Social Capital and Women's Reduced Vulnerability to HIV Infection in Rural Zimbabwe

Gregson, Simon; Mushati, Phyllis; Grusin, Harry; Nhamo, Mercy; Schumacher, Christina; Skovdal, Morten; Nyamukapa, Constance; Campbell, Catherine

Social Capital and Women's Reduced Vulnerability to HIV Infection in Rural Zimbabwe

SIMON GREGSON

PHYLLIS MUSHATI

HARRY GRUSIN

MERCY NHAMO

CHRISTINA SCHUMACHER

MORTEN SKOVDAL

CONSTANCE NYAMUKAPA

CATHERINE CAMPBELL

SOCIAL CAPITAL refers to the community cohesion that results from positive aspects of community life, particularly from high levels of civic engagement as reflected in membership in local voluntary associations (Putnam 2000). Increasing evidence suggests that social capital is an important determinant of health in many contexts (Kim et al. 2008) and that certain forms of community group membership might predispose people to make more effective use of HIV/AIDS prevention, care, and treatment services.

The high level of interest in social capital in the HIV/AIDS field follows from a growing consensus that the disappointing outcomes of many traditional biomedically and behaviorally oriented programs may have been due in part to their failure to involve local community groups and resources, or to respond to the perceived needs and interests of their target communities (Hawe and Shiell 2000). In order to respond more clearly to such needs, these programs must be supplemented by efforts to create "health-enabling community contexts"—social settings that increase the likelihood that people will make optimal use of prevention, care, and treatment services (Campbell, Nair, and Maimane 2007; Campbell et al. 2009). Enhancing people's opportunities for social participation in local community groups and networks is increasingly being advanced as a potential strategy for such community-

strengthening programs in some contexts (Folland 2007; Eriksson et al. 2010). However, participation in community groups is not always beneficial to health, and several limitations have been noted (Veenstra 2000; Ziersch and Baum 2004).

In the HIV/AIDS field, social capital has been found to have protective effects on a number of factors associated with risk of infection, including other sexually transmitted infections (Holtgrave and Crosby 2003), sexual behavior (Crosby et al. 2003), condom use (Albarracin et al. 2004), use of alcohol (Campbell, Williams, and Gilgen 2002), and intimate-partner violence (Pronyk et al. 2008b). Social capital has also been found to mediate people's access to AIDS-related health services and antiretroviral treatment (Binag-waho and Ratnayake 2009; Ware et al. 2009), and to influence the extent to which people perpetuate or internalize stigma associated with AIDS (Chiu et al. 2008).

A few studies have directly explored the influence of social capital on HIV acquisition (Campbell, Williams, and Gilgen 2002; Gregson et al. 2004b; Pronyk et al. 2008b). While these studies have found potentially protective effects of community group membership, their cross-sectional designs and focus on associations with prevalent (current) rather than incident (new) HIV infection status leave open the possibility that these findings may not be causal but, for example, may result from selective participation in community groups by "health-conscious" individuals (Dutta-Bergman 2004). A further limitation of the literature on the relationship between community group membership and HIV infection is that, while social capital is often regarded as being a property of communities, studies have focused exclusively on the relationship at the individual level.

In this article, we investigate the effect of community group membership on HIV incidence among women and men at both the population level and the individual level. We use prospective data from a population-based cohort study in communities in eastern Zimbabwe that have been subject to one of the largest generalized AIDS epidemics in sub-Saharan Africa. We describe recent patterns of group membership within these communities and find that membership levels tend to be higher among women than among men and have fluctuated somewhat over a period of political and socioeconomic instability. We show that communities with greater social capital tend to have lower levels of HIV incidence and less risky behavior patterns among women, although this is explained, to some extent, by these communities' older age structures and less developed and more remote locations. At the individual level, we find that women who have participated in a wide range of different community groups have lower HIV incidence rates and are more likely to have adopted protective sexual behavior than women with no prior participation in these groups. Men who participated in community groups also reported adopting safer behavior, but this did not result in lower HIV

incidence. We explore whether group membership could have facilitated the successful adoption of protective behaviors through knowledge diffusion or by increasing self-efficacy in these communities, and we identify some of the characteristics of groups that may influence their social capital value in supporting the adoption of low-risk behaviors.

Community groups and reduced vulnerability to HIV infection: Theoretical perspectives

Social capital research varyingly emphasizes its "network" dimension (high levels of participation in local community groups) (Foley and Edwards 1999) and its "norm" dimension (particularly levels of trust among community members) (Binagwaho and Ratnayake 2009). Putnam (2000) argues that the network concept of associational membership is a more powerful marker of social capital than the norm dimensions of trust and reciprocity. Furthermore, in our original research in Zimbabwe (Gregson et al. 2004b), we found no relationship between measures of trust and reciprocal help and support, the two norm measures most frequently used in social capital research. Against this background, we define social capital in terms of people's participation in local community groups (Campbell, Williams, and Gilgen 2002; Gregson et al. 2004b).

Community groups are seen as facilitating psychosocial determinants of healthy behaviors, first, because they provide networks for the diffusion of health-related information (knowledge diffusion) and, second, because the solidarity that arises from membership in a positively valued social group leads to higher levels of confidence in one's ability to take control of one's health (health-related agency or perceived self-efficacy—Bandura 1977; Wallerstein 1992).

Nevertheless, the influence of social capital on health is varied, and studies have sometimes yielded apparently conflicting results. Social capital has been found to have both negative and positive effects on health (Portes and Landolt 1996), and the social capital value of a given community group may lie on a continuum that ranges from the positive to the negative (Astone et al. 1999). Previously, we have suggested that this might be because the social capital value of community groups varies in the effect it has on health outcomes according to individual member and group characteristics (Gregson et al. 2004b).

At the individual level, the effect of group membership varies by sex (Norris and Inglehart 2006; Pronyk et al. 2008b), ethnicity (Nhamo, Campbell, and Gregson 2010), and educational attainment (Gregson et al. 2004b). At the level of community groups, it is believed that intra-group, inter-group, and beyond-group characteristics all can be important. Community groups can offer "social spaces" for informal discussion in which respected and trusted

peers are able to "translate" unfamiliar biomedical information into locally ap-
propriate language and terminology that makes sense to group members, and
to debate any reservations members might have about the value of the knowl-
edge (renegotiation of peer norms). Such discussion provides opportunities
for peer group members to formulate health-enhancing action plans that are
realistic in light of locally mediated social, economic, and cultural constraints
on behavior. Community groups may be more likely to effect improvements
in health and health care when they create contexts for the development of
comradeship and solidarity that boosts members' confidence, social skills,
and perceived self-efficacy (Putnam 2000; Saegart, Thompson, and Warren
2001; Campbell and MacPhail 2002; Wouters, Meulemans, and Van Rensburg
2009). At the same time, groups with diversity in their membership could
increase the likelihood of program success by putting members in touch
with more powerful social groups that can provide support and assistance
(Campbell and Mzaidume 2001; Skovdal et al. 2010). Other intra-group char-
acteristics that could be influential in determining the social capital value of a
particular community group include whether the group functions effectively,
the frequency and timing of meetings, whether the group has a horizontal or
a hierarchical structure (Collier 1998), whether meetings are cooperative or
conflictual, the formality of meeting structures, whether meeting agendas are
open or narrowly focused, meeting settings, alcohol consumption at meetings,
and whether the group has external sponsorship (Gregson et al. 2004b). Inter-
and beyond-group ties through overlapping memberships, interactions with
similar and different groups (Putnam 1993; Woolcock 2001), and provision
of assistance for non-members also may be important.

The Manicaland study: Data and methods

Our study was carried out in Manicaland, Zimbabwe's eastern province, be-
tween 1998 and 2005. This was a period of considerable political and socio-
economic instability in Zimbabwe, with the emergence of the Movement for
Democratic Change opposition party in 1999, the defeat of a proposed new
constitution in a national referendum in 2000, closely fought parliamentary
(2000 and 2005) and presidential (2002) elections, and a turbulent land
redistribution program (starting in 2000). In the wake of these and other
developments (e.g., Zimbabwe's involvement in the war in the Democratic
Republic of the Congo in 1998 and the imposition of targeted sanctions in
2002), the economy experienced a rapid decline in the early 2000s, with aver-
age real earnings dropping by more than 80 percent between 2001 and 2004
(International Monetary Fund 2008). Extensive internal and international
migration also occurred throughout this period.

   The Manicaland study was conducted in 12 locations comprising two
small towns, two tea and coffee estates, two forestry plantations, two roadside
trading settlements, and four subsistence farming areas. Most of the locations

were not directly affected by the land redistribution process, which was focused on privately owned commercial farms. However, the economic decline had a major impact through reductions in earnings and erosion of savings, while the highly charged political environment influenced the extent of social interactions and modified their nature.

We use prospective data from the Manicaland study to measure and evaluate statistical associations between community group membership and risk of acquiring HIV infection at the population and individual levels. The detailed procedures followed in the study have been published previously (Gregson et al. 2006). In brief, a baseline enumeration of all households in each location was carried out in one site at a time between July 1998 and February 2000. A random sample of women aged 15–44 years and men aged 17–54 resident within these households was recruited into a longitudinal general-population open-cohort survey, interviewed on such topics as socio-demographic characteristics, membership in community groups, and sexual behavior, and tested for HIV infection. First and second follow-up enumerations and surveys were conducted three years (July 2001–February 2003) and five years (July 2003–August 2005) after the baseline survey in each location. All respondents at baseline and individuals who had previously been too young to participate but who now met the age criteria were considered eligible at each round of follow-up.

