

*School Education & Avoidance of Early HIV Infection:  
The Mediating Roles of Social Capital & Psychosocial  
Factors among Young Women in Rural Zimbabwe*

SIMON GREGSON,<sup>1,2\*</sup> NICOLA TERCEIRA,<sup>3</sup> PHYLLIS MUSHATI,<sup>2</sup> CONSTANCE NYAMUKAPA<sup>2</sup>  
AND CATHERINE CAMPBELL<sup>4</sup>.

*From <sup>1</sup>the Department of Infectious Disease Epidemiology, Imperial College School of Medicine,  
Norfolk Place, London W2 1PG, United Kingdom,*

*<sup>2</sup>Biomedical Research and Training Institute, University of Zimbabwe Campus, P.O. Box CY1753,  
Harare, Zimbabwe,*

*<sup>3</sup>Wellcome Trust Centre for the Epidemiology of Infectious Disease, Oxford University, South Parks  
Road,  
Oxford OX1 3FY, United Kingdom, and*

*<sup>4</sup>Social Psychology, London School of Economics and Political Science, Houghton Street, London  
WC2A 2AE.*

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\* Author for correspondence - Department of Infectious Disease Epidemiology, Imperial College School of Medicine, Norfolk Place, London W2 1PG. Telephone number: 00 44 207 594 3286; e-mail address: [sajgregson@aol.com](mailto:sajgregson@aol.com).

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**Abstract**

*Background*

Secondary school education is associated with increased chances of avoiding HIV infection in young women in a number of sub-Saharan African populations and is commonplace in rural areas of Manicaland, Zimbabwe's eastern province. Community and individual level psychosocial mechanisms have not previously been studied.

*Objectives*

To describe and investigate the patterns of association between school education, social capital, psychosocial status, and HIV risk aversion in young women in rural Manicaland.

*Study Design*

Exploratory analysis of data from a cross-sectional population-based survey of 2,272 women aged 15-24 years stratified by socio-economic stratum.

*Results*

Membership of well- and poorly-functioning community groups is associated with increased and reduced chances of having avoided HIV infection, respectively. Youth groups show the strongest effects: membership of a well-run group is associated with greater HIV knowledge, enhanced sense of personal vulnerability, greater self-efficacy, and increased chance of having avoided HIV infection. Young women with secondary education are more likely to be

members of well-functioning out-of-school community groups. Those that join such groups are more likely to have avoided HIV infection.

### *Conclusion*

Further research in this area is warranted. Longitudinal studies may be needed to unravel the directions of causality of interconnections between the respective benefits of school education and social group membership and to explore possible diffusion effects to less educated women and men.

HIV PREVALENCE has reached extremely high levels in southern Africa (UNAIDS, 2000). In some populations, the lifetime risks of acquiring HIV infection (Gregson *et al.*, 1996; Gregson *et al.*, 1998) and dying from associated causes (UNAIDS, 2000) are currently as high as two in three. As if this were not disturbing enough, population-based studies conducted in the 1990s have shown that, in women, much of this risk has already been accumulated by the early 20s (Fylkesnes *et al.*, 1998; Zaba *et al.*, 2000). It has been concluded that HIV prevention strategies must be even more closely focussed upon encouraging and assisting young women to adopt lifestyles that afford protection against acquiring HIV infection.

Similar patterns of high adult life-course risk of HIV acquisition commencing at very young ages in females have been observed in rural areas of Manicaland in eastern Zimbabwe (Gregson and Garnett, 2000; Gregson *et al.*, 2001). More encouragingly, there were also signs that early age HIV infection rates may be lower among those women who

had experienced some secondary school education (Gregson *et al.*, 2001). Longitudinal studies in Uganda and Zambia have documented faster declines in early-age HIV prevalence levels amongst women with greater education (Kilian *et al.*, 1999; Fylkesnes *et al.*, 2001). At the macro level, African countries with higher levels of education appear to experience faster and larger HIV epidemics but may also be mounting more rapid and effective responses (Blanc, 2000; Gregson *et al.*, 2001). However, little is known about the pathways through which greater education supports adoption of lifestyles that are protective against HIV infection.

