study location. Contrary to earlier concerns expressed by Lopman et al. (2007)[28] based on 1998-2000 and 2001-2003 data from the Manicaland Study, HIV has not become a disease of the poor in Zimbabwe.

Parkhurst (2010)[1] presents a comparison of HIV prevalence and relative wealth in 12 sub-Saharan African countries in relation to national income, including 2005-06 Demographic Health Surveillance (DHS) data from Zimbabwe. The author found that in most countries with a per capita gross domestic product adjusted for purchasing power parity below US$2000, prevalence increases together with wealth, while in wealthier countries no clear pattern can be observed. Zimbabwe was ranked just above US$2000 and female HIV prevalence increased with wealth up to the fourth quintile but with lowest infection risk observed in the highest quintile. In Zimbabwean men, no trend was found. The difference in females might be explained by the mostly rural character of the Manicaland study area and its lack of bigger cities as compared to the DHS areas.

One main advantage of the Manicaland Survey is the consecutive collection of data which allows assessment of trends in wealth and HIV risk over time. However, our present analysis is based on HIV prevalence rather than incidence and mortality. This makes it challenging to determine whether any significant associations were caused by wealth or whether HIV serostatus was in fact altering wealth. Furthermore, prevalence is a cumulative measure which changes slowly over time and does not well capture short-term effects. Hence, altering trends after the peak in economic decline in 2008-2009 might not yet be observable with our latest HIV prevalence data from 2009-2011. As drug supplies improve and treatment guidelines change, more people will have access to antiretroviral therapy and survival will increase. Wealthier people might benefit more from these changes which could lead to future associations between wealth and HIV prevalence. However in 2009-2011, uptake of antiretroviral drugs was only 16.3% and 26.9% in HIV positive men and women, respectively, and no significant differences were found between absolute wealth groups.

We used panel data to take into account the possibility of repeated observations at the same households and individuals at different survey rounds via regressions with fixed random effects. Our models assumed that missing observations occur randomly but households and individuals might have dropped out or refused to be interviewed in follow-up surveys because of factors related to the outcomes. However, the probability of follow-up was similar across wealth groups making it unlikely that our results are biased with respect to wealth. With respect to HIV serostatus, follow-up rates in HIV positives are higher than in HIV negatives across all rounds and we might overestimate HIV infection risk.

Wealth expressed as summed asset ownership score has an intuitive interpretation and can easily be reproduced. However, it is a rather crude measure with each item contributing equally to the final estimate. This implies that, for example, a household owning a radio but no car is as wealthy as a household owning a car but no radio. Multiple correspondence analyses could be used instead to create a more sophisticated measure based on the first dimension of the correlation matrix.[30] Exploratory analyses showed (results not presented) that the correlation between the two methods was high ($R^2 \geq 0.93$) for each study site type. Therefore, we assumed that both methods are equally good to create a wealth measure and chose the simpler method instead.

Another issue related to an asset-based approach is the limitation in capturing individual wealth. The household head might be solely in charge of finances and financial decisions and other household members would consequently be dependent on the gratitude of the household head. Household wealth would be the same for each member but individual wealth could be very different. In the absence of income data, occupation might be a better proxy for individual wealth. In fact, we showed that men in Manicaland working in a professional job were at lower HIV risk than unemployed men until 2006-2008 after accounting for confounding and wealth group. However, we did not observe any consistent associations in women which might have been obscured by high transitions between occupation types over survey rounds. An analysis of the Tanzania HIV/AIDS indicator survey 2003-04 data[13,31] also found lower HIV infection risk in men and similar risk in women between these occupation types. These results confirm the importance of capturing individual wealth when analysing the HIV-wealth relationship, especially in men.

The comparatively stable and mostly improving socio-economic situation in estates over time is probably explained by the different housing situation in these areas. People usually do not own there house but live in properties provided by the estate which takes care of general housing improvements. Since these improvements are to a large extent independent from the wealth of the inhabitants, the sellable assets score might give a better indication of household-related wealth in estates than the combined asset score.

Our results underline how factors affecting HIV risk are inter-linked differently in different contexts and that the correlation between poverty/wealth and HIV prevalence is a result of those complex factor associations and changes between settings and times. Therefore, no universal conclusion can be drawn whether HIV infection is a result or the cause of poverty. While reducing poverty will always be an important issue in general, sustainable long-term effects in HIV control are unlikely to be achieved with such methods alone.