Following these procedures, 80 percent of eligible women and 78 percent of eligible men participated at baseline, 77 percent and 80 percent participated at first follow-up, and 87 percent and 79 percent participated at second follow-up. Sixty-six percent of women and 54 percent of men interviewed at baseline and not known to have died in the interim were re-interviewed at first follow-up. The equivalent figures between the first and second follow-up surveys were 66 percent and 58 percent. Out-migration was the principal reason for loss to follow-up.

Here we use data primarily from the first two rounds of the Manicaland study since these span the period (1998–2003) of widespread reductions in rates of sexual partner acquisition and the beginnings of an extended decline in HIV prevalence in Zimbabwe (Gregson et al. 2010; Zimbabwe Ministry of Health and Child Welfare 2010). In an earlier analysis of cross-sectional data for young women, we found that membership in community groups self-reported as functioning well was protective against HIV infection, while membership in groups reported as functioning poorly was associated with increased risk of infection (Gregson et al. 2004b). Therefore, we treated study participants as being members of community groups if they reported membership in at least one group that they regarded as functioning effectively. Community groups identified specifically as "church groups" were not included since membership is very high (72 percent of women and 48 percent of men at baseline), and their social capital value in supporting safer sexual behaviors would have been difficult to distinguish from the effects of

religious teaching. We examined the effects of community group member-
ship on two main outcome indicators—incident HIV infection and adoption
of safer behavior during the three-year inter-survey period—and (in the
individual-level analysis) on two possible intermediate variables—increased
knowledge about HIV/AIDS and increased self-efficacy measured over the
same period. Respondents were considered to have adopted safer behavior
if they reported having been sexually active at baseline and reported fewer
new sexual partners or no new partners in the last year at follow-up. Data
on sexual behavior were collected using the Informal Confidential Voting
Interview method to reduce under-reporting of socially proscribed behaviors
(Gregson et al. 2004a). In each round of the survey, knowledge about HIV/
AIDS was measured using an index constructed from responses to questions
about modes of transmission, protective measures, and symptoms (Gregson
et al. 1998). The median index scores for knowledge at baseline were 59
percent for women and 61 percent for men. Self-efficacy was measured us-
ing responses to the question: "Do you think there are things you can do to
avoid becoming infected with HIV?" The extent to which community groups
provided social spaces for discussion of HIV/AIDS was measured at follow-
up only, using responses to a question on whether the group in which the
participant spent most time discussed HIV prevention as part of their formal
agenda and/or in informal discussions.

For the population-level analysis of the effects of community group
membership, the original 12 study locations were subdivided into clusters
based on villages (in rural areas and roadside settlements), residential com-
pounds (estates), and suburbs (small towns). Where a cluster had fewer than
ten individuals who qualified for a particular analysis (i.e., on the basis of sex,
age, and being uninfected at baseline), it was excluded from that analysis.
In measuring the individual-level effects of community group membership
over the inter-survey period, we compared outcomes, among previously un-
infected women and men, between those who were members of community
groups at baseline and those who were not. Thus, individuals who ceased to
be members of groups during the study period were included, while those
who joined groups during this period were excluded.

Population-level effects of community group membership

Social capital is conceived of most commonly as a property of communities.
Therefore its effects should, wherever possible, be investigated at the popula-
tion level. Before exploring the association between group membership and
HIV risk in the Manicaland study, we briefly describe the levels of commu-
nity group membership over time across the different socioeconomic strata
represented in these data.

Trends in community group membership

Group membership fluctuated during Zimbabwe's recent history (Figure 1), dropping from 43 percent (women) and 28 percent (men) in the late 1990s to 33 percent and 21 percent, respectively, in the early 2000s before recovering to 37 percent and 23 percent in the mid-2000s. Underlying these trends was considerable turnover of group membership. One-third (34 percent) of the women who had reported membership in a group they regarded as functioning well in the first round of the survey had ceased to be a member of any group three years later at round two, and a further 5 percent reported that the group or groups they belonged to previously were no longer functioning well. The equivalent percentages for men were even higher—61 percent and 11 percent.

In the late 1990s, the most popular groups for women were burial societies (community insurance schemes for funeral expenses) (22 percent), rotating credit societies (savings clubs for income-generating projects) (18 percent), and women's groups (sewing and other income-generating activities) (10 percent). Sports clubs (12 percent) were the most popular type of group for men. Contrasting increases or decreases in membership levels were seen for different types of groups between the late 1990s and the mid-2000s, probably reflecting the effects of high AIDS mortality and rapidly rising inflation. Burial societies (women: from 22 percent to 21 percent; men: 6 percent to 8 percent), AIDS groups (women: 2 percent to 5 percent; men: 1 percent to 2 percent), and political groups (women: 3 percent to 7 percent; men: 2 percent to 7 percent) experienced stable or consistently rising membership over time, while rotating credit societies (women: 18 percent to 10 percent; men: 10 percent to 4 percent) and women's groups (10 percent to 6 percent) saw reductions in participation.

### Population-level analysis

In our study sites in Zimbabwe, 88 out of 222 clusters had ten or more uninfected women at baseline. Figure 2 shows that those clusters with greater proportions of women reporting membership in community groups at baseline had fewer new HIV infections over the following three years (ordinary least squares regression coefficient –.090, p<.001). This effect was reduced after adjustment for differences in the proportions of younger and older women in the clusters (coeff. –.060, p=.03) and reduced further after additional adjustment for socioeconomic strata (town, estate, roadside, and village) and level of education (coeff. –.051, p=.1). For men, there were 47 clusters with ten or more uninfected individuals at baseline, and no evidence was found for lower HIV incidence in clusters with greater proportions of men participating in community groups (unadjusted coeff. +.043, p=.3).

FIGURE 1   Community group membership among women and men in 12 study sites, by location, in three successive survey rounds, Manicaland, Zimbabwe, 1998–2005
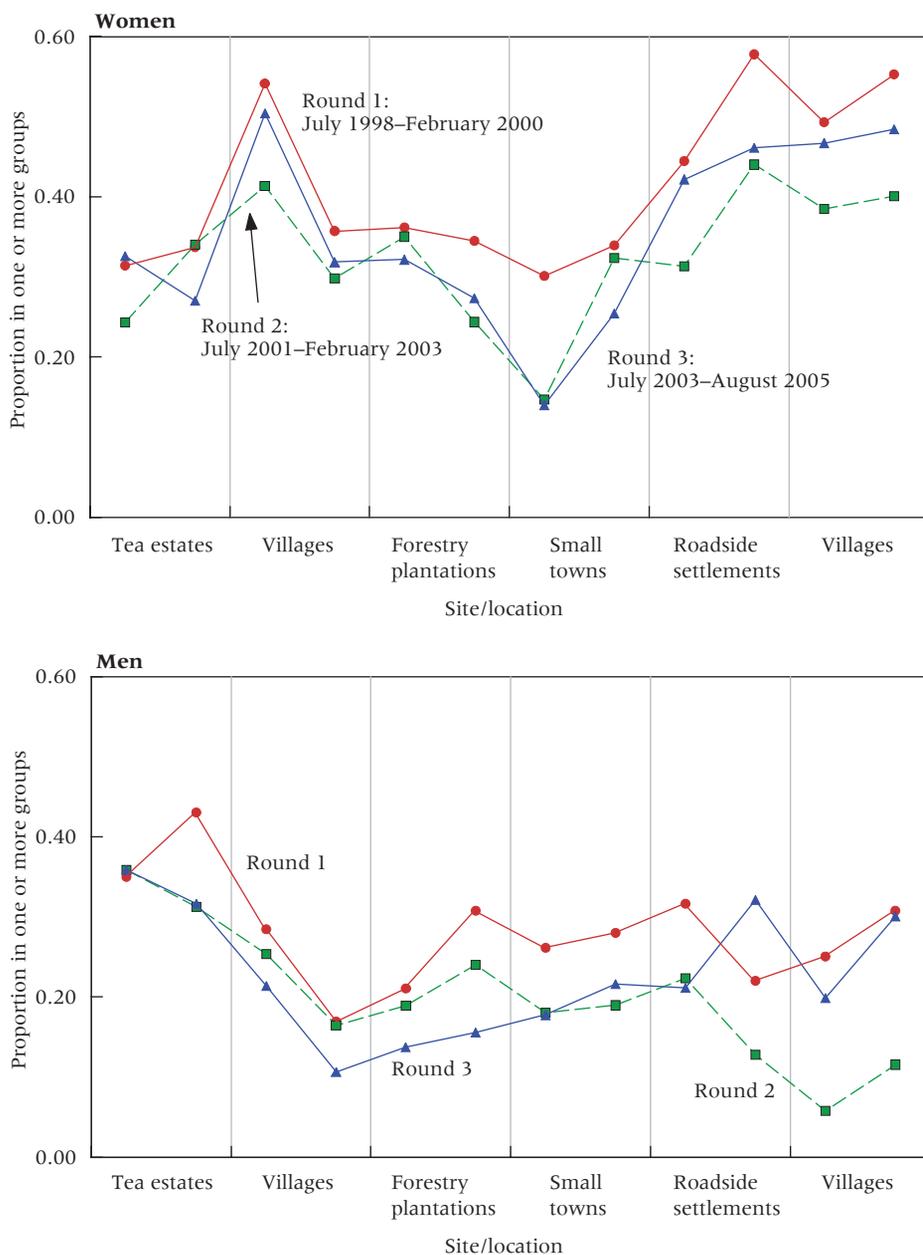
NOTE: The 12 sites covered by the Manicaland study are enumerated in a fixed sequence in each round of the survey starting with the two tea estates, followed by two sites each comprising farming villages, forestry plantations, small towns, roadside trading settlements, and other farming villages. Women aged 15–44 years, men aged 17–44 years.