In this paper, we explore the data from Manicaland more closely to examine community and individual-level mechanisms through which greater school education might facilitate and promote avoidance of HIV infection in young women. In particular, we investigate the possible mediating roles of aspects of social capital (Putnam, 1993; Gillies *et al.*, 1996; Baum, 1999) and psychosocial factors (Bandura, 1977; Lindan *et al.*, 1991). We examine a simple theoretical model that posits that besides providing possible direct individual benefits, greater school education facilitates reductions in HIV infection rates among young women (including those with less education) by strengthening aspects of social capital that are associated with psychosocial determinants of behaviour change.

In the analysis, we adopt a life-course framework to examine the influence of factors that may enhance the chances of avoiding HIV infection. In the absence of the widespread availability of an effective vaccine, the risk of acquiring HIV infection is one that persists throughout the lifetime. However, the nature and degree of exposure to this risk can vary greatly depending on age, marital status, parental status, and so on. Thus, for example, risk-reduction strategies that prove effective before marriage can, subsequently, become redundant or insufficient. In order to avoid rather than merely delay infection, young women must adjust their strategies for avoiding HIV as they pass through a number of key life stages (Figure 1). To assess the influence of social capital and psychosocial factors in facilitating HIV risk aversion up to any given age, we examine trends in and determinants of the number of years of having avoided ('survived' without) HIV infection beyond age 15.

### **School Education, Social Capital and HIV Avoidance**

#### *Social Capital*

There has been some debate as to the precise origins of the term social capital. In the 1970s, Pierre Bourdieu applied the expression to refer to the advantages and opportunities accruing to people through membership of certain communities (Portes and Landolt, 1996). Subsequently, the term was used to describe the resources of individuals that emerge from social ties and it has now come to refer to features of social networks, norms, and trust that facilitate coordination and cooperation for mutual

benefit.

Social capital or social cohesion has been identified as a critical factor in sustainable development and the alleviation of poverty. High levels of social capital have been associated with more effective education and healthcare systems and with reductions in mortality rates. It has been suggested that social capital may influence health by promoting the diffusion of health-related information and ensuring continued access to services and amenities even in the face of budget cuts (Veenstra, 2000).

However social capital also has its negative aspects (Portes and Landolt, 1996). Social cohesion and tight-knit communities can be damaging: they may be exclusionary, they may demand conformity suffocating individual enterprise in the process, they may undermine promising business initiatives by turning them into "welfare hotels", and they may exert downward leveling pressures (e.g. Mafia and youth gangs) which prevent the acquisition of human capital (Portes and Landolt, 1996; Collier, 1998). Thus, the notion of negative "anti-social capital" has been proposed to characterize such communities (Baum, 1999).

Social capital is generated as a by-product of social interaction and has benefits that can accrue - often incidentally - to those not directly involved in the interaction. Social interaction usually takes two forms - social support, identified as the interactions with close friends and family,

and social involvement in formal and informal voluntary associations (Veenstra, 2000).

The latter form of social capital is the one most frequently referred to in the literature and has been further classified into two distinct types - vertical and horizontal (Collier, 1998). Vertical interaction, or one-way involvement, is an extremely organized system of interaction that is usually defined by the presence of an hierarchy. Horizontal interaction, or reciprocal involvement, takes two forms - networks (spontaneous free associations) that lack the capacity for decision making and clubs (organized associations) which have the infrastructure to make decisions and act collectively (Collier, 1998). Differences may exist in the quality of the social capital generated by vertical and horizontal associations. Other things being equal, collaboration among horizontally-based associations is thought to increase the stocks of social capital at community level (Putnam, 1993). However, individual members within a community can have different degrees of access to the benefits of social capital (Campbell *et al.*, 1999); the degree of access being dependent, *inter alia*, upon aspects of socio-demographic status (Campbell *et al.*, 2001).

A number of inter-related characteristics that could influence the social capital value of individual community associations are summarized in Table 1, classified according to whether or not their influence is likely to extend beyond group members. In addition to vertical-horizontal

structure, formality of meetings and external collaboration, external sponsorship and diversity of membership may increase effectiveness and, therefore, value, particularly in low-development settings. Where meetings are primarily formal, open-ness to the introduction of new topics of discussion and to the possibility of debate are likely to make them more conducive to the diffusion of health-related ideas and information.