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Figures:

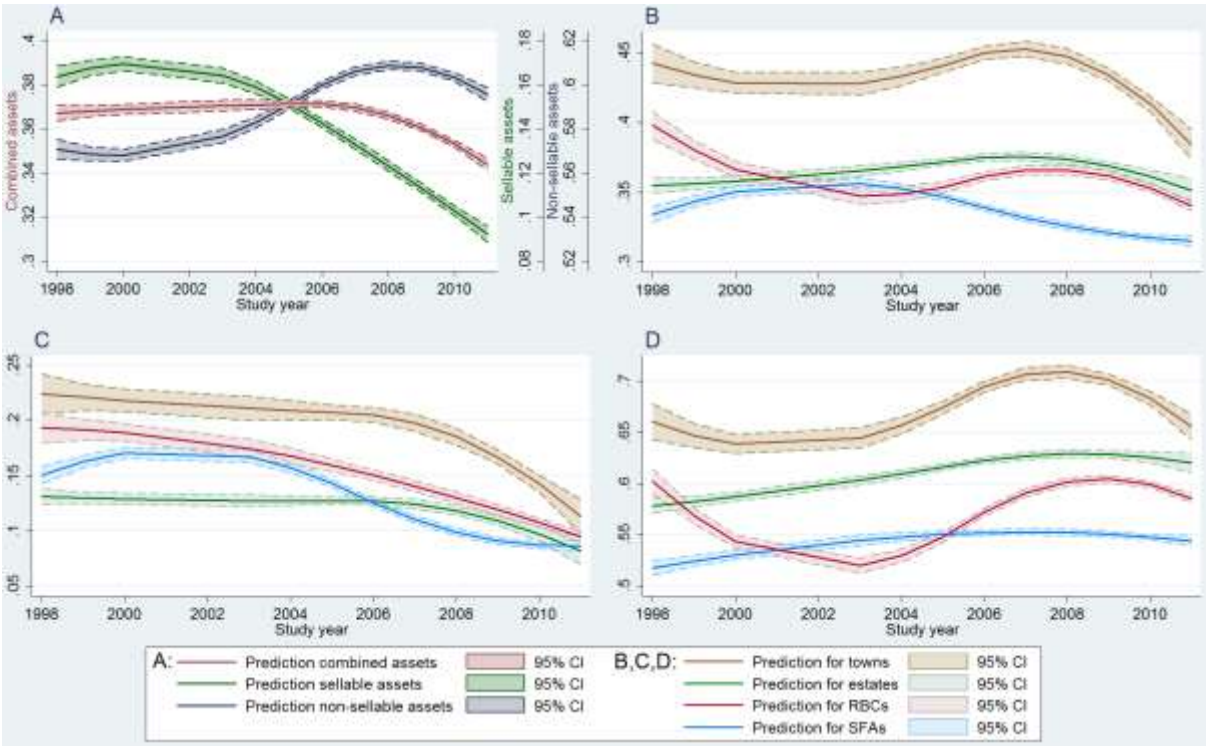

Figure 1: Trends in summed asset ownership score by A) asset type, B) by site type for combined assets, C) by site type for sellable assets, and D) by site type for non-sellable assets based on normal panel data regressions with quadratic B-spline functions of survey year.