FIGURE 2   Population-level effect of participation in community groups on HIV incidence for women, Manicaland, Zimbabwe, 1998–2003
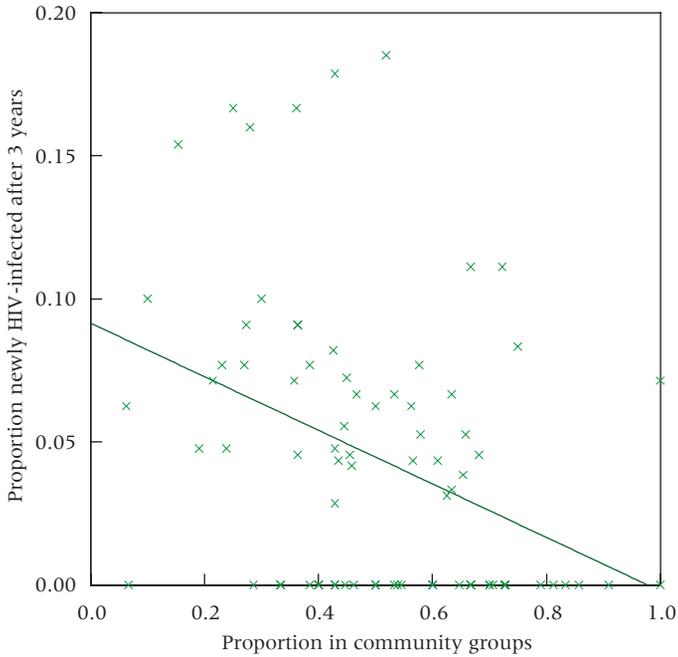

Clusters with greater female membership in community groups also had higher proportions of women reporting adoption of lower-risk sexual behavior (Figure 3)(coeff. +.131, p=.011, N=70). Once again, however, the effect was reduced after adjustment for differences in the proportions of younger and older women in the clusters and for socioeconomic strata and level of education (coeff. +.066, p=.13). Clusters with greater male membership in community groups and clusters with lower levels of male participation had similar proportions of men reporting adoption of safer behavior (coeff. + .067, p=.6, N=37).

Individual-level effects of community group membership

The association between membership in community groups and HIV risk at the individual level could be confounded by other factors related both to participation in groups and to HIV risk. Therefore, we begin by identifying the characteristics of women and men who participated in community groups in our study areas.

FIGURE 3 Population-level effect of participation in community groups on adoption of lower-risk sexual behavior for women, Manicaland, Zimbabwe, 1998–2003
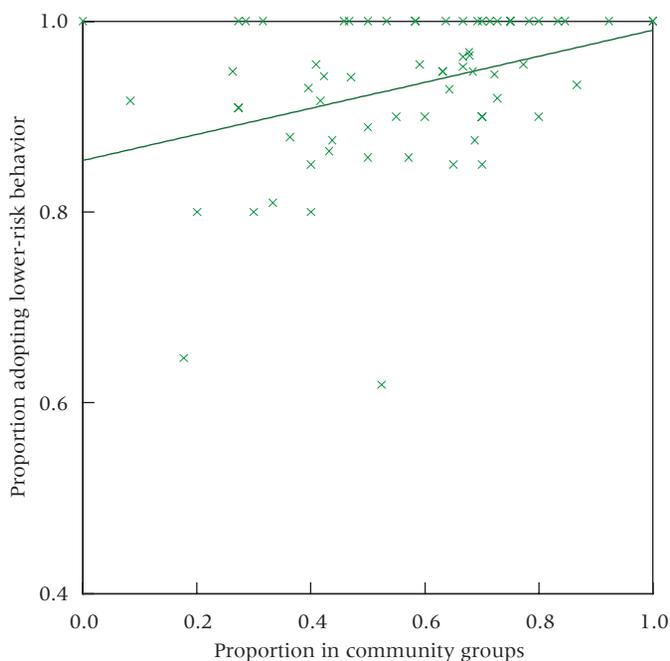
NOTE: Adoption of lower-risk sexual behavior is defined as decreasing or maintaining low-risk behavior where "decreased risk" = reducing number of new sexual partners in the past year and "low risk" = no new partners in the past year.

Characteristics of group members

The data in Table 1 show that, within our cohorts of previously uninfected women and men, older, better-educated, and married individuals and those from the poorest households were more likely to report membership in community groups. Men living on commercial farms and men in employment were more likely to participate in community groups than those living in villages and those without jobs in the formal sector, while the opposite was true for women in both cases. Women who belonged to a Christian church were also more likely to be members of community groups.

Individual-level effects of community group membership

The incidence rate of new HIV infections between 1998 and 2003 was lower among women who were members of community groups (0.97 percent) than

TABLE 1 Baseline characteristics of HIV-uninfected women and men, followed up after three years, by baseline membership in community groups, Manicaland, Zimbabwe, 1998–2000

Socio-demographic characteristic	Women Group members	Non–group members	Test for difference aOR (95% CI)	Men Group members	Non–group members	Test for difference aOR (95% CI)
All individuals	0.51	0.49	—	0.31	0.69	—
Age						
Under 25 years	0.29	0.71	1	0.29	0.71	1
25–39 years	0.59	0.41	3.5 (2.9–4.3)	0.32	0.68	1.1 (0.9–1.4)
40 years and above	0.75	0.25	7.1 (5.5–9.2)	0.37	0.63	1.4 (1.0–1.9)
Residence						
Village	0.55	0.45	1	0.25	0.75	1
Roadside settlement	0.60	0.40	1.2 (0.9–1.5)	0.31	0.69	1.4 (1.0–2.0)
Commercial farming estate	0.39	0.61	0.5 (0.4–0.7)	0.38	0.63	1.8 (1.4–2.3)
Town	0.42	0.58	0.7 (0.5–0.9)	0.28	0.72	1.1 (0.8–1.6)
Marital status						
Single	0.28	0.72	1	0.28	0.72	1
Married	0.59	0.41	1.4 (1.1–1.9)	0.36	0.64	1.5 (1.1–2.0)
Divorced/separated	0.35	0.65	0.6 (0.4–0.9)	0.23	0.77	0.8 (0.4–1.7)
Widowed	0.62	0.38	1.0 (0.6–1.7)	0.29	0.71	0.6 (0.1–6.1)
Education						
Primary or less	0.57	0.43	1	0.30	0.70	1
Secondary or more	0.45	0.55	1.2 (1.0–1.5)	0.32	0.68	1.3 (1.0–1.6)
Socioeconomic status						
Poorest tercile	0.53	0.47	1	0.34	0.66	1
Middle tercile	0.54	0.46	0.9 (0.8–1.2)	0.30	0.71	0.8 (0.6–1.1)
Wealthiest tercile	0.45	0.55	0.6 (0.5–0.8)	0.29	0.71	0.8 (0.6–1.0)
Employment						
Unemployed	0.51	0.49	1	0.27	0.73	1
Employed	0.43	0.57	0.6 (0.5–0.9)	0.37	0.63	1.6 (1.3–1.9)
Religion						
None	0.28	0.72	1	0.25	0.75	1
Traditional	0.31	0.69	1.1 (0.5–2.4)	0.36	0.64	1.6 (1.1–2.5)
Christian	0.52	0.48	3.0 (1.8–4.9)	0.31	0.69	1.3 (0.9–2.0)
N			2,374			1,673

NOTE: aOR = age-adjusted odds ratio for membership in at least one well-functioning community group. CI = confidence interval.
SOURCE; Manicaland study, baseline survey.

among women who were not members (2.19 percent) (Table A1). This difference continued to be statistically significant after controlling for age, previous risk behavior, location of residence, marital status, religion, education, socio-