Social capital forms one folder in the complex asset portfolio managed by individuals and groups. Unlike tangible assets such as labour and human capital, social capital is largely invisible and intangible (Moser, 1998). In certain situations, social capital may substitute for other forms of capital and, unlike other forms of capital, it is a resource that accrues through use and is depleted through lack of use (Putnam, 1993). Social capital is a dynamic commodity: it may have persistent effects if it induces investment in other forms of physical or human capital (Collier, 1998). However, the existence of social capital is tenuous as it may be eroded by economic crises and social circumstance. The long-term erosion of social capital can lead to a worsening of social and economic circumstances and can cause a corresponding increase in reliance on vertical, externally managed NGOs and government agency projects with income and welfare components. Conversely, good stocks of social capital can lead to increased reliance on informal credit arrangements and support networks, and an increase in the provision of services through the collaboration with NGOs and



government (Moser, 1998). Social interaction builds trust, fosters mutual cooperation and reciprocity, and lays the foundation for future potentially beneficial relationships between community members. As such, social capital seems to be a precondition for economic development, effective government, and efficiency in public expenditure (Putnam, 1993; Collier, 1998).

The discourse on social capital and health has covered a number of topics ranging from predicting the effectiveness of community health interventions by level of social capital to the inverse relationship between social capital and rates of mortality and cardiovascular disease and the positive correlation between social capital and self-rated health status (Putnam, 1993; Kawachi and Kennedy, 1997; Lomas, 1998; Baum, 1999; Ellaway and McIntyre, 2000; Veenstra, 2000).

Nevertheless, there have been relatively few empirically based studies on the influence of social capital on health due, in part, to methodological difficulties in operationalizing the concept. The latter have often stemmed from the "lack of terminological precision and theoretical rigor" within social capital theory (Baum, 1999), the subjective nature of its building blocks - participation, trust, networks and cooperation - and uncertainty as to whether the focus should be placed solely on collective (contextual) forms of social capital to the exclusion of individual (compositional) levels of measurement (Kreuter *et al.*, 1997).

### *Social Capital & HIV Avoidance*

A simple theoretical model of the role that social capital may play in mediating the influence of broader macro-social factors on adoption of behaviours that are protective against HIV infection in sub-Saharan African countries subject to widely disseminated epidemics is illustrated in Figure 2. It is suggested that macro-social factors including school education influence the development and character of social capital within a community (as well as *vice versa*). In turn, social capital serves to promote psychosocial attributes that support the adoption and maintenance of behaviours that afford protection against HIV infection at different stages of the life-course.

In the remainder of this paper, we examine the ways in which these relationships might contribute to the associations observed between levels of school education and HIV avoidance and test the hypotheses implicit within this model using data from Manicaland. Following Narayan and Pritchett (Narayan and Pritchett, 1997; Campbell *et al.*, 2001), we operationalise social capital in sub-Saharan African conditions in terms of civic engagement or participation determined by levels of membership of a range of community and social groups.

### *School Education & Social Capital: A Synergistic Relationship?*

More extensive school education should equip individuals with a number of advantages in avoiding HIV infection. Formal instruction in school and easier access to information made available through the media should provide greater exposure to the facts about HIV and AIDS (Gregson *et al.*, 1998); enhanced negotiating skills, economic opportunity and sense of self-efficacy should reduce fatalism and inadvertent involvement in high-risk relationships (Bandura, 1977; Lindan *et al.*, 1991), and greater readiness to use modern health services should increase access to prompt treatment for sexually transmitted diseases and to condoms (Blanc, 2000).

However, schools can also provide convenient settings for group formation and operation. Schools can provide facilities for meetings, resources for group activities, training in organisational and administrative skills, and so on. Specific times can be set aside for group activities obviating the otherwise common problem of competing obligations. Group activities within schools provide forums within which information and ideas can be disseminated and shared and therefore contribute to the greater knowledge and social skills found amongst the more educated. Thus, the school setting can both facilitate the development of social capital and provide students with easy access to it.

Participation in school groups may instil a greater sense of the value of collective action that is carried over to out-of-school activities. More

educated individuals may tend to join intrinsically more viable and beneficial types of groups and may make more effective use of opportunities provided by group membership.

