USAID
FROM THE AMERICAN PEOPLE

DHS WORKING PAPERS

Individual- and Community-level Determinants of Social Acceptance of People Living with HIV in Kenya: Results from a National Population-based Survey

Chi Chiao
Vinod Mishra
William Sambisa

2008 No. 50

DEMOGRAPHIC AND HEALTH RESEARCH

August 2008

The *DHS Working Papers* series is an unreviewed and unedited prepublication series of papers reporting on research in progress based on Demographic and Health Surveys (DHS) data. This research was carried out with support provided by the United States Agency for International Development (USAID) through the MEASURE DHS project (#GPO-C-00-03-00002-00). The views expressed are those of the authors and do not necessarily reflect the views of USAID or the United States Government.

MEASURE DHS assists countries worldwide in the collection and use of data to monitor and evaluate population, health, and nutrition programs. Additional information about the MEASURE DHS project can be obtained by contacting Macro International Inc., Demographic and Health Research Division, 11785 Beltsville Drive, Suite 300, Calverton, MD 20705 (telephone: 301-572-0200; fax: 301-572-0999; e-mail: reports@macrointernational.com; internet: www.measuredhs.com).

Individual- and Community-level Determinants of Social Acceptance of People Living with HIV in Kenya: Results from a National Population-based Survey

Chi Chiao[1]

Vinod Mishra[2]

William Sambisa[3]

Macro International Inc.

August 2008

[1]*Corresponding author*: Chi Chiao, Institute of Health and Welfare Policy, National Yang-Ming University, Taipei Taiwan; Phone: +886-2-28267000 ext 7916; Email: cchiao@ym.edu.tw

[2]MEASURE DHS, Macro International Inc., Calverton, Maryland, USA

[3]MEASURE Evaluation and Carolina Population Center, University of North Carolina at Chapel Hill, USA

Abstract

Using data from the 2003 Kenya Demographic and Health Survey, we investigated the influence of individual- and community-level factors on accepting attitudes toward people living with HIV (PHLIV) using three outcomes: willingness to care for an infected household member, willingness to buy vegetables from an infected vendor, and willingness to allow an infected female teacher to continue teaching. Multilevel logistic regression models, with individuals at the first level and community variables at the second level, were performed. We found that males were more likely than females to have higher social acceptance attitudes toward PLHIV. Respondents who were older, had higher education, had high knowledge of AIDS, knew someone with HIV or someone who had died of AIDS, or who were exposed to mass media expressed greater acceptance of PLHIV. The percentage of the total variance that was explained by the community of residence ranged between 14 percent and 23 percent among females and between 14 percent and 32 percent among males across all three outcomes. At the community level, differences in accepting was attitudes were associated with community AIDS knowledge, community education, and community AIDS experience, but not with region or place of residence. The findings suggest that community level factors play a significant role in determining social acceptance of PLHIV. Programmatic strategies aimed at increasing accepting attitudes toward PLHIV should take into consideration both individual- and community-level factors.

Key words: accepting attitudes; people living with HIV (PLHIV), individual-level effects, community-level effects; Kenya, demographic and health survey

Acknowledgements

This research was supported by a post-doctoral fellowship to Chi Chiao from the United States Agency for International Development (USAID) through the MEASURE DHS project at Macro International Inc. An earlier version of this paper was presented at the 2006 International AIDS Conference in Toronto.

Introduction

The reasons behind the global spread of HIV infection are complex. However, it is clear that the nonacceptance of people living with HIV (PLHIV) acts as a major obstacle to implementing HIV prevention programs, particularly as it engenders complacency in groups untargeted, yet at risk for HIV infection (Brooks et al., 2005; Chesney and Smith, 1999; Parker and Aggleton, 2003; Peretti-Watel et al., 2007). In addition, intolerance toward those with HIV is considered one of the greatest barriers to the provision of treatment, care, and support to PLHIV (Lentine et al., 2000; UNAIDS, 2006; World Health Organization, 2005). In sub-Saharan Africa, there is a growing concern about the pervasiveness of intolerant attitudes toward PLHIV (Alubo et al., 2002; Ezedinachi et al., 2002; Nyblade et al., 2002; Ogden and Nyblade, 2005; Sepulveda et al., 2003). Similarly, there is concern about the role of the social epidemic of AIDS acting as a major obstacle in dealing effectively with HIV infection and AIDS for individuals and communities (Cameron, 2000; Nyblade et al., 2003; Rankin et al., 2005; van Dyk, 2001). Given that intolerant attitudes toward HIV play an important role in determining the trajectory of the epidemic, a better understanding of the factors that act as barriers or facilitators to social acceptance of PLHIV is relevant to informing the design of interventions that could be implemented to improve tolerant attitudes toward PLHIV.

Several studies describe a range of multiple-level factors—individual and community—associated with social acceptance of PLHIV (Warwick et al., 1998). At the individual level, some authors have stressed sociodemographic characteristics such as gender (Lau and Tsui, 2003), age and education (Chen et al., 2005, 2007; Hamra et al., 2006; Lau et al., 2005; Lau and Tsui, 2003), marital status and religion (Lau and Tsui, 2007), household wealth (Chliaoutakis and Trakas, 1996), and exposure to mass media (Macintyre et al., 2001) as important factors associated with social acceptance of PLHIV. In addition, social tolerance of PLHIV is shaped by psychosocial factors such as knowledge of HIV transmission (Chen et al., 2005, 2007; Chliaoutakis and Trakas, 1996; Hamra et al,. 2005, 2006; Takai et al., 1998), self-evaluated perception of risk of HIV infection (Herek et al., 2002; Lew-Ting and Hsu 2002), and knowing someone with HIV or who has died of AIDS (Lau and Tsui 2007; Pallikadavath et al., 2006).

A handful of studies have gone beyond assessing the individual-level correlates of accepting attitudes toward PLHIV to examining the potential role of community-level (contextual) factors

in an individual's tolerance toward those with HIV (VanLandingham et al., 2005). There is an increasing recognition that these community-level factors are causes of causes, which affect individuals directly or constrain the choice they make, and that contextual factors also can contain information not easily captured by individual-level data (Diez-Roux, 1998). The constructs of social learning and social influence are features of the social context that have been posited to influence individual behavior (Kohler et al., 2001; Montgomery and Casterline, 1996). Social learning means that knowledge and attitudes are transmitted directly among community members by communication and observation. In contrast, social influence refers to a more passive imitation of behavior, driven by a desire to gain other peoples' approval or avoid sanctions. In addition, individual behavior may be influenced by social institutions and other societal factors, which to some extent are shaped by the ideas, resources, and behavior of the people in the community (Benefo, 2006; Kravdal, 2002). This particular approach is highly applicable in the context of social acceptance of PLHIV because although the effect of tolerant attitudes toward those with HIV appears to be evident at the individual level, the nature, context, and severity of such attitudes are influenced by the social environment (Parker and Aggleton, 2003). For instance, some communities and families believe that someone with HIV brings shame on them. Such beliefs have resulted in people who are suspected to be HIV positive being banished, hidden, abandoned, and even murdered (Baleta, 1999; Nyblade et al., 2003; UNAIDS, 2002).