FIGURE 4   Individual-level effect of participation in community groups on HIV incidence: age-adjusted incidence rate ratio (aIRR) and 95 percent confidence interval for HIV infection for women in community groups at baseline compared to those not in a group, by type of group, Manicaland, Zimbabwe, 1998–2003
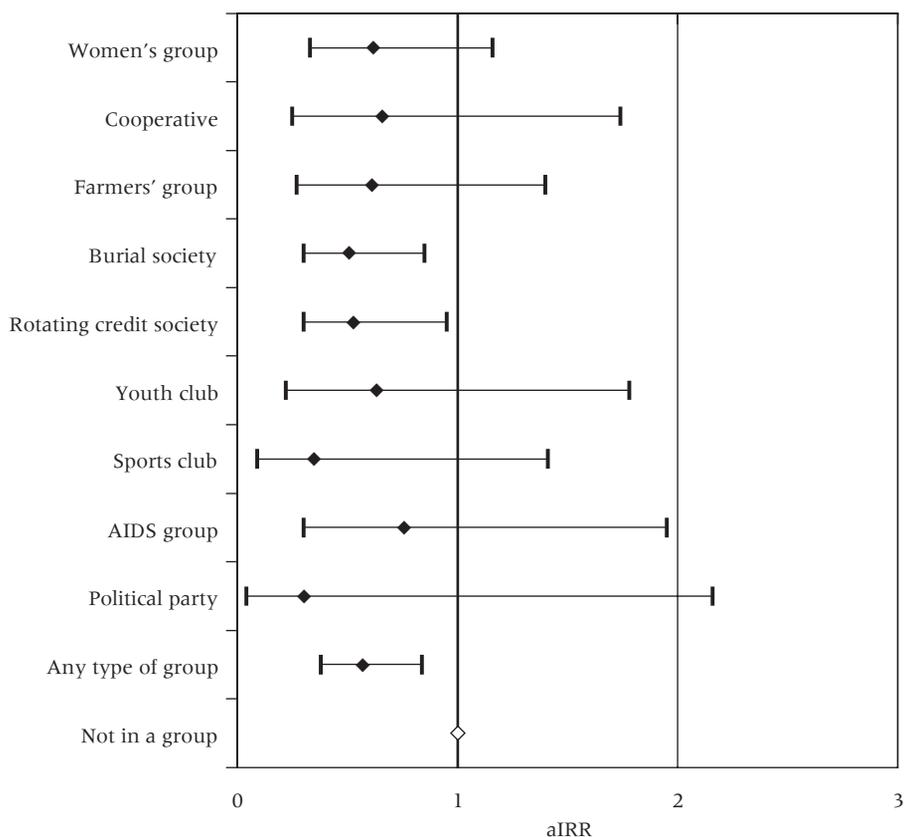
economic status, and employment. Furthermore, the same trend was seen over a wide range of different groups (Figure 4). Among men, incidence of new HIV infections was higher among members of community groups (2.60 percent versus 1.71 percent), but this difference ceased to be statistically significant after controlling for age (p=.1). The pattern of association between community group membership and HIV incidence varied among different types of groups, with no significant effects being seen.

Adoption of less risky sexual behavior was also more common among women who were members of community groups at baseline (Table A2). Among sexually active women belonging to community groups, 96 percent had either remained with a single partner or had reduced their number of sexual partners in the last year compared to 90 percent of sexually active

FIGURE 5 Individual-level effect of participation in community groups on adoption of lower-risk sexual behavior: age-adjusted odds ratio (aOR) and 95 percent confidence interval for behavior change for women in community groups at baseline compared to those not in a group, by type of group, Manicaland, Zimbabwe, 1998–2003
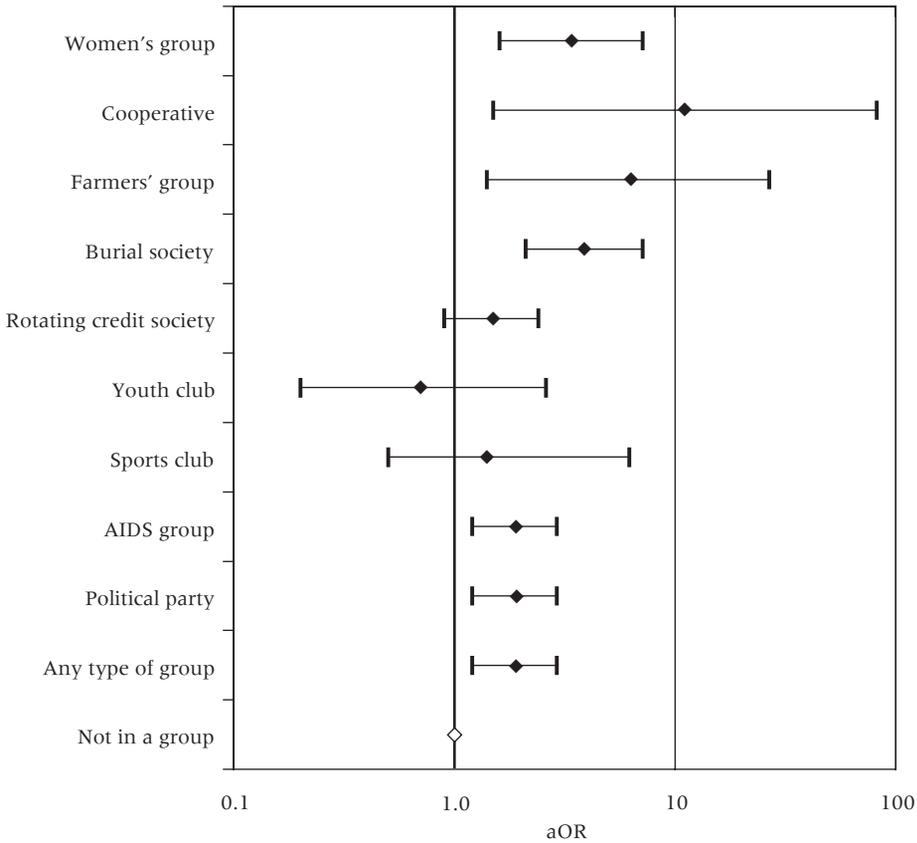
SOURCE: Table A2.

women who were not group members. Once again, this effect remained statistically significant after controlling for known confounding factors and was observed across different types of community groups (Figure 5). Adoption of less risky behavior was also reported more frequently by men who were members of community groups than by other men (78 percent versus 73 percent). Similar patterns were seen in most types of groups (Table A2).

Psychosocial determinants of healthy behavior

According to the theory of social capital, community group membership can increase healthier behaviors by facilitating the development of individual

FIGURE 6 Individual-level effect of participation in community groups on psychological determinants of HIV infection: age-adjusted odds ratio (aOR) and 95 percent confidence interval for increased knowledge about HIV/AIDS and self-efficacy for women in community groups at baseline compared to those not in a group, by type of group, Manicaland, Zimbabwe, 1998–2003

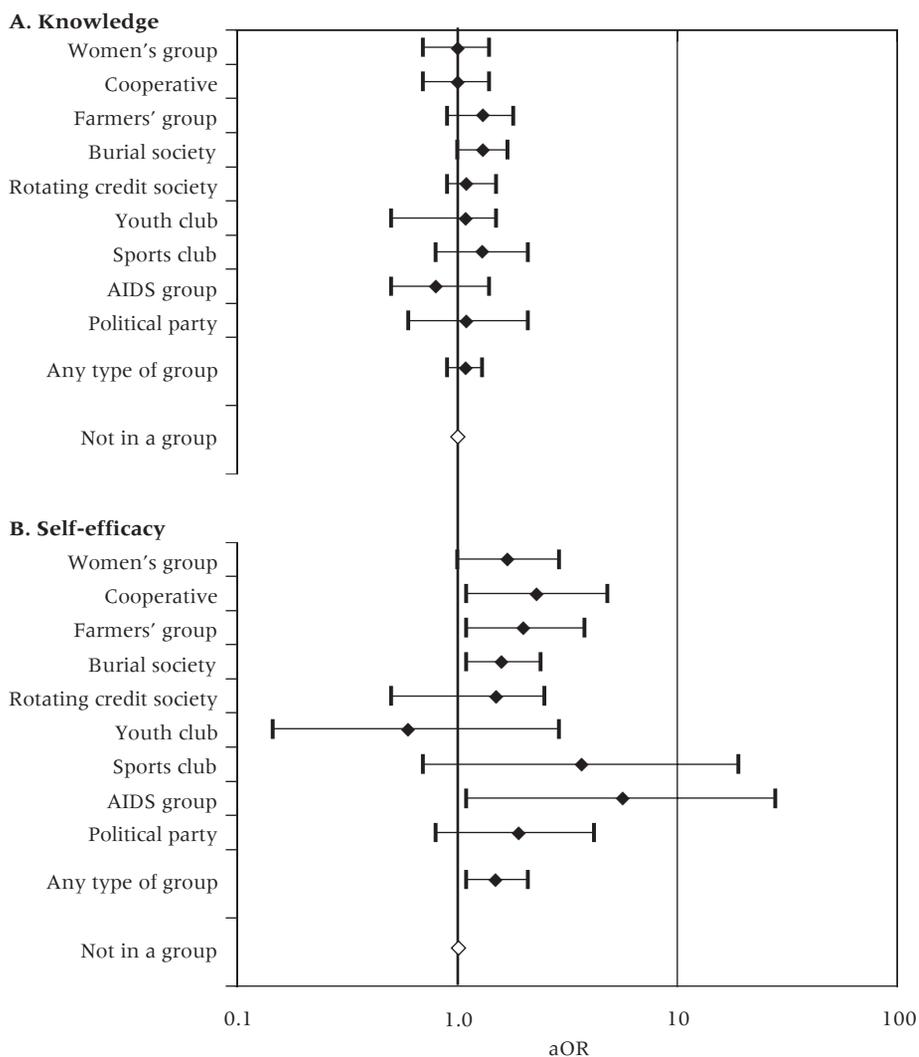SOURCE: Manicaland study, rounds 1 and 2.

psychosocial characteristics that support the adoption of these behaviors. In particular, this can occur through knowledge diffusion and increases in perceived self-efficacy.