Participation of individuals with greater education in out-of-school groups can contribute to the effectiveness of these groups as vehicles for wider information dissemination, ideational change and promotion of social skills. Less educated individuals participating in groups with members from diverse educational backgrounds may benefit from improved organisational structure and access to external resources, greater exposure to new information and ideas, and enhanced training opportunities. In some instances, more educated members may provide positive role models. Thus, external groups with mixed educational membership could serve a useful function in facilitating the wider dissemination of psychosocial attributes often acquired in school and thought to assist in avoidance of HIV infection.

### **School Education & Avoidance of HIV in rural Zimbabwe**

Female HIV prevalence rates by age and level of education in selected rural areas in Manicaland, Zimbabwe's eastern province are shown in Figure 3. Access to secondary education has increased markedly since independence in 1980 so that while 54% of all women aged 15-44 years have completed at least one year of secondary education, the equivalent figure for 15-24 year-olds is 74%. Some of the variability in HIV

prevalence levels at young ages in the less educated group is therefore due to small numbers. Nevertheless, women with experience of secondary education are more likely to have avoided HIV infection at all ages up to the early 30s. Odds ratios for having avoided HIV infection given secondary education adjusted for age and socio-economic stratum - residence in towns, commercial estates and subsistence farming areas - were 2.52 ( $P < 0.001$ ,  $N = 1,249$ ) and 1.75 ( $P < 0.001$ ,  $N = 1,019$ ) in women aged 15-19 and 20-24, respectively.

Of course, not all of the reduction in risk of infection in young women with greater schooling is due to the protective effects of education as those who remain in school are selected for avoidance of unprotected sex; young women who become pregnant rarely returning to school. Even so, the strength of the effect is impressive, given that the difference in years in school is only one or two years in many cases and the differential in HIV prevalence persists well into the 20s.

#### *Sexual Histories Associated with Successful HIV Avoidance*

In earlier analyses, we found that delayed onset of sexual activity, smaller numbers of lifetime sexual partners, small age-differences with sex partners, and having a regular partner who does not casual sexual partners were the principal behavioural determinants of avoidance of HIV infection in young women in the study populations (Gregson *et al.*, 2001).

The greater chances of having avoided HIV infection seen in young women with some secondary education appeared to have been due to their later onset of sexual relations (median age at first sex 19.5 *versus* 17.5 in less educated young women) and less frequent unprotected casual sex (Gregson *et al.*, 2001). After adjusting for number of years in school, teenage women with secondary education with greater knowledge about AIDS were somewhat less likely to have started sex ( $P=0.099$ ;  $N=952$ ). However, similar proportions of the more and less educated young women who reported not having started sex gave protection from HIV infection as their main reason for not having started (age-adjusted  $OR=1.09$ ;  $P=0.742$ ) and comparison of results from successive national demographic and health surveys indicates that much of the differential in age at first sex by level of education pre-dates the spread of HIV within Zimbabwe (Gregson *et al.*, 2001). The difference in unprotected casual sex reflected fewer casual partners rather than greater condom use within such relationships.

### *Psychosocial Mediators of HIV Avoidance*

In a previous publication, we described modest changes in fertility-related behaviour among women in rural Manicaland in the early-1990s associated with greater knowledge about HIV and AIDS, greater perceived personal vulnerability to infection (risk perception), and having close relatives or household members with AIDS (Gregson *et al.*, 1998).

Similar associations between these and other (e.g.: self-efficacy) psychosocial mediators have been reported elsewhere in Africa (Lindan *et al.*, 1991).

In the most recent survey in Manicaland conducted at the end of the 1990s, knowledge about HIV and AIDS, perceived personal vulnerability (risk perception), and self-efficacy were the principal psychosocial mediators measured. An index of knowledge about HIV and AIDS similar to that utilized in the earlier study (Gregson *et al.*, 1998) was constructed based on responses to questions on modes of HIV transmission, cofactors in sexual and vertical transmission, and distinctions between HIV and AIDS. Risk perception was assessed using a direct question on whether respondents felt in danger of becoming infected with HIV themselves. However, the potential positive effects of heightened risk perception are difficult to assess particularly among young people in generalised epidemics due to difficulties in identifying the direction of causation (Gregson *et al.*, 1998). Two indicators of self-efficacy were employed: one based on responses to a question on whether survey participants felt they were able to avoid HIV infection; the other, for sexually active women, on whether they felt they could persuade their current partner to avoid unprotected sex with casual partners.

Results on associations between these indicators of psychosocial status, aspects of sexual behaviour protective against HIV infection, and

avoidance of HIV infection are given in Table 2 in the form of age-adjusted odds ratios.