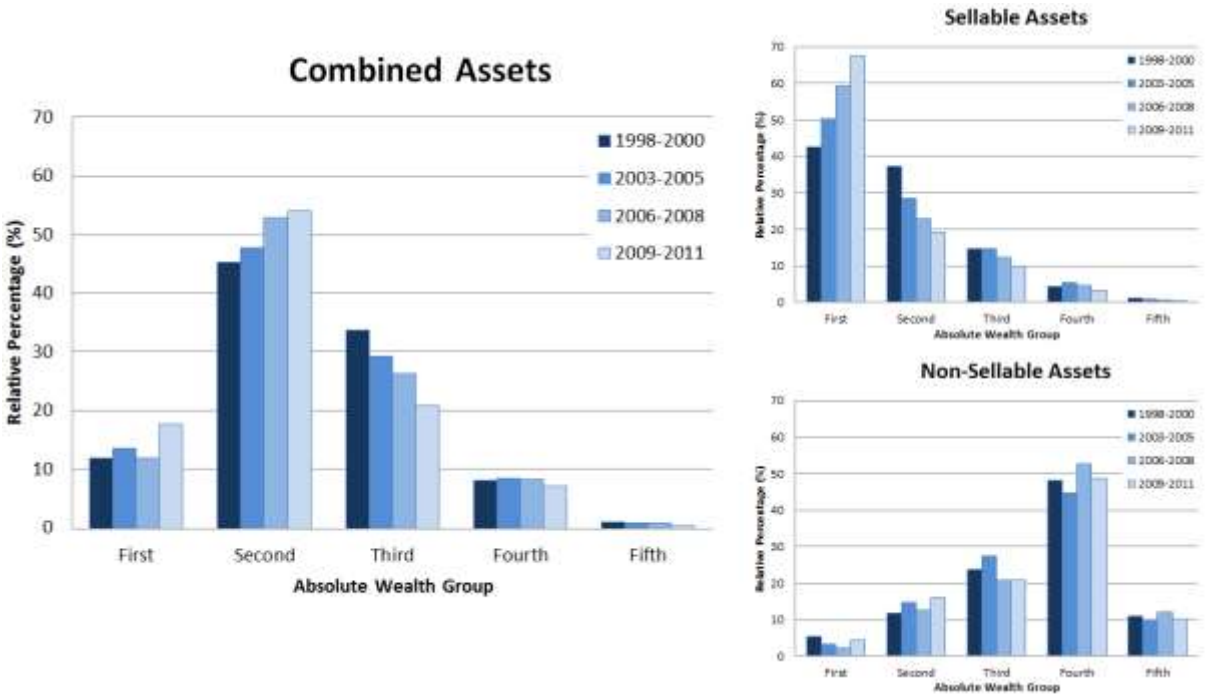

Figure 2: Absolute wealth groups over study rounds by asset type.

Tables:

Table 1: Trends in HIV prevalence and logistic regression results by characteristic and study round in men.

	Round 1 (1998-2000)			Round 3 (2003-2005)			Round 4 (2006-2008)			Round 5 (2009-2011)		
Characteristics	**N**	**HIV+ (%)**	**OR adjusted†**	**N**	**HIV+ (%)**	**OR adjusted†**	**N**	**HIV+ (%)**	**OR adjusted†**	**N**	**HIV+ (%)**	**OR adjusted†**
Absolute wealth group												
First	369	23.0 (18.7-27.3)	1	654	16.4 (13.5-19.2)	1	468	12.6 (9.6-15.6)	1	856	10.5 (8.5-12.6)	1
Second	1620	17.5 (15.6-19.3)	0.91 (0.67-1.24)	2436	14.0 (12.6-15.3)	0.90 (0.66-1.23)	2239	11.5 (10.2-12.8)	1.06 (0.74-1.51)	2348	10.1 (8.9-11.4)	1.28 (0.91-1.81)
Third	1452	17.9 (15.9-19.9)	1.04 (0.76-1.43)	1835	13.0 (11.5-14.6)	0.83 (0.60-1.15)	1319	12.0 (10.2-13.7)	1.01 (0.69-1.48)	1127	11.4 (9.5-13.2)	1.29 (0.88-1.91)
Highest	426	18.1 (14.4-21.7)	0.99 (0.67-1.49)	643	14.6 (11.9-17.4)	0.94 (0.63-1.42)	467	11.8 (8.9-14.7)	0.93 (0.57-1.51)	404	12.9 (9.6-16.1)	1.35 (0.81-2.27)
Study site												
Towns	721	26.4 (23.1-29.6)	1	956	21.7 (19.0-24.3)	1	763	16.4 (13.8-19.0)	1	823	13.9 (11.5-16.2)	1
Estates	1528	18.1 (16.1-20.0)	0.63* (0.49-0.80)	1824	15.6 (14.0-17.3)	0.55* (0.42-0.73)	1246	14.0 (12.1-16.0)	0.58* (0.42-0.80)	1339	10.6 (9.0-12.3)	0.57* (0.39-0.83)
RBC	513	15.8 (12.6-18.9)	0.68* (0.48-0.96)	1046	10.2 (8.4-12.1)	0.51* (0.36-0.72)	905	9.0 (7.1-10.8)	0.54* (0.37-0.78)	966	9.5 (7.7-11.4)	0.75 (0.50-1.11)
SFA	1105	14.3 (12.2-16.4)	0.56* (0.43-0.75)	1742	10.4 (9.0-11.8)	0.44* (0.32-0.60)	1579	9.4 (7.9-10.8)	0.50* (0.36-0.70)	1607	10.0 (8.5-11.4)	0.83 (0.58-1.19)
Occupation type												
Unemployed	825	15.5 (13.0-18.0)	1	1499	13.8 (12.1-15.6)	1	1694	11.9 (10.4-13.5)	1	1638	11.2 (9.7-12.8)	1
Unskilled - Other	1692	17.4 (15.6-19.2)	0.88 (0.66-1.18)	2371	10.3 (9.1-11.5)	0.80 (0.61-1.05)	1700	9.4 (8.0-10.7)	1.06 (0.80-1.39)	1677	7.2 (5.9-8.4)	1.35 (0.96-1.91)
Unskilled - Informal	756	18.8 (16.0-21.6)	0.80 (0.59-1.08)	982	18.2 (15.8-20.6)	0.97 (0.74-1.28)	579	16.1 (13.1-19.1)	1.15 (0.85-1.56)	784	13.4 (11.0-15.8)	0.99 (0.71-1.37)
Professional/Skilled	594	23.6 (20.2-27.0)	0.63* (0.45-0.86)	716	20.9 (18.0-23.9)	0.69* (0.50-0.94)	520	14.4 (11.4-17.4)	0.93* (0.57-1.51)	636	15.6 (12.7-18.4)	0.84 (0.58-1.22)
TOTAL	**3867**	**18.2 (17.0-19.4)**		**5568**	**14.0 (13.1-14.9)**		**4493**	**11.8 (10.8-12.7)**		**4735**	**10.7 (9.8-11.6)**	

† Adjusted for household-level clustering and controlled for potential confounding in age, educational level, and marital status

* Significant difference from reference category (p<0.05)

Table 2: Trends in HIV prevalence and logistic regression results by characteristic and study round in women.