In our study populations, women who were already members of community groups had greater knowledge about HIV/AIDS at baseline (Gregson et al. 2004b). However, membership in community groups led to only modest improvements in knowledge about HIV/AIDS during the follow-up period. Thirty-five percent of the women who reported membership in community groups at baseline had improved their score on the knowledge index by 5 percent or more during the inter-survey period, compared with 31 percent of the women who had not previously been members of community groups. The difference was statistically significant only for members of burial societies (Figure 6A). In contrast, a larger increase in the proportion of women who believed they could take steps to avoid becoming infected with HIV (self-efficacy) occurred between 1998 and 2003 among women who were members of community groups than among women who were not (26 percent versus 15 percent). This trend was observed in all types of groups except youth clubs (Figure 6B).

Similar proportions of men who were and were not participating in community groups at baseline (37 percent in each case) improved their score on the knowledge index by 5 percent or more during the inter-survey period. There were no signs in the data of variations by type of group. Most men believed there were things they could do to avoid becoming infected with HIV, and the proportion increased over time from 93 percent to 97 percent; however, no difference was found between the increases in men who were members of community groups and those who were not.

Characteristics of community groups that may help their members reduce HIV risk

In the second round of the Manicaland study (2001–03), we collected data on group characteristics suggested in the literature (Gregson et al. 2004b) as potentially enhancing the effect of community groups in assisting their members to avoid HIV infection (Table 2). We found that for men and women combined community groups generally met on a regular basis (53 percent of members reported meeting weekly and a further 40 percent said they met monthly). Two-thirds of the respondents (65 percent) reported discussing HIV/AIDS during their meetings either as part of the formal agenda or informally, and there was evidence that this was the case not only in AIDS groups but in groups as diverse as sports clubs and farmers' groups (Figure 7). In most cases, meetings were said to be cooperative (90 percent) rather than conflictual (10 percent).

There was considerable heterogeneity in the membership of individual groups. For example, 52 percent of women and 45 percent of men reported that the group in which they spent the most time also had members from the opposite sex. Most groups had members from more than one educational

TABLE 2 Characteristics of community groups formed by women and men during 2001–2003, Manicaland, Zimbabwe, by type of group[a]

Type of group	Meeting frequency: Meet at least monthly		AIDS discussions: Formal or informal		Sex balance: Proportion male		Age mix: Proportion <20 years		Education mix: Proportion attended secondary school		Sponsorship[b]	
	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men
Women's group	0.95	—	0.82	—	0.01	—	0.09	—	0.45	—	0.46	—
Cooperative	0.96	0.93	0.67	0.67	0.13	0.68	0.07	0.06	0.38	0.54	0.46	0.50
Farmers' group	0.93	0.83	0.68	0.73	0.24	0.71	0.12	0.07	0.36	0.45	0.58	0.73
Burial society	0.97	0.91	0.48	0.64	0.19	0.53	0.06	0.06	0.40	0.47	0.15	0.13
Rotating credit society	0.96	0.95	0.49	0.64	0.05	0.86	0.07	0.08	0.44	0.67	0.18	0.09
Youth club	0.94	0.82	0.80	0.71	0.33	0.51	0.60	0.55	0.66	0.65	0.78	0.65
Sports club	0.94	0.96	0.38	0.62	0.23	0.94	0.47	0.36	0.74	0.64	0.69	0.68
AIDS group	0.95	0.91	1.00	1.00	0.19	0.44	0.18	0.30	0.48	0.60	0.86	0.73
Political party	0.82	0.68	0.61	0.82	0.45	0.64	0.21	0.27	0.42	0.54	0.82	0.98
All groups	0.95	0.88	0.62	0.70	0.17	0.74	0.15	0.28	0.45	0.61	0.42	0.60
Test for sex difference[c]	2.4 (1.4, 4.1)		0.7 (0.5, 0.9)		—		0.5 (0.4, 0.7)[e]		0.7 (0.3, 1.5)[e]		0.6 (0.4, 0.7)	
Test for sex difference[d]	2.1 (1.2, 3.8)		0.6 (0.4, 0.8)		—		1.1 (0.8, 1.6)[e]		0.8 (0.4, 1.9)[e]		1.0 (0.7, 1.5)	

TABLE 2 (continued)

Type of group	Alcohol: Members drink during or after meetings		Cooperative vs. conflictual		Networking: Assist or meet with other groups		Participation		Test for diff[f]
	Women	Men	Women	Men	Women	Men	Women	Men	
Women's group	0.14	—	0.98	—	0.57	—	0.06	—	—
Cooperative	0.26	0.67	0.97	0.92	0.74	0.67	0.04	0.01	2.7 (1.9, 4.0)
Farmers' group	0.58	0.76	0.93	0.94	0.75	0.85	0.04	0.02	1.5 (1.1, 2.1)
Burial society	0.39	0.66	0.94	0.98	0.50	0.35	0.19	0.04	4.3 (3.5, 5.3)
Rotating credit society	0.19	0.55	0.94	0.97	0.35	0.30	0.13	0.03	5.1 (4.0, 6.4)
Youth club	0.23	0.52	0.93	0.91	0.81	0.91	0.03	0.05	0.6 (0.5, 0.8)
Sports club	0.19	0.74	0.91	0.81	0.78	0.94	0.02	0.07	0.3 (0.2, 0.3)
AIDS group	0.41	0.42	0.95	0.96	0.90	0.92	0.04	0.02	1.5 (1.1, 2.0)
Political party	0.91	0.93	0.91	0.88	0.82	0.90	0.07	0.04	1.6 (1.2, 2.0)
All groups	0.34	0.69	0.94	0.89	0.61	0.70	0.33	0.21	1.8 (1.6, 2.0)
Test for sex difference[c]	0.2 (0.1, 0.3)		1.3 (0.8, 2.0)		0.4 (0.3, 0.6)		—		
Test for sex difference[d]	0.2 (0.2, 0.3)		0.8 (0.5, 1.3)		0.8 (0.6, 1.2)		—		

NOTE: Women aged 15–44 years, men aged 17–44 years.

[a]Estimates are averages of reports by individual female and male group members interviewed in the second round of the survey (including individuals already infected with HIV at baseline). [b]Sponsored by a church, school, NGO, political party, employer, or other external body. [c]Odds ratios and 95% confidence intervals for reporting group characteristic, women compared to men, adjusted for age and location. [d]Odds ratios and 95% confidence intervals for reporting group characteristic, women compared to men, adjusted for age, location, and type of group. [e]For age mix, odds ratio for reporting 20% or more members aged under 20 years; for education mix, odds ratios for reporting 50% or more members with secondary education. [f]Odds ratios and 95% confidence intervals for reporting membership in a well-functioning community group, women compared to men, adjusted for age and location.
SOURCE: Manicaland study, round 2.

FIGURE 7   Proportion of respondents (women and men combined) reporting formal and informal discussions about HIV/AIDS during group meetings, by type of community group, Manicaland, Zimbabwe, 2001–03
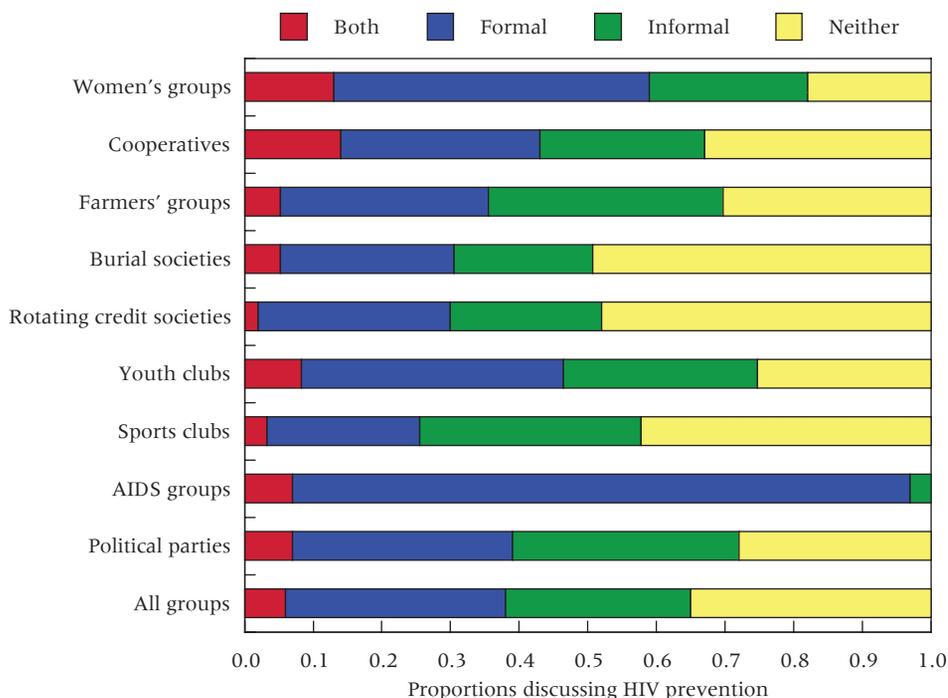
NOTE: Women aged 15–44 years, men aged 17–44 years.
SOURCE: Manicaland study, round 2.

background. Teenagers participated to some extent in all groups but, as would be expected, particularly in youth groups and sports clubs.