Greater knowledge about HIV and AIDS was associated with increased chance of having avoided HIV infection, primarily due to an association with later commencement of sexual activity. Personal risk perception was not associated with HIV infection status but was more common among young women who had started sex and single women who reported more than one lifetime partner. Women who maintained that they could avoid HIV infection were less likely to have started sex. Among those who had become sexually active but were not yet married, more of those who thought it possible to avoid HIV infection reported having kept to one partner. However, the effect on actually having avoided HIV was not statistically significant. For women who were currently sexually active, those who reported that they could persuade their partner to refrain from having sex with other partners were more likely to report that he was doing so. These women were more likely to have avoided HIV infection - particularly, prior to marriage.

#### *School Education, Social Group Participation & HIV Avoidance*

Overall, 83 percent (1,891/2,272) of the young women who participated in the survey reported membership of at least one social group. Church groups were by far the most common but there was also significant



involvement in youth groups (11%), savings clubs (9%), burial societies (7%), sports clubs (6%), and women's groups (4%). Eighty-seven percent of those participating felt that their groups functioned well. Church groups (90%), youth groups (88%) and burial societies (86%) were most likely to be reported as functioning well whilst satisfaction levels were lowest in women's groups (67%), political parties (78%) and savings clubs (79%).

In Table 3, we show the effects of community group participation on the chance of having avoided HIV infection and the possible mediating psychosocial factors. Age- and socio-economic stratum-adjusted odds ratios are presented that compare the chance of having avoided HIV (and so on) in groups members who report their group as functioning well with those who are either not a member of such a group or who are dissatisfied with the group's performance.

Overall, young women who reported membership of a well-functioning community group were more likely to have avoided HIV infection. Knowledge about HIV and AIDS, personal risk perception, and self-efficacy were all greater in those reporting group membership. The difference was highly significant ( $P < 0.001$ ) in the case of knowledge but marginal for the other variables.

In six out of the nine different types of group the chances of having avoided HIV infection were greater among members. This effect was significant in the case of youth groups and of borderline significance in

the case of church groups. In both of these cases, group membership was associated with greater knowledge, risk perception and self-efficacy but these effects were only statistically significant for youth groups. There are numerous different denominations of churches in Manicaland with widely varying belief systems and teachings in regard to HIV and HIV prevention (Gregson *et al.* 1999). Thus, these results almost certainly conceal considerable variation in the effects of participation in individual churches.

The few members of political parties that were said to be functioning well were significantly less likely to have avoided HIV infection. Burial societies and savings clubs also showed negative effects and were each associated with low self-efficacy. Young women who reported being in any group that they felt was functioning poorly were less likely to have avoided HIV than those who were not in a group at all (adjusted OR=0.61;  $P=0.051$ ; N=530).

A number of groups are delineated by marital status. Thus, the women in youth groups and sports clubs were mostly single whilst most of those in burial societies, cooperatives, women's groups and savings clubs were married. The small proportions of women who felt they were able to avoid HIV infection in the latter groups reflect the fact that very few of those who were married felt they were able to avoid HIV infection (age and socio-economic stratum-adjusted OR=0.35;  $P<0.001$ ). For these

groups, the results on perceived ability to persuade regular partners to refrain from unprotected casual sex may therefore be more significant.

Greater levels of school education were associated with increased knowledge, personal risk perception (non-significant) and self-efficacy in young women (Table 4). Thus, some of the patterns of psychosocial status seen in Table 3 (e.g.: the differences in knowledge about HIV) also reflect differences in the educational composition of the members of the different types of group. Overall, secondary educated women were more likely to report being a member of a social or community group (age, socio-economic stratum and within-school-adjusted OR=1.34;  $P=0.023$ ). There was no difference whilst in school (adjusted OR=0.56;  $P=0.56$ ) but a significant contrast amongst young women who had left school (adjusted OR=1.56;  $P=0.027$ ). More educated members of groups were also more likely to report that they functioned well (age, socio-economic stratum and within-school-adjusted OR=1.44;  $P=0.058$ ).