In our review of the literature on accepting attitudes toward PLHIV, we were able to identify few studies that focused their attention on exploring the association between social tolerance of those with HIV and community-level factors (Chen et al., 2005, 2007; Muyinda et al., 1997). A study conducted in China found that a high level of HIV/AIDS-related risk behavior in the community and a low level of community development are associated with high social intolerance toward PLHIV, after controlling for social and demographic characteristics (Chen et al., 2005). Another study in Thailand found that community reactions to persons with HIV/AIDS were judged to be more positive in rural areas than in urban areas (VanLandingham et al., 2005). The findings of community effects on social acceptance of PLHIV suggest that the neighborhood context could be both an independent determinant of respondents' likelihood of holding tolerant attitudes toward seropositive persons and a potential modifier of the relationship between

respondents' own individual characteristics and social acceptance attitudes toward PLHIV (Chen et al., 2007).

Using multilevel analyses, this study examines the barriers and facilitators to accepting attitudes toward PLHIV in Kenya by analyzing the effect of individual-level correlates of social acceptance of PLHIV, including sociodemographic characteristics (age, education, ethnicity, marital status, religion, household wealth, and exposure to mass media) and psychosocial factors (knowledge of AIDS, perceived risk of HIV infection, and knowing someone with HIV or someone who had died of AIDS), as well as assessing the relative contribution of community-level factors (community AIDS experience, community education, community wealth, residence, and distance from the road), to tolerant attitudes toward those with HIV. A search of the literature indicated that no multilevel study has been done so far on the social acceptance of PLHIV in sub-Saharan Africa. Our study provides a unique perspective on social acceptance of PLHIV in this region. Before implementing programs to improve social tolerance of PLHIV, it is important to assess the extent of social acceptance of PLHIV and associated factors in Kenya.

Methods

Data

We used cross-sectional data drawn from the 2003 Kenya Demographic and Health Survey (KDHS), a nationally representative household survey that collected data on a wide range of information including background characteristics, knowledge and attitudes about HIV/AIDS, sexual behavior, and accepting attitudes toward persons living with HIV. The survey employed a national probability sample of households, using a two-stage sampling strategy (Central Bureau of Statistics [Kenya] et al., 2004). Each province or region of the country was divided into small census enumeration areas, which spanned one or a few villages or settlements, a small town, or part of a larger town or city. There were 400 clusters (defined as primary sampling units) selected, using the master frame of the 1999 Kenya Population and Housing Census. A total of 9,865 households were randomly sampled within the selected clusters, of which 8,889 were occupied and 8,561 successfully interviewed (96 percent response rate). Within each household, all women of reproductive age (age 15-49 years) were eligible for interview. In every other household, data were also collected from all men aged 15-54 years. This sampling procedure

yielded 8,717 women and 4,183 men eligible for interview, with response rates of 94 percent and 86 percent, respectively (Central Bureau of Statistics [Kenya] et al., 2004). We restricted the analyses to the respondents who indicated that they ever heard of HIV/AIDS and who responded to questions on accepting attitudes toward PLHIV. The final sample consisted of 7,377 women and 3,109 men.

Measures

Outcome variables. We analyzed three binary outcome variables related to accepting attitudes towards PLHIV: willingness to care for an infected household member, willingness to purchase vegetables from an infected vendor, and willingness to allow an infected female teacher to continue teaching. The variables were coded with a value of 1 if the respondent affirmed social acceptance toward people with HIV; otherwise, they were coded with a value of 0.

Independent Variables

Individual-level variables. At the individual level, we included several sociodemographic characteristics: age in years, education, ethnicity, marital status, working status, religion, household wealth, and media exposure. Age was grouped into 3 categorizes: 15-24 years, 25-34 years, and 35 years or older. Education was analyzed in terms of the following categories: illiterate, incomplete primary, completed primary, and secondary or higher. Respondents described the ethnic group they belonged to using the following categories: Kikuyu, Kelanjin, Kamba, Luhya, Luo, and other. Marital status was defined as never married, married, living together, and formerly married. Working status was classified according to whether the respondent was working or not working. Religion was recorded as a four-category variable indicating whether the individual was a Catholic, Protestant/other Christian, Muslim, or no religion/other. Household wealth was grouped into 5 categories: poorest, poor, middle, richer, and richest status, based on an assets-based wealth index quintiles. Finally, media exposure was assessed by three separate binary variables on whether respondents listened to radio, watched television, and read newspapers at least once a week.

In addition, individual-level measures obtained from the survey data included psychosocial characteristics such as AIDS knowledge, a 10-item summative index capturing the respondent's knowledge about ways to reduce AIDS transmission and modes of HIV transmission. Correct responses were counted and summed. The index was then grouped into a three-category variable indicating low, median, and high knowledge. Perceived AIDS risk was measured based on self-evaluation of risk of getting infected with HIV categorized as no, small, moderate, and high risk or has HIV already. Personal knowledge of someone who has HIV or someone who had died of AIDS was captured by a binary variable coded as 1 if the respondent knew someone who has HIV or someone who had died of AIDS; it was coded as 0 otherwise.

Community-level variables. We included six community-level measures. Three measures used a set of derived aggregates in the community cluster, using an average approach to conceptualize the neighborhood effect on social acceptance toward PLHIV (Kravdal, 2002; Raudenbush and Bryk, 2002), whereas the other three measures were nonaggregate variables. Aggregate-level variables included community AIDS experience, conceptualized as the proportion of community members knowing someone with HIV or someone who has died of AIDS, with the following specified percentage ranges: low AIDS experience (0-69 percent), medium AIDS experience (70-89 percent), and high AIDS experience (90-100 percent). Second, a crude indicator of community education was measured by average number of years at school among females and males in the cluster specified with the following years of schooling range: 0-5 years, 6-8 years, and 9 or more years. Third, community wealth was specified as tertiles distinguishing primary sampling units with low, median, and high levels of community wealth. The three nonaggregate community-level variables that pick up some remaining community factors included a dichotomous variable of residence defined as urban and rural, province (Nairobi, Central, Coast, Eastern, Nyanza, Rift Valley, Western, and North Eastern), and distance to a major road, specified as quartiles based on the distance to a major road in kilometers.