Slightly less than half of the women and men in community groups reported that their groups received sponsorship—with common sources of assistance coming from nongovernmental organizations (18 percent), churches (16 percent), political parties (16 percent), employers (8 percent), and schools (5 percent). Two-thirds (68 percent) of respondents reported that the community groups in which they spent the most time assisted or met with other groups of the same or different types, and over half of respondents (54 percent) said their groups interacted with members of the wider community.

Comparison of community groups joined by women and men

Women were more likely to participate in rotating credit societies, burial societies, and cooperatives, while men predominated in sports clubs and youth

groups. More women than men reported that the community group in which they spent the most time held meetings at least once a month (Table 2). But fewer women were in a group that discussed AIDS, a group with young people, a group with a high proportion of better-educated people, a group with external sponsorship, a group where members drank alcohol, or a group that assisted or met with other groups. Some of these differences reflect underlying differences in the types of groups in which men and women participated. The burial societies and rotating credit societies favored by women rarely received external support or assisted other groups, while the sports clubs and youth clubs preferred by men generally had younger members and were often sponsored by schools or employers. Once contrasts between the types of groups that women and men joined were taken into account, the only differences that remained were in AIDS discussions and alcohol consumption. When analysis is restricted to discussions held as part of the formal agenda, women were more likely than men to report discussing AIDS during group meetings (42 percent versus 32 percent). This difference was explained by women's greater propensity to join groups that hold formal discussions about AIDS (e.g., women's groups, youth clubs, and AIDS groups).

Discussion

As has been the case in Zimbabwe as a whole (Gregson et al. 2010), HIV prevalence in adults has been falling in our study populations in eastern Zimbabwe since the late 1990s—from 23 percent to 18 percent over the period 1998 to 2005 (Gregson et al. 2007). This fall in HIV prevalence appears to have followed an acceleration in the rate of decline of new infections between 1999 and 2004 (Hallett et al. 2009), driven in part by reductions in rates of sexual partner acquisition (Gregson et al. 2006). These changes in behavior are believed to have resulted from social changes prompted by increased awareness of AIDS deaths aided by HIV prevention programs using both mass media and church-based, workplace-based, and other interpersonal communication activities (Halperin et al. 2011). Our findings suggest that these social changes also may have been facilitated by high levels of social capital in the form of female civic engagement. Almost half of the previously uninfected women in our sample were members of community groups at recruitment; a higher proportion of these women than of their peers who were not members of groups reported adopting lower rates of sexual partner acquisition during the following three years, and fewer became infected with HIV. Similar effects were also seen at the population level of analysis, although the associations were reduced after adjustment for differences in age, location, and education.

Participation in community groups appears to have helped women to adopt safer behaviors and to avoid HIV infection primarily through increased self-efficacy—an individual-level characteristic that is protective against HIV infection in this population (Gregson et al. 2011). Among women who had

previously said they did not know how to avoid becoming infected with HIV, those who were members of community groups were much more likely at follow-up to report feeling able to protect themselves from infection.

Studies on the effects of social capital on health have sometimes appeared to yield conflicting results. Much of this complexity may lie in differences in how the concept is defined and measured. Pronyk and colleagues noted recently that "despite over a decade's experience, there is no universally accepted way to measure social capital" (Pronyk et al. 2008b). In their own study of poor households in rural Limpopo province in South Africa, community group membership was associated with *greater* risk of HIV infection in women (ibid.). However, the apparent discrepancy between their finding and the results for women in our study may be explained by differences in the way group membership was measured (intensity of membership versus quality of group functioning; household-level versus individual-level reporting), differences in the biological specimens used to detect the presence of HIV infection (oral-mucosal transudate versus dried blood spot specimens), and differences in the variables controlled for in the statistical analyses (prior history of high-risk sexual behavior was not controlled for in the South Africa study), as well as by differences in some of the factors noted in the following two paragraphs.

Differences in study methods notwithstanding, it seems clear that social capital varies in the effect it has on health outcomes in different settings (Portes and Landolt 1996). We have suggested that this may reflect differences in local context, local patterns of group membership, and group and individual member characteristics (Gregson et al. 2004b). The contrasting effects on HIV incidence in women and men found in the current study may reflect sex differences in some of these factors.

The groups in which women in our study communities participated appear to have had a number of positive features. Almost all groups met at least once a month, and HIV prevention was discussed both formally and informally by a wide variety of groups, indicating that community groups provide numerous social spaces for dialogue about HIV prevention. Meetings were reported overwhelmingly as being cooperative, and the involvement of, for example, more and less educated individuals within the same groups, together with extensive interaction with other groups and the wider community, testifies to high levels of bridging social capital.

In contrast to these findings for women, we found little evidence that membership in community groups had helped men take steps to avoid HIV infection. We found greater reductions in reported sexual risk behavior among male group participants, but these did not lead to lower incidence of new HIV infections. Furthermore, group membership was not associated with larger increases in knowledge or self-efficacy in men. A number of factors may help to explain the different findings for women and men. These include the greater and longer-term participation of women in community

groups, the pre-existing high levels of self-efficacy seen among men, and the differences in the types and characteristics of the groups joined by women and men. Men are generally less likely to join groups where AIDS is discussed (Lyttleton 2004; Skovdal et al. in press), and this was true in the current study for formal discussions about AIDS. Men who participated in community groups in Manicaland were more likely to join groups such as sports clubs and political parties, which exhibit competitiveness and power rather than care and sustaining of household livelihoods. This tendency is linked intrinsically to gender-based and local constructions of masculinity (Barker and Ricardo 2005). For example, in South Africa, Ragnarsson and colleagues (Ragnarsson et al. 2009) found that the kind of community groups and networks with which men are typically affiliated promote behavior that actively encourages multiple sexual partners and related high-risk behaviors. This, coupled with men's greater propensity to belong to groups that drink alcohol during or after meetings, suggests that men often join community groups as a way to develop and demonstrate their masculine identities—often at the expense of their health. Acknowledging social constructions of masculinity as a barrier to health and well-being, researchers are increasing their efforts to document the pathways through which men can create social spaces to renegotiate and develop more health-promoting concepts of masculinity (Barker and Ricardo 2005; Colvin and Robins 2009; Burke et al. 2010).

   One of the main contributions of this study is its use of an actual health outcome (HIV incidence) rather than purely self-rated outcomes. On the other hand, a limitation is the study's reliance on self-reported data on group membership and characteristics (including whether or not the group functioned effectively). The self-reports on sexual behavior were collected using a confidential method that has been shown to reduce bias in study populations, and the reports are credible since the results largely match those for HIV incidence (Lopman et al. 2008). Participation in community groups in Manicaland is selective. Differences in individual characteristics between group members and non-members at baseline were controlled for in the main analyses, and types of groups with different patterns of membership showed similar trends in reducing HIV incidence. However, we were not able to capture unobservable characteristics of respondents in the study, so selective participation may have had some residual effect on the findings. The evidence for population-level associations between levels of group membership and HIV risk in women was weak, possibly because it is more difficult to establish evidence of impact of group membership when communities are loosely defined and groups are not specific to particular communities as was the case in this study. We excluded community groups identified specifically as "church groups" from the analysis; if the effect of women's participation in these groups (over and above any effect of religious teaching) is similar to that observed for other types of groups, then the overall contribution of community group membership to reductions in HIV incidence could be even greater.

The effect of community group membership appears to have been particularly important during the period up to 2003. Whereas women who participated in these groups were at lower risk of having contracted HIV infection prior to baseline (1998–2000) (Gregson et al. 2004b) and experienced fewer new infections over the period 1998–2003, no effect on HIV incidence was observed in the following two years—that is, between the second and third rounds of our survey (data not shown). Overall, there were fewer new infections during this period, and group members, having already adopted less risky behaviors, had less scope for further reductions.

Because of the potential for social capital to mitigate HIV risk, some efforts have been made to explore whether social capital can be generated intentionally. Recent experiences from group-based microfinance projects in South Africa (Pronyk et al. 2008a; Pronyk et al. 2008c) and Kenya (Skovdal et al. 2010) suggest that social capital can be generated and strengthened exogenously. Furthermore, we noted that many of the groups in Manicaland received assistance from nongovernmental organizations and other external sources of support. The evidence we identified for reductions in new cases of HIV infection among women who participated in community groups strongly suggests that support for women's community groups could be an effective HIV prevention strategy in countries with large-scale HIV epidemics.