Amongst those who had left school, young women with secondary education were more highly represented in youth groups (age and socio-economic stratum adjusted OR=2.72;  $P<0.001$ ), church groups (1.47; 0.002), sports clubs (4.42; 0.006) and AIDS clubs (5.22, 0.116). Less educated women were over-represented within political parties (0.34;

0.014), savings clubs (0.75; 0.077<sup>1</sup>) and women's groups (0.71; 0.158). Thus, women with secondary education appear to prefer groups associated with HIV avoidance whilst those with less education tend to be in groups that show negative effects. To explore further the direction of causality, we disaggregate the data by level of education (Table 5).

Overall, young women with secondary education who belong to a well-functioning community group can be seen to have been more successful in avoiding HIV infection than those who do not. Other things being equal, group members have greater knowledge and risk perception concerning AIDS but there is no difference in self-efficacy. In contrast, group membership makes no difference among women with less education despite having a positive impact on knowledge.

Membership of youth groups is protective for more educated women for whom it appears to instil heightened risk perception and greater self-efficacy and also appears to offer some assistance to less educated women. Membership of women's groups and church groups is also protective for women with secondary education. However, neither of these groups affords protection for less educated women although there is a suggestion that participation in women's groups may support enhanced self-efficacy. There is some evidence that less educated

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<sup>1</sup> Relative preference for savings club membership becomes statistically significant (OR=0.72;  $P=0.041$ ) if those still in school are also included and school attendance is added as a control in the logistic regression).

women in cooperatives and farmers groups also have greater self-efficacy. The small numbers of less educated women in political parties are unlikely to have avoided HIV infection whilst those in savings clubs also appear to gain little that assists them in avoiding infection.

## Discussion

Levels of female education in Zimbabwe are amongst the highest in Africa. The results presented here also show that many young women are members of social groups. Church groups predominate but there are also many other groups that are organised in school settings or within the general community. The results of this essentially exploratory study indicate that membership of a community group that functions well is associated with heightened chances of having avoided HIV infection in young women. Conversely, membership of a poorly functioning group is associated with reduced chances of avoiding infection. To a degree, these patterns must reflect differential membership by level of education, as young women with greater education are both more likely to have avoided HIV infection and more likely to belong to community groups that function effectively. However, young women who have left school after completing at least one year of secondary education have a greater chance of having avoided HIV infection if they belong to an effective community group. Furthermore, some of the advantage seen

among women with secondary education may itself have accrued through their greater involvement in social groups.

The benefits of community group participation in HIV prevention terms are less apparent in those with less education. There is some suggestion that transfers of information could be taking place in groups where members come from mixed educational backgrounds (e.g.: in youth groups) but no sign that this is being translated into more effective HIV risk-aversion.

Of the various different types of groups in which young women participate, youth groups appear to be especially effective. High proportions of members' report that they function well, they have a strong appeal to the more educated, and membership appears to have some protective effects against HIV infection irrespective of level of education. Findings from qualitative studies carried out in parallel with the survey in Manicaland indicate that there is a good deal of variation in the nature and activities of these and other groups. However, it seems that they frequently have many of the characteristics considered to increase social capital value. e.g.: external sponsorship, frequent, formal and cooperative meetings, diverse membership, and assistance for non-members. In contrast, the types of groups showing effects more consistent with anti- social capital in regard to HIV prevention (i.e.: political parties, savings clubs and burial societies) were somewhat less likely to have these characteristics.

The similarity of these results for individual group types to those found in the only previous study of this type carried out in a southern African setting is intriguing. In a mining community in Carltonville, South Africa, with strongly contrasting levels of female alcohol consumption and involvement in casual sex, young women participating in youth groups and sports clubs were also more likely to have avoided HIV infection whilst those participating in savings clubs (*stokvels*) typically showed signs of having more risky lifestyles (Campbell *et al.*, 2001)

In addition to the more generic women's groups, many community associations with specific functions (e.g.: burial societies and savings clubs as well as sports clubs) were segregated along gender lines. Thus, practices such as alcohol consumption that might have been expected associated with certain types of groups (e.g.: burial societies) were less common than we had anticipated. In this paper, we have not considered the effects of social group membership in young men and it is quite likely that these will differ from those seen amongst women.