Statistical Analyses

Our analytical approach included descriptive as well as multilevel logistic regression analyses. Separate analyses are performed for female and male respondents. All analyses are weighted to adjust for sample design. Descriptive statistics for the analytical sample are calculated using the survey commands in Stata version 10.0 (StataCorp, 2005). Because of the design of the KDHS data collection procedure, the sample is potentially clustered on two levels: individual (level 1) and community (level 2). We specified two-level multilevel logistic regression models (Goldstein, 1999; Snijders and Bosker, 1999) to determine the independent association between individual and community variables to each outcome reporting accepting attitudes toward PLHIV. Multilevel logistic regression models are estimated using the HLM 6.0 software (Raudenbush et al., 2004).

For each outcome variable, we developed two simple variance components regression models (Snijders and Bosker, 1999). In the first model, we assessed whether accepting attitudes toward PLHIV vary across individuals and communities by fitting a two-level random intercept logit model with no observed covariates (the empty model). The percentage of the total variance in accepting attitudes toward PLHIV (for each outcome variable) that was related to the community (the intracommunity correlation or the intraclass correlation coefficient) was used as a measure of the contextual effects. Intracommunity correlation was approximated as $\sigma_\mu^2/[\sigma_\mu^2 + \sigma_e^2]$, where σ_μ^2 denotes community-level variance and σ_e^2 denotes individual-level variance, with the latter variance set to $\pi^2/3$ (equal to 3.29; Merlo et al., 2005).

In the second model, all individual- and community-level factors were added together. In the model, individual-level variables are group centered, and contextual-level variables are grand mean centered. The logit of the probability of each outcome was modeled as follows:

$$\text{logit}(\pi_{ij}) = \log(\pi_{ij}/1-\pi_{ij})$$

$$= \beta_0 + \beta_1 I_{ij} + \beta_2 C_{ij} + \mu_j,$$

where *i* and *j* are the level 1 (individual) and level 2 (community) units, respectively; π_{ij} is the probability of the outcome of interest for the *i*th respondent in the *j*th community; the βs are the fixed coefficients; $\mu_j \sim N(0, \sigma^2_j)$ shows the random effects for the *j*th community; and I and C refer to individual- and community-level variables, respectively. The random intercept is shared

by all individuals from the same community (defined by primary sampling unit) and serves as an indirect control for community factors not included in the models that may affect accepting attitudes toward PLHIV. Individual odds ratios (ORs; 95 percent confidence intervals) were obtained from the beta coefficients in the fixed part of the models.

Results

Sample Characteristics

Table 1 shows the general profile of the respondents in the selected sample and also compares accepting attitudes by sex. Regarding the questions on accepting attitudes, sex differences are observed across all three outcomes of social acceptance of PLHIV. Males were more likely than females to have higher tolerant attitudes, and they were more likely to have tolerant attitudes toward an infected household member, followed by tolerant attitudes toward infected vendors, and then tolerant attitudes toward letting female teachers living with HIV continue teaching. For both females and males, the majority of respondents are aged 15-24 years, currently working, affiliated with the Protestant/Other Christian religion, and listen to the radio, watch television, and read a newspaper at least once a week. Furthermore, the majority of respondents perceived themselves at small or no risk of getting infected by HIV. More than half of either females or males lived in communities where 70-89 percent of individuals knew someone who has HIV or someone who has died of AIDS, the respondents of which averaged 6-8 years of schooling, and that had medium-level community wealth.

Table 1 Sample characteristics and distributions

Sample characteristics and distributions among females (aged 15-49 year) and males (aged 15-54 years), 2003 Kenya Demographic and Health Survey

Variable	Female (n = 7,377)	Male (n = 3,109)
Outcome variable		
Accepting attitudes toward an infected household member	86.3	89.1
Accepting attitudes toward an infected vendor	62.0	75.2
Accepting attitudes toward an infected female teacher	59.7	62.7
Individual-level variable		
Sociodemographic characteristic		
Age (in years)		
15-24	43.2	45.5
25-34	30.4	27.5
35+	26.4	27.0
Education		
Illiterate	10.9	4.9
Incomplete primary	32.6	34.3
Completed primary	25.8	22.6
Secondary and above	30.8	38.2
Ethnicity		
Kikuyu	23.9	23.1
Kalenjin	9.9	12.4
Kamba	11.2	11.2
Luhya	15.5	15.1
Luo	12.6	12.0
Others	26.8	26.2
Marital status		
Never married	30.2	47.6
Married	54.1	47.4
Living together	5.6	0.9
Formerly married	10.1	4.1
Working status		
Working	59.3	71.4
Not working	40.7	28.6

(Cont'd)

Table 1 Continued

Variable	Female (n = 7,377)	Male (n = 3,109)
Religion		
Catholic	25.2	26.4
Protestant/other Christian	66.2	60.9
Muslim	6.9	6.1
No religion/others	1.8	6.5
Household wealth (quintiles)		
Poorest	15.6	14.5
Poor	17.5	16.9
Middle	18.7	18.4
Richer	21.5	22.4
Richest	26.7	27.9
Listens to radio at least once a week		
Yes	76.9	91.0
No	23.1	9.1
Watches TV at least once a week		
Yes	29.6	41.0
No	70.4	59.0
Reads newspaper at least once a week		
Yes	23.6	46.0
No	76.4	54.0
Psychosocial characteristic		
Knowledge of AIDS[†]		
Low	34.0	25.1
Median	47.6	48.6
High	18.5	26.4
Perceived risk of getting AIDS		
No risk at all	35.4	33.8
Small risk	39.8	52.1
Moderate risk	15.4	9.8
High risk or having AIDS already	9.4	4.7
Knowing someone who has HIV or has died of AIDS		
Yes	76.4	75.7
No	23.6	24.3

(Cont'd)

Table 1 Continued

Variable	Female (n = 7,377)	Male (n = 3,109)
Community-level variable		
Proportion of individuals in the community who know someone who has HIV or died of AIDS		
Low (<0.70)	27.9	28.2
Median (0.70-0.89)	51.7	52.9
High (0.90+)	20.4	19.0
Average years of schooling in the community		
0-5	20.2	19.3
6-8	58.0	58.7
9+	21.9	22.0
Community wealth score (tertiles)		
Low	15.3	14.8
Median	54.1	53.4
High	30.6	31.9
Residence		
Urban	25.4	25.6
Rural	74.6	74.4
Province		
Nairobi	10.4	11.4
Central	15.2	15.8
Coast	7.6	7.0
Eastern	15.9	15.4
Nyanza	15.2	13.2
Rift Valley	22.1	24.5
Western	11.8	11.3
North Eastern	1.8	1.5
Distance to a major road (in km)		
First quartile: 0-0.529	23.4	23.1
Second quartile: 0.530-1.229	25.3	25.2
Third quartile: 1.230-3.259	26.9	25.9
Fourth quartile: 3.260-22.626	24.5	25.8

Note: Percentages were weighted using individual-level sampling weights. Total *Ns* were unweighted. Percentages may not add up to 100 due to rounding.