TABLE A1 Impact of social group membership[a] on risk of acquiring HIV infection between 1998–2000 and 2001–2003, Manicaland, Zimbabwe, by sex and type of group

| | Women | | | | | | Men | | | | | |
| | HIV incidence | | Incidence rate ratio[b] | | | | HIV incidence | | Incidence rate ratio[b] | | | |
Type of group	Infections/ pyrs	Percent (95% CI)	Un-adjusted (95% CI)	Age-adjusted (95% CI)	Fully adjusted[c] (95% CI)	N	Infections/ pyrs	Percent (95% CI)	Un-adjusted (95% CI)	Age-adjusted (95% CI)	Fully adjusted[c] (95% CI)	N
Women's group	10/915	1.09 (0.59, 2.03)	0.51 (0.29, 0.91)	0.62 (0.33, 1.16)	0.75 (0.40, 1.42)	305	—					
Cooperative	5/523	0.96 (0.40, 2.30)	0.45 (0.20, 1.02)	0.66 (0.25, 1.74)	0.87 (0.32, 2.37)	174	3/124	2.43 (0.78, 7.52)	1.41 (0.45, 4.41)	1.46 (0.47, 4.49)	1.40 (0.48, 4.07)	42
Farmers' group	5/579	0.86 (0.36, 2.08)	0.40 (0.18, 0.89)	0.61 (0.27, 1.40)	0.78 (0.34, 1.83)	193	2/141	1.42 (0.36, 5.68)	0.84 (0.20, 3.49)	0.77 (0.18, 3.29)	0.71 (0.16, 3.08)	47
Burial society	17/2081	0.82 (0.51, 1.31)	0.38 (0.24, 0.62)	0.51 (0.30, 0.85)	0.62 (0.37, 1.05)	691	4/359	1.11 (0.42, 2.97)	0.66 (0.24, 1.79)	0.63 (0.23, 1.77)	0.43 (0.14, 1.32)	120
Rotating credit society	14/1444	0.97 (0.57, 1.64)	0.45 (0.26, 0.80)	0.53 (0.30, 0.95)	0.61 (0.35, 1.08)	483	19/487	3.90 (2.49, 6.12)	2.18 (1.27, 3.76)	1.84 (1.04, 3.25)	1.83 (0.99, 3.38)	172
Youth club	4/305	1.31 (0.49, 3.50)	0.60 (0.23, 1.59)	0.63 (0.22, 1.78)	0.68 (0.22, 2.08)	103	4/193	2.07 (0.78, 5.53)	1.22 (0.48, 3.08)	1.32 (0.51, 3.39)	1.42 (0.55, 3.69)	65
Sports club	2/288	0.69 (0.17, 2.78)	0.32 (0.09, 1.23)	0.35 (0.09, 1.41)	0.41 (0.11, 1.57)	96	16/596	2.68 (1.64, 4.38)	1.56 (0.92, 2.65)	1.63 (0.94, 2.82)	1.61 (0.92, 2.83)	203
AIDS group	3/227	1.32 (0.04, 4.10)	0.61 (0.24, 1.60)	0.76 (0.30, 1.95)	0.93 (0.36, 2.35)	76	1/40	2.48 (0.35, 17.62)	1.41 (0.21, 9.55)	1.50 (0.24, 9.53)	1.17 (0.18, 7.56)	14
Political party	1/211	0.47 (0.07, 3.37)	0.22 (0.03, 1.55)	0.30 (0.04, 2.16)	0.34 (0.05, 2.47)	71	3/132	2.27 (0.73, 7.03)	1.32 (0.46, 3.72)	1.26 (0.43, 3.66)	0.86 (0.28, 2.64)	45
Any type of group	35/3607	0.97 (0.70, 1.35)	0.45 (0.30, 0.68)	0.57 (0.38, 0.84)	0.64[e] (0.43, 0.94)	1,206	40/1539	2.60 (1.91, 3.54)	1.50 (1.00, 2.24)	1.46 (0.94, 2.28)	1.46[e] (0.95, 2.24)	527
Not a member at round 1[d]	75/3424	2.19 (1.75, 2.75)	1	1	1	1,168	58/3388	1.71 (1.32, 2.21)	1	1	1	1,146

NOTE: pyrs = person-years.

[a]Membership = member of at least one well-functioning community group at round 1; all adjusted for clustering at the village level. [b]Incidence rate ratios compared with women and men who were not members of any well-functioning community group. [c]Adjusted for age, previous risk behavior, location of residence, marital status, religion, education, socioeconomic status, and employment. [d]Irrespective of whether a member at round 2. [e]After additional adjustment for knowledge about HIV/AIDS at round 1: women, aIRR=0.56 (0.38,0.83); men, aIRR=1.46 (0.97, 2.21).

TABLE A2   Impact of social group membership[a] on reducing or maintaining low-risk behavior between 1998–2000 and 2001–2003, Manicaland, Zimbabwe, by sex and type of group

	Women					Men				
	Behavior change		Odds ratio[b]			Behavior change		Odds ratio[b]		
Type of group	n / N	Percent (95% CI)	Un-adjusted (95% CI)	Age-adjusted (95% CI)	Fully adjusted[c] (95% CI)	n / N	Percent (95% CI)	Un-adjusted (95% CI)	Age-adjusted (95% CI)	Fully adjusted[c] (95% CI)
Women's group	295/301	98 (96.4, 100.0)	5.5 (2.5, 12.1)	3.4 (1.6, 7.1)	2.7 (1.3, 6.0)	—				
Cooperative	169/170	99.4 (98.3, 100.0)	19.3 (2.6, 143.8)	11.0 (1.5, 81.9)	7.5 (1.0, 57.3)	30/35	85.7 (73.5, 97.9)	2.3 (1.0, 5.2)	1.7 (0.8, 3.9)	1.7 (0.7, 4.0)
Farmers' group	191/193	99.0 (97.5, 100.0)	11.4 (2.8, 46.6)	6.3 (1.5, 26.6)	4.5 (1.0, 19.6)	41/46	89.1 (79.8, 98.5)	3.0 (1.2, 7.7)	2.1 (0.8, 5.4)	2.7 (0.9, 8.2)
Burial society	668/681	98.1 (97.1, 99.1)	6.1 (3.3, 11.1)	3.9 (2.1, 7.1)	3.1 (1.6, 5.9)	85/106	80.2 (72.5, 87.9)	1.5 (0.9, 2.4)	1.1 (0.7, 1.9)	1.1 (0.7, 1.9)
Rotating credit society	451/474	95.1 (93.2, 97.1)	2.3 (1.4, 3.6)	1.5 (0.95, 2.4)	1.7 (1.0, 2.7)	126/155	81.3 (75.1, 87.5)	1.6 (1.2, 2.3)	1.5 (1.0, 2.2)	1.5 (1.0, 2.3)
Youth club	15/18	83.3 (64.3, 100.0)	0.6 (0.2, 2.2)	0.7 (0.2, 2.6)	0.6 (0.2, 2.1)	30/43	69.8 (55.5, 84.1)	0.8 (0.5, 1.5)	1.2 (0.7, 2.3)	1.2 (0.6, 2.2)
Sports club	46/49	93.9 (86.9, 100.0)	1.9 (0.4, 8.6)	1.4 (0.3, 6.2)	0.9 (0.2, 3.8)	119/159	74.8 (68.0, 81.7)	1.1 (0.8, 1.6)	1.4 (1.0, 2.0)	1.4 (1.0, 2.1)
AIDS group	58/62	93.5 (87.3, 99.8)	1.8 (0.6, 5.3)	1.1 (0.4, 3.2)	0.9 (0.3, 2.9)	9/12	75.0 (46.3, 100.0)	1.2 (0.3, 4.6)	1.3 (0.3, 5.3)	1.2 (0.2, 5.8)
Political party	68/71	95.8 (91.0, 100.0)	2.4 (0.9, 6.8)	1.3 (0.5, 3.6)	1.4 (0.6, 3.3)	32/42	76.2 (62.8, 89.6)	1.2 (0.6, 2.2)	0.8 (0.4, 1.6)	1.0 (0.5, 1.9)
Any type of group	1032/1073	96.2 (94.9, 97.2)	2.9 (1.9, 4.4)	1.9 (1.2, 2.9)	1.8[e] (1.2, 2.8)	340/434	78.3 (74.2, 82.1)	1.3 (1.1, 1.7)	1.3 (1.0, 1.7)	1.4[e] (1.0, 1.8)
Not a member at round 1[d]	785/871	90.1 (87.9, 92.0)	1	1	1	653/896	72.9 (69.8, 75.8)	1	1	1

NOTE: N is the number of individuals reporting sexual activity at baseline; n is the number of those who have adopted low-risk behavior at follow-up.
[a]Membership = member of at least one well-functioning community group.   [b]Odds ratios compared with women and men who were not members of any well-functioning community group at round 1: all adjusted for village-level clustering and interview method.   [c]Adjusted for age, previous risk behavior, location of residence, marital status, religion, education, socioeconomic status, and employment.   [d]Irrespective of whether a member at round 2.   [e]After additional adjustment for knowledge about HIV/AIDS at round 1: women, aOR=1.9 (1.2, 2.9); men, aOR=1.4 (1.1, 1.9).

Note

Figures in this article are available in color in the electronic edition of the journal.

References

Albarracin, D. et al. 2004. "Influences of social power and normative support on condom use decisions: a research synthesis," *AIDS Care* 16**:** 700–723.

Astone, N.M., C.A. Nathanson, R. Schoen, and Y.J. Kim. 1999. "Family demography, social theory, and investment in social capital," *Population and Development Review* 25**:** 1–31.

Bandura, A., 1977. "Self-efficacy: Toward a unifying theory of behaviour change," *Psychological Review* 84**:** 191–215.

Barker, G. and C. Ricardo. 2005. *Young Men and the Construction of Masculinity in Sub-Saharan Africa: Implications for HIV/AIDS, Conflict and Violence.* Washington, DC.