Of the psychosocial factors examined here, social group membership appears to have positive effects on knowledge about HIV and AIDS, which, in turn, is positively associated with HIV risk aversion. Differences in understanding of non-sexual modes of HIV transmission (e.g.: mosquito bites) and of HIV-associated symptoms (e.g.: whether it is always possible to tell if a person is HIV-positive simply by sight) remain and appear to have some significance. The links between social group membership, risk

perception, self-efficacy and successful avoidance of HIV infection are less clear-cut and probably differ by life stage and form of social group. As might have been expected, burial society membership was associated with heightened risk perception and low self-efficacy. More positively, there were signs that less educated women in cooperatives and women's groups might have greater self-efficacy - possibly due economic and social empowerment imparted by membership of such groups. However, negative aspects of membership of these groups (e.g.: less educated membership, weaker organisation etc.) and the additional challenges faced with marriage - almost all of the less educated women in these groups are married - obscure the potential benefits in regard to HIV risk aversion.

These results suggest that a rich combination of extensive female secondary school education and widespread community group participation on the part of young women exists in rural areas of Zimbabwe that should provide a strong platform within which effective youth-focussed HIV prevention programmes can be promoted. Indeed, this approach is already being adopted in a variety of AIDS-related projects in Manicaland (Wilson *et al.*, 1994; Foster *et al.*, 1996). The fact that many of the social groups have a religious basis poses some difficulties in regard to youth programmes - most notably in relation to condom promotion. However, other features such as the widespread separation of groups according to gender and marital status provide



valuable opportunities to tailor HIV prevention messages and activities to individual circumstances.

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**Figure 1:** Early female life-course strategies for avoiding HIV infection in widely disseminated HIV epidemics