Random Intercept Model

Table 2 shows the intracommunity correlation and variances of the random intercept with no covariates and controlling for both individual- and community-level variables. The percentage of the total variance in accepting attitudes in the community that are explained by the community of one's residence (i.e., intracommunity correlation) ranged between 14.2 percent and 23.2 percent among females and between 13.8 percent and 32.0 percent for males across all outcomes. In other words, most of the variation in the three outcomes examined was explained by the individual-level characteristics. However, community-level factors also accounted for a substantial proportion of the variation explained across all outcomes.

With or without individual- and community-level variables, the highest proportion of the variance at the community-level is for accepting attitudes toward an infected household member, and the least is for accepting attitudes toward an infected female teacher. In addition, Table 2 shows that the contributions of both individual and community variables to the community-level variance for the three outcomes. For example, a comparison of the empty model with the full model indicates that community-level variance is reduced by 54 percent ([0.9916 − 0.4568]/0.9916 × 100) for females and is reduced by 11 percent ([1.5467 − 1.3778]/1.5467 × 100) for males when both individual- and community-level variables are included in the full model. Even though the unexplained community-level variances are reduced in the full models, the remaining community level variances still remain significant (Table 2).

Table 2 Accepting attitudes toward people living with HIV: individual- and community-level variances

Individual- and community-level variances for multilevel random intercept logit models predicting accepting attitudes toward people living with HIV, 2003 Kenya Demographic and Health Survey

	Accepting attitudes towards					
	An infected household member		An infected vendor		An infected female teacher	
	Female	Male	Female	Male	Female	Male
Statistics						
Intracommunity correlation (%)[†]	23.16[*]	31.98[*]	14.23[*]	15.53[*]	18.70[*]	13.80[*]
Variance of random intercept						
No individual or community characteristics	0.9916[*]	1.5467[*]	0.5458[*]	0.6048[*]	0.7569[*]	0.5266[*]
Individual and community characteristics	0.4568[*]	1.3778[*]	0.2366[*]	0.3717[*]	0.2648[*]	0.2402[*]
Explained community-level variance (%)	53.93	10.97	56.65	38.54	65.02	54.39

[*] $P < .05$.

[†]Intracommunity correlation or the intraclass correlation coefficients measures the degree of clustering and includes random intercepts only without predictors. It is calculated as $\sigma_\mu^2/[\sigma_\mu^2 + \sigma_e^2]$, where σ_μ^2 denotes community-level variance and σ_e^2 denotes individual-level variance, with this latter variance set to $\pi^2/3$ (equal to 3.29).

Individual- and Community-Level Effects

Table 3 shows the adjusted ORs and 95 percent confidence intervals of predictor variables on accepting attitudes toward PLHIV when both individual- and community-level factors are included. At the individual level, age is significant in predicting accepting attitudes toward those with HIV. There were significantly higher ORs of accepting attitudes toward PLHIV among older adults than among younger adults. The ORs of accepting attitudes toward PLHIV were significantly higher among the group with higher education and in the group with medium and high levels of AIDS knowledge for both females and males. The odds for accepting attitudes toward PLHIV for respondents who knew someone who has HIV or someone who had died of AIDS were significantly higher than for those who knew no one across all outcomes for females, but not males.

It is noteworthy that the ORs of accepting attitudes differed according to sex, with significant ORs among females. The ORs were significantly higher for those living in households with higher wealth compared with those living in the poorest households for accepting attitudes toward an infected vendor and an infected female teacher. Similarly, listening to the radio at least once a week significantly predicted accepting attitudes toward an infected vendor among females (OR = 1.20) and accepting attitudes toward infected female teachers among both females and males (OR = 1.27 and 1.68, respectively). In addition, females who read a newspaper at least once a week had significantly greater odds of accepting attitudes toward an infected household member (OR = 1.44) and infected vendor (OR= 1.23) than females who had not read a newspaper.

Turning to the community level, females and males living in a community with a high proportion of residents who knew someone with HIV or someone who had died of AIDS were more likely to have accepting attitudes toward an infected vendor and infected female teacher. The OR of accepting attitudes toward an infected household was higher for respondents living in a community with high experience of HIV/AIDS compared with those living in a community with low experience of HIV/AIDS for males but not for females. Community education and community wealth were significant in explaining accepting attitudes toward PLHIV. Those living in a community with higher levels of community education and community wealth had significantly greater odds of tolerant attitudes toward an infected vendor and an infected female

teacher than those living in communities with lower community education and community wealth, respectively, even after controlling for individual- and community-level variables. Significant differences according to gender were found in accepting attitudes toward an infected household member by community wealth, with females living in communities with higher wealth more likely to have tolerant attitudes than those living in poorer communities. However, this association is not significant for males. Residence and distance to a major road, in contrast, were not significant in predicting accepting attitudes toward PLHIV for both sexes.

Table 3 Accepting attitudes toward people living with HIV: odds ratio and 95 percent confidence intervals

Odds ratio and 95 percent confidence intervals (95% CIs) of multilevel random intercept logit models predicting accepting attitudes toward people living with HIV, 2003 Kenya Demographic and Health Survey