Binagwaho, A. and N. Ratnayake. 2009. "The role of social capital in successful adherence to antiretroviral therapy in Africa," *Public Library of Science Medicine* 6: e18.

Burke, C., K. Maton, E. Mankowski, and C. Anderson. 2010. "Healing men and community: Predictors of outcome in a men's initiatory and support organization," *American Journal of Community Psychology* 45**:** 186–200.

Campbell, C. and C. MacPhail. 2002. "Peer education, gender and the development of critical consciousness: Participatory HIV prevention by South African youth," *Social Science and Medicine* 55**:** 331–345.

Campbell, C. and Z. Mzaidume. 2001. "Grassroots participation, peer education, and HIV prevention by sex workers in South Africa," *American Journal of Public Health* 91**:** 1978–1987.

Campbell, C., Y. Nair, and S. Maimane. 2007. "Building contexts that support effective community responses to HIV/AIDS: A South African case study," *American Journal of Psychology* 39**:** 347–363.

Campbell, C., Y. Nair, S. Maimane, and A. Gibbs. 2009. "Strengthening community responses to AIDS: Possibilities and challenges," in P. Rohleder, L. Swarz, and S. Kalichman (eds.), *HIV/AIDS in South Africa 25 Years On.* London: Springer.

Campbell, C., B. Williams, and D. Gilgen. 2002. "Is social capital a useful conceptual tool for exploring community level influences in HIV infection? An exploratory case study from South Africa," *AIDS Care* 14**:** 41–54.

Chiu, J. et al. 2008. "HIV-related stigma and social capital in South Africa," *AIDS Education and Prevention* 20**:** 519–530.

Collier, P. 1998. "Social capital and poverty," Social Capital Initiative Working Paper Number 4, Washington, DC.

Colvin, C. and S. Robins. 2009. "Positive men in hard, neoliberal times: engendering health citizenship in South Africa," in J. Boeston and N. Poku (eds.), *Gender and HIV/AIDS: Critical Perspectives from the Developing World.* Farnham: Ashgate Publishing Limited, pp. 177–190.

Crosby, R.A. et al. 2003. "Social capital as a predictor of adolescents' sexual risk behavior," *AIDS and Behaviour* 7**:** 245–252.

Dutta-Bergman, M.J., 2004. "An alternative approach to social capital: exploring the linkage between health consciousness and community participation," *Health Communication* 16**:** 393–409.

Eriksson, M. et al. 2010. "Social capital, gender and educational level: Impact of self-rated health," *The Open Public Health Journal* 3**:** 1–12.

Foley, M. and B. Edwards. 1999. "Is it time to divest in social capital?," *Journal of Public Policy* 19**:** 141–173.

Folland, S. 2007. "Does 'community social capital' contribute to population health?," *Social Science and Medicine* 64**:** 2342–2354.

Gregson, S., T. Zhuwau, R. Anderson, and S. Chandiwana. 1998. "Is there evidence for behaviour change in response to AIDS in rural Zimbabwe?," *Social Science and Medicine* 46: 321–330.

Gregson, S. et al. 2004a. "Informal confidential voting interview methods and temporal changes in reported sexual risk behaviour for HIV transmission in sub-Saharan Africa," *Sexually Transmitted Infections* 80: 36–42.

Gregson, S., N. Terceira, P. Mushati, C.A. Nyamukapa, and C. Campbell, C. 2004b. "Community group participation: Can it help young women to avoid HIV? An exploratory study of social capital and school education in rural Zimbabwe," *Social Science and Medicine* 58**:** 2119–2132.

Gregson, S. et al. 2006. "HIV decline associated with behaviour change in eastern Zimbabwe," *Science* 311**:** 664–666.

Gregson, S. et al. 2007. "A critique of early models of the demographic impact of HIV/AIDS in sub-Saharan Africa based on empirical data from Zimbabwe," *Proceedings of the National Academy of Sciences* 104**:** 14586–14591.

Gregson, S. et al. 2010. "HIV decline due to reductions in risky sex in Zimbabwe? Evidence from a comprehensive epidemiological review," *International Journal of Epidemiology* 39: 1311–1323.

Gregson, S. et al. 2011."Did national HIV prevention programmes contribute to HIV decline in eastern Zimbabwe? Evidence from a prospective community survey," *Sexually Transmitted Diseases* 38(12). Published online January 27. DOI: 10.1097/OLQ.0b013e3182080877.

Hallett, T.B., S. Gregson, O.Mugurungi, E. Gonese, and G.P. Garnett. 2009. "Is there evidence for behaviour change affecting the course of the HIV epidemic in Zimbabwe? A new mathematical modelling approach," *Epidemics* 1**:** 108–117.

Halperin, D.T. et al. 2011. "A surprising prevention success: Why did the HIV epidemic decline in Zimbabwe?," *Public Library of Science Medicine* 8**:** e1000414.

Hawe, P. and A. Shiell. 2000. "Social capital and health promotion: a review," *Social Science and Medicine* 51**:** 871–885.

Holtgrave, D.R. and R. A. Crosby. 2003. "Social capital, poverty, and income equality as predictors of gonorrhoea, syphilis, chlamydia and AIDS case rates in the United States," *Sexually Transmitted Infections* 79**:** 62–64.

International Monetary Fund. 2008. *World Economic Outlook Database.* Washington, DC.

Kim, D. et al. 2008. "Social capital and physical health. A systematic review of the literature," in I. Kawachi, S. Subramanian, and D. Kim (eds.), *Social Capital and Health.* New York: Springer Science / Business Media LCC, pp. 139–190.

Lopman, B. et al. 2008. "Determinants of HIV incidence after 3 years follow-up in a cohort recruited between 1998 and 2000 in Manicaland, Zimbabwe," *International Journal of Epidemiology* 37**:** 88–105.

Lyttleton, C., 2004. "Fleeing the fire: Transformation and gendered belonging in Thai HIV/AIDS support groups," *Medical Anthropology: Cross-Cultural Studies in Health and Illness* 23: 1–40.

Nhamo, M., C. Campbell, and S. Gregson. 2010. "Contextual determinants of HIV prevention programme outcomes: Obstacles to local-level AIDS competence in rural Zimbabwe," *AIDS Care* 22: 1662–1669.

Norris, P. and R. Inglehart. 2006. "Gendering social capital: Bowling in women's leagues?," in B. O'Neill and E. Gidengil (eds.), *Gender and Social Capital.* New York: Routledge, pp. 73–98.

Portes, A. and P. Landolt. 1996. "The downside of social capital," *The American Prospect* 26: 18–21.

Pronyk, P.M. et al. 2008a. "Can social capital be intentionally generated? A randomised trial from South Africa," *Social Science and Medicine* 67**:** 1559–1570.

Pronyk, P.M. et al. 2008b. "Is social capital associated with HIV risk in rural South Africa?," *Social Science and Medicine* 66**:** 1999–2010.

Pronyk, P.M. et al. 2008c. "A combined microfinance and training intervention can reduce HIV risk behaviour in young female participants," *AIDS* 22**:** 1659–1665.

Putnam, R. D. 1993. *Making Democracy Work.* Princeton University Press.

———. 2000. *Bowling Alone: The Collapse and Revival of American Community.* New York: Simon and Schuster.

Ragnarsson, A., L. Townsend, A. Thorson, M. Chopra, and A.M. Ekstraam. 2009. "Social networks and concurrent sexual relationships: A qualitative study amongst men in an urban South African community," *AIDS Care* 21: 1253–1258.

Saegart, S., J.P. Thompson, and M.R. Warren. 2001. *Social Capital in Poor Communities.* New York: Russell Sage Foundation.

Skovdal, M. et al. In press. "Masculinity as a barrier to men's uptake of HIV services in Zimbabwe," *Globalization and Health*.

Skovdal, M., W. Mwasiaji, A. Webale, A. and A.M. Tomkins. 2010. "Building orphan competent communities: Experiences from a community-based capital cash transfer initiative in Kenya," *Health, Policy and Planning*. Published online August 30. DOI: 10.1093/heapol/czq039.

Veenstra, G. 2000. "Social capital, SES, and health: An individual level analysis," *Social Science and Medicine* 50**:** 619.

Wallerstein, N. 1992. "Powerlessness, empowerment and health: Implications for health promotion programmes," *American Journal of Health Promotion* 6**:** 197–205.

Ware, N.C. et al. 2009. "Explaining adherence success in sub-Saharan Africa: An ethnographic study," *Public Library of Science Medicine* 6**:** e1000011.

Woolcock, M. 2001. "Microenterprise and social capital: a framework for theory, research and policy," *Journal of Socio-Economics* 30**:** 193–198.

Wouters, E., H. Meulemans, and H.C.J. Van Rensburg. 2009. "Slow to share: Social capital and its role in public HIV disclosure among public sector ART patients in the Free State province of South Africa," *AIDS Care* 21: 411–421.

Ziersch, A.M. and F.E. Baum. 2004. "Involvement in civil society groups: Is it good for your health?," *Journal of Epidemiology and Community Health* 58: 493–500.

Zimbabwe Ministry of Health and Child Welfare. 2010. *Zimbabwe National HIV and AIDS Estimates 2009*. Harare.