	Round 1 (1998-2000)			Round 3 (2003-2005)			Round 4 (2006-2008)			Round 5 (2009-2011)		
Characteristics	**N**	**HIV+ (%)**	**OR adjusted†**	**N**	**HIV+ (%)**	**OR adjusted†**	**N**	**HIV+ (%)**	**OR adjusted†**	**N**	**HIV+ (%)**	**OR adjusted†**
Absolute wealth group												
First	614	30.5 (26.8-34.1)	1	1135	24.6 (22.1-27.1)	1	759	20.6 (17.7-23.4)	1	1284	15.1 (13.1-17.1)	1
Second	2278	26.1 (24.3-27.9)	0.95 (0.75-1.21)	3661	20.2 (18.9-21.5)	0.83 (0.68-1.00)	3066	18.7 (17.3-20.0)	0.87 (0.67-1.13)	3492	17.7 (16.4-19.0)	1.34* (1.07-1.68)
Third	1645	23.3 (21.3-25.4)	0.82 (0.63-1.06)	2345	19.7 (18.1-21.4)	0.84 (0.68-1.03)	1687	19.0 (17.1-20.8)	0.87 (0.65-1.16)	1467	17.2 (15.3-19.2)	1.33* (1.02-1.73)
Highest	495	23.8 (20.1-27.6)	0.70* (0.49-0.99)	795	20.1 (17.3-22.9)	0.76 (0.58-1.01)	622	18.8 (15.7-21.9)	0.74 (0.51-1.08)	584	14.4 (11.5-17.2)	0.90 (0.62-1.30)
Study site												
Towns	721	43.5 (40.0-47.1)	1	956	29.4 (26.9-32.0)	1	763	29.5 (26.6-32.5)	1	823	22.2 (19.9-24.5)	1
Estates	1528	25.1 (22.8-27.4)	0.35* (0.27-0.46)	1824	21.1 (19.4-22.8)	0.56* (0.45-0.68)	1246	19.8 (17.8-21.7)	0.42* (0.32-0.55)	1339	17.0 (15.2-18.8)	0.54* (0.42-0.69)
RBC	513	22.8 (20.3-25.4)	0.31* (0.23-0.42)	1046	19.3 (17.4-21.2)	0.51* (0.40-0.64)	905	16.8 (14.7-18.9)	0.36* (0.26-0.48)	966	15.9 (14.0-17.9)	0.58* (0.44-0.75)
SFA	1105	14.3 (12.2-16.4)	0.27* (0.20-0.36)	1742	10.4 (9.0-11.8)	0.46* (0.37-0.56)	1579	9.4 (7.9-10.8)	0.35* (0.27-0.46)	1607	10.0 (8.5-11.4)	0.58* (0.44-0.75)
Occupation type												
Unemployed	2250	26.7 (24.9-28.5)	1	4353	21.5 (20.3-22.7)	1	4101	19.7 (18.5-20.9)	1	4526	17.9 (16.8-19.0)	1
Unskilled - Other	1031	17.4 (15.0-19.7)	0.74* (0.57-0.95)	1881	13.6 (12.0-15.1)	1.10 (0.90-1.35)	1295	11.6 (9.8-13.3)	0.92 (0.70-1.21)	1329	10.8 (9.1-12.4)	1.24 (0.94-1.65)
Unskilled - Informal	1549	28.4 (26.2-30.7)	0.96 (0.81-1.15)	1450	26.8 (24.5-29.1)	1.12 (0.95-1.32)	457	29.8 (25.6-34.0)	1.35* (1.01-1.80)	744	19.6 (16.8-22.5)	0.95 (0.74-1.22)
Professional/Skilled	202	31.2 (24.8-37.6)	0.97 (0.66-1.43)	252	24.6 (19.3-29.9)	0.87 (0.61-1.24)	281	25.6 (20.5-30.7)	0.96 (0.66-1.39)	228	22.4 (16.9-27.8)	1.02 (0.67-1.54)
TOTAL	**5032**	**25.5 (24.3-26.7)**		**7936**	**20.7 (19.8-21.6)**		**6134**	**19.0 (18.0-20.0)**		**6827**	**16.8 (15.9-17.7)**	

† Adjusted for household-level clustering and controlled for potential confounding in age, educational level, and marital status

* Significant difference from reference category (p<0.05)