	Accepting attitudes toward											
	An infected household member				An infected vendor				An infected female teacher			
	Female		Male		Female		Male		Female		Male	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Individual-level variables												
Sociodemographic characteristic												
Age (in years) (ref = 15-24)												
25-34	1.31*	(1.05, 1.64)	1.16	(0.74, 1.82)	1.03	(0.88, 1.21)	1.36	(0.94, 1.96)	1.42*	(1.21, 1.66)	1.65*	(1.20, 2.29)
35+	1.58*	(1.24, 2.02)	1.03	(0.62, 1.72)	1.23*	(1.03, 1.47)	1.26	(0.83, 1.91)	1.10	(0.92, 1.30)	1.38	(0.98, 1.95)
Education (ref = Illiterate)												
Incomplete primary	0.81	(0.58, 1.13)	0.90	(0.50, 1.60)	1.43*	(1.11, 1.84)	1.07	(0.57, 2.02)	1.13	(0.86, 1.47)	1.99*	(1.22, 3.24)
Completed primary	1.04	(0.73, 1.47)	1.84	(0.99, 3.43)	2.25*	(1.71, 2.97)	2.03*	(1.02, 4.04)	1.72*	(1.31, 2.28)	4.88*	(2.90, 8.21)
Secondary and above	2.00*	(1.33, 3.01)	2.31*	(1.14, 4.71)	3.45*	(2.62, 4.54)	2.91*	(1.45, 5.88)	3.52*	(2.64, 4.70)	9.40*	(5.42,16.29)
Ethnicity (ref = Kikuyu)												
Kalenjin	1.76	(0.76, 3.96)	1.15	(0.47, 2.81)	0.74	(0.43, 1.29)	0.63	(0.22, 1.79)	0.89	(0.51, 1.56)	1.03	(0.39, 2.76)
Kamba	1.74*	(1.04, 2.91)	1.07	(0.44, 2.61)	1.00	(0.69, 1.44)	0.88	(0.34, 2.25)	0.76	(0.51, 1.12)	0.75	(0.38, 1.50)
Luhya	0.96	(0.55, 1.68)	1.28	(0.62, 2.63)	1.18	(0.81, 1.72)	0.79	(0.40, 1.56)	0.90	(0.61, 1.31)	0.77	(0.38, 1.59)
Luo	0.89	(0.53, 1.50)	0.88	(0.44, 1.77)	0.82	(0.57, 1.19)	0.91	(0.43, 1.93)	0.57*	(0.36, 0.92)	0.74	(0.38, 1.46)
Others	0.82	(0.46, 1.45)	1.14	(0.53, 2.45)	0.96	(0.69, 1.34)	0.61	(0.32, 1.17)	0.68	(0.46, 1.00)	0.62	(0.33, 1.17)
Marital status (ref = Never married)												
Married	0.86	(0.69, 1.07)	0.86	(0.51, 1.45)	0.72*	(0.61, 0.85)	0.70	(0.47, 1.04)	0.79*	(0.67, 0.93)	1.22	(0.87, 1.71)
Living together	0.63*	(0.45, 0.88)	0.49	(0.10, 2.35)	0.84	(0.64, 1.10)	0.69	(0.23, 2.08)	0.83	(0.61, 1.12)	1.15	(0.33, 4.00)
Formerly married	1.01	(0.73, 1.41)	0.79	(0.37, 1.68)	0.96	(0.74, 1.25)	0.58	(0.32, 1.07)	0.85	(0.68, 1.06)	0.71	(0.42, 1.21)
Working status (ref = Not working)												
Working	1.06	(0.89, 1.27)	1.33	(0.93, 1.91)	0.98	(0.86, 1.12)	1.19	(0.90, 1.57)	1.01	(0.88, 1.15)	0.81	(0.59, 1.11)

(Cont'd)

Table 3 Continued

	Accepting attitudes toward											
	An infected household member				An infected vendor				An infected female teacher			
	Female		Male		Female		Male		Female		Male	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Religion (ref = Catholic)												
Protestant/other Christian	0.97	(0.80, 1.18)	0.99	(0.71, 1.37)	0.99	(0.85, 1.15)	1.07	(0.83, 1.38)	1.07	(0.93, 1.23)	1.24	(0.99, 1.55)
Muslim	0.82	(0.51, 1.34)	0.80	(0.31, 2.06)	0.94	(0.69, 1.29)	0.89	(0.49, 1.62)	1.26	(0.86, 1.84)	0.91	(0.52, 1.60)
No religion/others	1.27	(0.69, 2.35)	0.83	(0.42, 1.64)	1.21	(0.77, 1.89)	1.21	(0.75, 1.95)	0.95	(0.64, 1.43)	1.29	(0.84, 1.99)
Household wealth (ref = Poorest)												
Poor	0.95	(0.73, 1.24)	0.94	(0.59, 1.51)	1.09	(0.84, 1.42)	1.37	(0.93, 2.03)	1.14	(0.91, 1.43)	1.24	(0.90, 1.73)
Middle	1.01	(0.76, 1.33)	0.98	(0.58, 1.65)	1.22	(0.93, 1.60)	1.28	(0.89, 1.82)	1.20	(0.95, 1.52)	1.46*	(1.01, 2.11)
Richer	1.01	(0.72, 1.41)	1.14	(0.66, 1.97)	1.37*	(1.02, 1.85)	1.33	(0.89, 2.00)	1.48*	(1.16, 1.90)	1.41	(0.92, 2.15)
Richest	1.12	(0.65, 1.94)	0.59	(0.26, 1.31)	1.36	(0.92, 2.03)	1.39	(0.78, 2.50)	1.23	(0.85, 1.79)	1.67	(0.97, 2.86)
Knowledge of AIDS† (ref = Low)												
Median	1.55*	(1.30, 1.85)	2.06*	(1.51, 2.81)	1.68*	(1.48, 1.90)	2.05*	(1.62, 2.61)	1.28*	(1.12, 1.48)	1.41*	(1.10, 1.81)
High	2.21*	(1.69, 2.90)	2.91*	(1.96, 4.32)	2.35*	(1.94, 2.83)	3.52*	(2.57, 4.81)	1.87*	(1.56, 2.23)	2.09*	(1.56, 2.81)
Listens to radio at least once a week (ref = No)	1.05	(0.85, 1.30)	1.25	(0.83, 1.88)	1.20*	(1.03, 1.41)	1.21	(0.85, 1.74)	1.27*	(1.05, 1.52)	1.68*	(1.17, 2.41)
Watches TV at least once a week (ref = No)	1.53	(0.92, 1.44)	0.91	(0.68, 1.22)	1.12	(0.95, 1.33)	1.09	(0.85, 1.41)	1.09	(0.92, 1.29)	0.93	(0.73, 1.18)
Reads newspaper at least once a week (ref = No)	1.44*	(1.14, 1.82)	1.18	(0.82, 1.69)	1.23*	(1.06, 1.43)	1.28	(0.99, 1.66)	1.18	(0.99, 1.42)	0.95	(0.74, 1.23)
Psychosocial characteristics												
Perceived risk of getting AIDS (ref = No risk at all)												
Small risk	1.47*	(1.21, 1.80)	1.52*	(1.03, 2.24)	1.26*	(1.10, 1.45)	1.12	(0.86, 1.46)	1.47*	(1.28, 1.68)	1.09	(0.87, 1.37)
Moderate risk	1.50*	(1.15, 1.95)	1.60	(0.69, 2.65)	1.11	(0.92, 1.35)	1.32	(0.88, 2.00)	1.32*	(1.10, 1.60)	1.19	(0.81, 1.73)
High risk or having AIDS already	1.57*	(1.14, 2.15)	1.31	(0.70, 2.48)	1.21	(0.97, 1.50)	1.76*	(1.06, 2.94)	1.14	(0.91, 1.42)	1.10	(0.73, 1.66)
Knowing someone who has HIV or has died of AIDS (ref = No)	1.33*	(1.11, 1.59)	1.16	(0.88, 1.54)	1.38*	(1.18, 1.61)	1.27	(0.99, 1.61)	1.33*	(1.16, 1.53)	1.14	(0.90, 1.45)

(Cont'd)

Table 3 Continued

	Accepting attitudes toward											
	An infected household member				An infected vendor				An infected female teacher			
	Female		Male		Female		Male		Female		Male	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Community-level variables												
Proportion of individuals in the community who know someone who has HIV or has died of AIDS (ref = Low)												
Median	1.17	(0.91, 1.50)	1.34	(0.91, 1.97)	1.48*	(1.23, 1.78)	1.57*	(1.19, 2.08)	1.31*	(1.08, 1.59)	1.42*	(1.11, 1.82)
High	1.10	(0.78, 1.55)	2.43*	(1.53, 3.84)	1.68*	(1.31, 2.15)	1.60*	(1.02, 2.51)	1.38*	(1.05, 1.80)	1.45*	(1.06, 1.97)
Average years of schooling in the Community (ref = 0-5)												
6-8	2.21*	(1.60, 3.07)	2.65*	(1.72, 4.11)	1.33*	(1.06, 1.69)	1.36*	(1.01, 1.84)	1.60*	(1.27, 2.01)	1.78*	(1.32, 2.41)
9+	2.86*	(1.89, 4.34)	3.01*	(1.72, 5.29)	2.08*	(1.54, 2.81)	3.65*	(2.39, 5.58)	3.00*	(2.19, 4.12)	3.87*	(2.57, 5.81)
Community wealth score (ref = Low)												
Median	1.44*	(1.03, 2.02)	1.58	(0.94, 2.65)	1.72*	(1.32, 2.23)	2.13*	(1.47, 3.09)	1.43*	(1.09, 1.88)	1.52*	(1.07, 2.16)
High	1.90*	(1.27, 2.84)	1.33	(0.70, 2.55)	2.65*	(1.88, 3.75)	2.45*	(1.47, 4.09)	2.91*	(1.95, 4.33)	2.10*	(1.28, 3.45)
Residence (ref = Rural)												
Urban	0.80	(0.55, 1.14)	0.60	(0.35, 1.02)	0.85	(0.63, 1.16)	0.64	(0.39, 1.06)	0.84	(0.60, 1.16)	0.69	(0.45, 1.08)
Province (ref = Nairobi)												
Central	1.53	(0.99, 2.40)	0.46*	(0.24, 0.88)	0.97	(0.70, 1.34)	0.64	(0.36, 1.16)	1.28	(0.90, 1.83)	0.65	(0.40, 1.06)
Coast	1.55	(0.94, 2.55)	1.23	(0.63, 2.39)	0.62*	(0.45, 0.85)	1.11	(0.64, 1.93)	0.81	(0.59, 1.13)	0.91	(0.56, 1.49)
Eastern	1.14	(0.71, 1.85)	0.57	(0.30, 1.10)	0.87	(0.61, 1.22)	0.54	(0.29, 1.00)	0.72	(0.52, 1.00)	0.33*	(0.21, 0.53)
Nyanza	0.90	(0.57, 1.42)	0.66	(0.35, 1.24)	1.54	(1.08, 2.18)	0.90	(0.52, 1.55)	0.93	(0.66, 1.30)	0.36*	(0.22, 0.60)
Rift Valley	1.29	(0.82, 2.01)	0.63	(0.36, 1.11)	1.15	(0.82, 1.62)	0.87	(0.52, 1.46)	0.81	(0.58, 1.14)	0.62*	(0.40, 0.98)
Western	0.82	(0.49, 1.37)	0.33*	(0.18, 0.62)	0.92	(0.64, 1.33)	0.88	(0.43, 1.79)	0.98	(0.64, 1.50)	0.61	(0.36, 1.01)
North Eastern	0.06*	(0.03, 0.11)	0.36	(0.10, 1.29)	0.21*	(0.11, 0.38)	0.35*	(0.16, 0.76)	0.21*	(0.11, 0.41)	0.18*	(0.08, 0.40)

(Cont'd)

Table 3 Continued

	Accepting attitudes toward											
	An infected household member				An infected vendor				An infected female teacher			
	Female		Male		Female		Male		Female		Male	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Distance to a major road (in kilometers) (ref = First quartile)												
Second quartile	0.93	(0.69, 1.25)	0.89	(0.60, 1.31)	1.00	(0.80, 1.24)	0.81	(0.56, 1.17)	0.98	(0.79, 1.20)	0.97	(0.72, 1.30)
Third quartile	0.83	(0.60, 1.15)	0.58*	(0.38, 0.87)	1.03	(0.81, 1.32)	0.84	(0.58, 1.24)	0.91	(0.71, 1.14)	1.17	(0.83, 1.65)
Fourth quartile	0.85	(0.61, 1.18)	0.92	(0.58, 1.44)	0.98	(0.77, 1.26)	0.80	(0.54, 1.18)	0.74*	(0.58, 0.95)	1.02	(0.72, 1.46)

*$P < .05$.

Discussion

This national sample of Kenyan adults shows that the reported levels of accepting attitudes toward PLHIV are relatively high, ranging from 60 percent of female respondents having an accepting attitude toward an infected female teacher and 89 percent of male respondents having an accepting attitude toward an infected household member. The high level of tolerant attitudes toward those with HIV might be explained by the fact that in Kenya, a substantial proportion of people know someone with HIV or someone who has died of AIDS (Ministry of Health [Kenya], 2005). Thus, being HIV infected does not seem to be a rare or deviant event in the daily experiences of the Kenyan populace. This serves to weaken their stigmatizing attitudes toward PLHIV. In addition, the supportive relationship in most African households is still substantial even though the AIDS epidemic has decimated the African family structure (Ankrah, 1993). Hence, accepting attitudes toward an infected household or community member are anticipated.

In our study, the infected female teacher was shown to be less likely to receive tolerant attitudes from the general population. This further supports the evidence that seropositive women are treated differently from men within households and communities in developing countries (Amuyunzu-Nyamongo et al., 2007; UNAIDS, 2004). In addition, due to women's subordinate status in the society, they are often stigmatized as the vectors of transmission (Muyinda et al., 1997).

The results show that accepting attitudes toward PLHIV are significantly associated with individual-level characteristics. Our findings about the effects of individual-level variables are consistent with previous studies in this area (Chen et al., 2005, 2007; Herek et al., 2002). The results show that accepting attitudes toward PLHIV are significantly associated with age, education, AIDS knowledge, perceived risk of getting infected with HIV, and knowing someone with HIV or someone who had died of AIDS, even after adjusting for other individual- and community-level variables. Studies indicate that knowing someone with HIV/AIDS (Herek and Capitanio, 1993; Herek et al., 2002) and good knowledge of AIDS (Ezedinachi et al., 2002; Herek et al., 2002) decreases intolerant attitudes. With regard to AIDS knowledge, dissemination of accurate information may be important not only for increasing AIDS-related knowledge but also for fostering acceptance of PLHIV. In addition, the present results suggest that accepting attitudes are affected by listening to the radio and reading a newspaper. However, watching TV has no significant influence across all three outcomes for both sexes. Our results on the effect of mass media on accepting attitudes toward PLHIV are inconsistent with findings from China (Chen et al., 2005).

Nevertheless, our results highlight the importance of designing HIV prevention programs to disseminate antistigma information to be media-specific.

The results of this study also suggest that accepting attitudes toward PLHIV are affected by contextual factors to a considerable extent. With regard to the effects of education, compared with individual-level education, community-level education plays a significantly stronger role in improving accepting attitudes toward PLHIV across all three accepting attitudes dimensions. The persistent link between individual- and community-level education and accepting attitudes toward PLHIV suggests that HIV prevention programs and policies aimed at promoting accepting attitudes toward PLHIV should bring more attention to the structural aspect of community improvement. In addition, accepting attitudes toward PLHIV for males are primarily affected by the intensity of community AIDS experience. However, for females, accepting attitudes toward PLHIV are affected by both individual-level and community-level experience of HIV/AIDS. Remarkably, for females, the effects of individual-level AIDS experience are much stronger than the effects of this measure at the community level. Gender differences in accepting attitudes may reflect various mechanisms through which HIV/AIDS experience could affect the formulation of stigmatizing attitudes. Because of women's social responsibilities for caring for the sick, women might be coming into contact with persons living with HIV earlier than men.

Our results on contextual factors are inconsistent with studies conducted in China (Chen et al., 2007), particularly with regard to the role of community wealth in understanding accepting attitudes toward PLHIV: Respondents living in communities with higher economic status were more likely to have accepting attitudes toward PLHIV than those living in communities with lower economic status. Given the importance of community-level variables in our study, we can argue that accepting attitudes toward those living with HIV might be learned through social influence and social learning processes (Parker and Aggleton, 2003).

Last, our findings should be interpreted within the context of the study's limitations. In addition to the common limitations associated with self-reported measures of attitudes, the association of individual- and community-level factors with accepting attitudes toward PLHIV might be influenced by concerns on endogeneity problems. Given the cross-sectional nature of the data, we cannot disentangle or establish directionality (cause versus effect) from the results. However, our analyses do show convincing associations between selected individual and community variables and accepting attitudes toward those with HIV. Our analyses are based on sets of simple multilevel logit models with random intercept and

fixed coefficients only. Hence, our findings cannot provide evidence of the effects of individual factors variance across communities. However, by using a multilevel analytical approach, our study provides important insights and identifies the multidimensional aspect and multilevel determinants of accepting attitudes toward PLHIV in a country with a serious HIV/AIDS epidemic in sub-Saharan Africa. Future research is needed to gain a better understanding of these accepting attitudes toward PLHIV in a broader relationship context, which will benefit policy makers in developing more effective HIV prevention programs and interventions.

Our description of individual- and community-level factors in this sample of females and males clearly demonstrates the importance of both personal and contextual factors in influencing accepting attitudes toward PLHIV. The analyses disentangle barriers and facilitators at different levels, thus providing a guide to the design of more appropriate interventions.

References

Alubo, O., A. Swandor, T. Joyayemi, and E. Omudu. 2002. Acceptance and stigmatizing of PLWA in Nigeria. AIDS Care 14: 117-126.

Amuyunzu-Nyamongo, M., L. Okeng'O, A. Wagura, and E. Mwenzwa. 2007. Putting on a brave face: The experiences of women living with HIV and AIDS in informal settlements of Nairobi, Kenya. AIDS Care 19(suppl. 1): S25-S43.

Ankrah, M.E. 1993. The impact of HIV/AIDS on the family and other significant relationships, the African clan revisited. AIDS Care 5: 5–22.

Baleta, A. 1999. South Africa faces an AIDS crisis as government health campaign fail. The Lancet 353(9153): 653.

Benefo, K.D. 2006. The community-level effects of women's education on reproductive behavior in rural Ghana. Demographic Research 14(20): 485-508.

Brooks, R.A., M.A. Etzel, E. Hinojos, C.H. Henry, and M. Perez. 2005. Preventing HIV among Latino and African American gay and bisexual men in a context of HIV related stigma, discrimination, and homophobia: Perspectives of providers. AIDS Patient Care STDS, 19(11): 737-744.

Cameron, E. 2000. The deafening silence of AIDS. Health and Human Rights 5: 7-24.

Central Bureau of Statistics [Kenya], Ministry of Health, and ORC Macro. 2004. Kenya Demographic and Health Survey 2003. Calverton, Maryland: Central Bureau of Statistics [Kenya], Ministry of Health, and ORC Macro.

Chen J., M.K. Choe, S. Chen, and S. Zhang. 2005. Community environment and HIV/AIDS-related stigma in China. AIDS Education and Prevention 17(1): 1-11.

Chen J., M.K. Choe, S. Chen, and S. Zhang. 2007. The effects of individual- and community-level knowledge, beliefs, and fear on stigmatization of people living with HIV/AIDS in China. AIDS Care 19(5): 666-673.

Chesney, M.A., and A.W. Smith. 1999. Critical delays in HIV testing and care: The potential role of stigma. American Behavioral Scientist 42: 1162-1174.

Chliaoutakis, J., and D.J. Trakas. 1996. Stigmatization, discrimination and fear of AIDS in Greece: Implications for health policy. Ethnicity and Health 1: 359-371.

Diez-Roux, A.V. 1998. Bringing context back into epidemiology: Variables and fallacies in multilevel analysis. American Journal of Public Health 88: 216-222.

Goldstein, H. 1999. Multilevel statistical models. London: Edward, Arnold.

Ezedinachi, E.N.E., M.W. Ross, M. Meremiku, E.J. Essienb, C.B. Edema, E. Ekurea, and O. Ita. 2002. The impact of an intervention to change workers' HIV/AIDS attitudes and knowledge in Nigeria: A controlled trial. Public Health 116(2): 106-112.

Hamra, M., M.W. Ross, M. Orrs, and A. D'Agostino. 2006. Relationship between expressed HIV/AIDS-related stigma and HIV-beliefs/knowledge and behavior in families of HIV infected children in Kenya. Tropical Medicine and International Health 11(4): 513-527.

Hamra, M., M.W. Ross, K. Karuri, M. Orrs, and A. D'Agostino. 2005. Relationship between expressed HIV/AIDS-related stigma and beliefs and knowledge about care and support of people living with AIDS in families caring for HIV-infected children in Kenya. AIDS Care 17(7):911-922.

Herek, G.M., J.P. Capitanio, and K.F. Widaman. 2002. HIV-related stigma and knowledge in the United States: Prevalence and trends, 1991-1999. American Journal Public Health 92(3): 371-377.

Herek, G.M., and J.P. Capitanio. 1993. Public reactions to AIDS in the United States: A second decade of stigma. American Journal of Public Health 83: 574-577.

Kohler, H.P., J.R. Behrman, and S.C. Watkins. 2001. The density of social network and fertility decisions: Evidence from South Nyanza District, Kenya. Demography 38: 43-58.

Kravdal, O. 2002. Education and fertility in sub-Saharan Africa: Individual and community effects. Demography 39(2): 233-250.

Lau, J.T.F., and H.Y. Tsui. 2003. Surveillance of HIV/AIDS-related attitudes and perceptions among the general public in Hong Kong from 1994 to 2000. AIDS Education and Prevention 14: 419-431.

Lau, J.T.F., and H.Y. Tsui. 2007. Comparing the magnitude of discriminatory attitudes toward people living with HIV/AIDS and toward people with mental illness in the Hong Kong general population. Health Education Research 22(1): 139-152.

Lau, J.T.F., H.Y. Tsui, and K. Chan, 2005. Reducing discriminatory attitudes toward people living with HIV/AIDS (PLWHA) in Hong Kong: An intervention study using an integrated knowledge-based PLWHA participation and cognitive approach. AIDS Care 17(1): 85-101.

Lentine, D.A., J.D. Hersey, V.G. Iannacchione, G.H. Laird, K. McClamroch, and L. Thalji. 2000. HIV-related knowledge and stigma-United States. 2000. MMWR. Morbidity and Mortality Weekly Report 49: 1062-1064.

Lew-Ting, C., and M.L. Hsu. 2002. Pattern of responses to HIV transmission questions: Rethinking HIV knowledge and its relevance for AIDS prejudice. AIDS Care 14: 549-557.

Macintyre, K., L. Brown, and S. Sosler. 2001. "It's not what you know, but who you knew": Examining the relationship between behavior change and AIDS mortality in Africa. AIDS Education and Prevention 13(2): 160-174.

Merlo, J., B. Chaix, M. Yang, J. Lynch, and L. Råstam. 2005. A brief conceptual tutorial of multilevel analysis in social epidemiology: Linking the statistical concept of clustering to the idea of contextual phenomenon. Journal of Epidemiology and Community Health 59: 443-449.

Ministry of Health [Kenya]. 2005. Behavioral Surveillance Survey 2002: Summary report, HIV/AIDS and sexually transmitted infections in Kenya. Nairobi: National AIDS/STI Control Program, Ministry of Health.

Montgomery, M.R., and J.B. Casterline. 1996. Social learning and social influence and new models of fertility. Population and Development Review 22(suppl.): 151-175.

Muyinda, H., J. Seeley, H. Pickering, and T. Barton. 1997. Social aspects of AIDS-related stigma in rural Uganda. Health and Place 3(3): 143-147.

Nyblade, L., R. Pande, S. Mathur, K. MacQuarrie, R. Kidd, V. Bond, A. Kidanu, H. Banteyerga, G. Kilonzo, and J. Mbwambo. 2003. Disentangling HIV and AIDS stigma in Ethiopia, Tanzania and Zambia. Washington, D.C.: International Center for Research on Women.

Nyblade, L., J. Mbwambo, A. Schneider, V. Bond, A. Kidanu, H. Banteyerga, and I. Kayawe. 2002. Addressing HIV-related stigma and resulting discrimination in Africa: A three-country study of Ethiopia, Tanzania and Zambia. Washington, D.C.: International Center for Research on Women.

Ogden, J., and L. Nyblade. 2005. Common at its core: HIV-related stigma across contexts. Washington, D.C.: ICRW and CHANGE.

Pallikadavath, S., C. Sreedharan, and R.W. Stones. 2006. Sources of AIDS awareness among women in India. AIDS Care 18(1): 44-48.

Parker, R., and P. Aggleton. 2003. HIV and AIDS-related stigma and discrimination: A conceptual framework and implications for action. Social Science and Medicine 57(1): 13-24.

Peretti-Watel, P., B. Spire, Y. Obadia, J.-P. Moatti, and the VESPA Group. 2007. Discrimination against HIV-Infected People and the Spread of HIV: Some evidence from France. PLoS ONE, 2(5): e411.

Rankin, W.W., S. Brennan, E. Schell, J. Laviwa, and S.H. Rankin. 2005. The stigma of being HIV-positive in Africa. PLoS Med 2(8): e247.

Raudenbush, S.W., A.S. Bryk. 2002. Hierarchical linear models: applications and data analysis methods. Thousand Oaks, California: Sage Publications.

Raudenbush, S.W., A. Bryk, Y.F. Cheong, and R. Congdon, 2004. Hierarchical linear and nonlinear modeling. Chicago: Scientific Software International.

Sepulveda, D., V. Habiyambere, J. Amandua, M. Borok, E. Kikule, B. Mudanga, T. Ngoma, and B. Solomon. 2003. Quality care at the end of life in Africa. British Medical Journal 327: 209-212.

Snijders, T.A.B., and R.J. Bosker. 1999. Multilevel analysis—an introduction to basic and advanced multilevel modeling. Thousand Oaks, California: Sage Publications.

StataCorp. 2005. Stata statistical software: Release 9.0. College Station, Texas: Stata Corporation.

Takai, A., S. Wondkhomthong, A. Akabayashi, I. Kai, G. Ohiu, and K. Naka. 1998. Correlation between history of contact with people living with HIV/AIDS (PWAs) and tolerant attitudes towards HIV/AIDS and PWAs in Thailand. International Journal of STD and AIDS 9: 482-484.

UNAIDS. 2002. World AIDS campaign 2002-2003. A conceptual framework and basic for action: HIV/AIDS stigma and discrimination. Geneva: UNAIDS.

UNAIDS. 2004. Report on the global AIDS epidemic. 4th Global Report. Geneva: UNAIDS.

UNAIDS. 2006. Stigma and discrimination. Geneva: UNAIDS. Available from http://www.unaids/en/issues/prevention_treatment/stigma.asp.

van Dyk, A. 2001. HIV/AIDS care and counseling: a multidisciplinary approach. Cape Town, South Africa: Pearson Education (Second Edition).

VanLandingham, M., W. Im-em, and C. Saengtienchai. 2005. Community reactions to persons with HIV/AIDS and their parents in Thailand. Research Report 05-577. Population Studies Center, University of Michigan, Institute for Social Research.

Warwick, I., S. Bharat, R. Castro, R. Garcia, M. Leshabari, A. Singhanetra-Renard, and P. Aggleton. 1998. Household and community responses to AIDS in developing countries. Critical Public Health 8(4): 291-310.

World Health Organization. 2005. EMRO world AIDS campaign 2005. Geneva: World Health Organization. Available from http://www.emro.who.int/asd/events-wac-2005-challenges.htm#section5.