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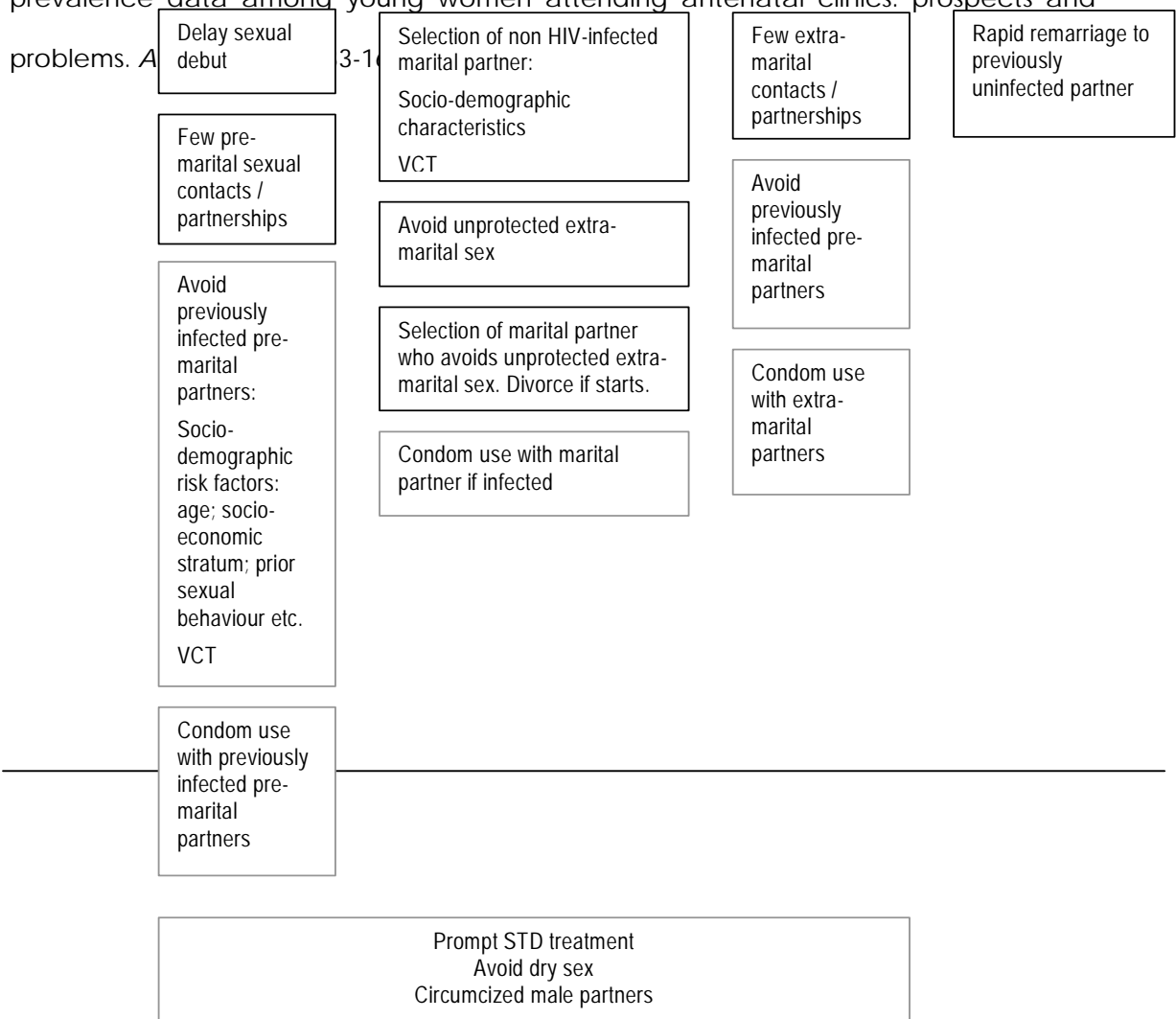
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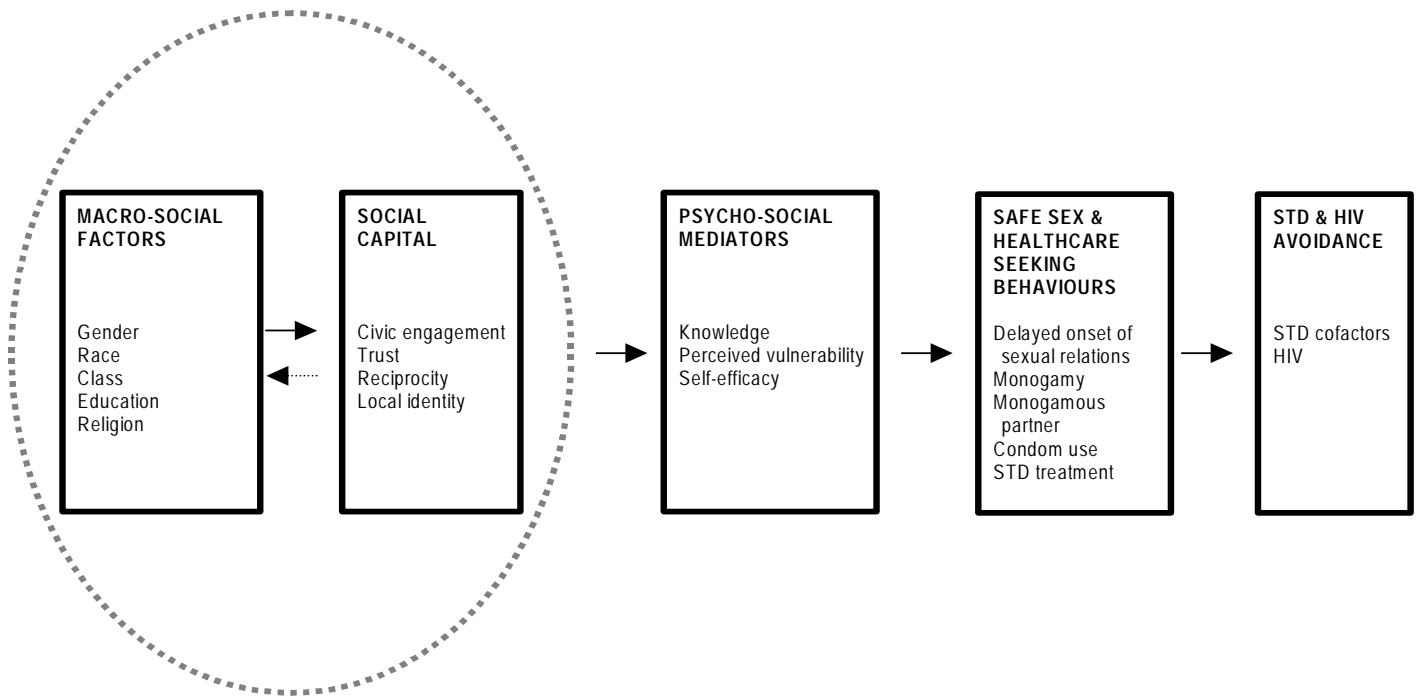
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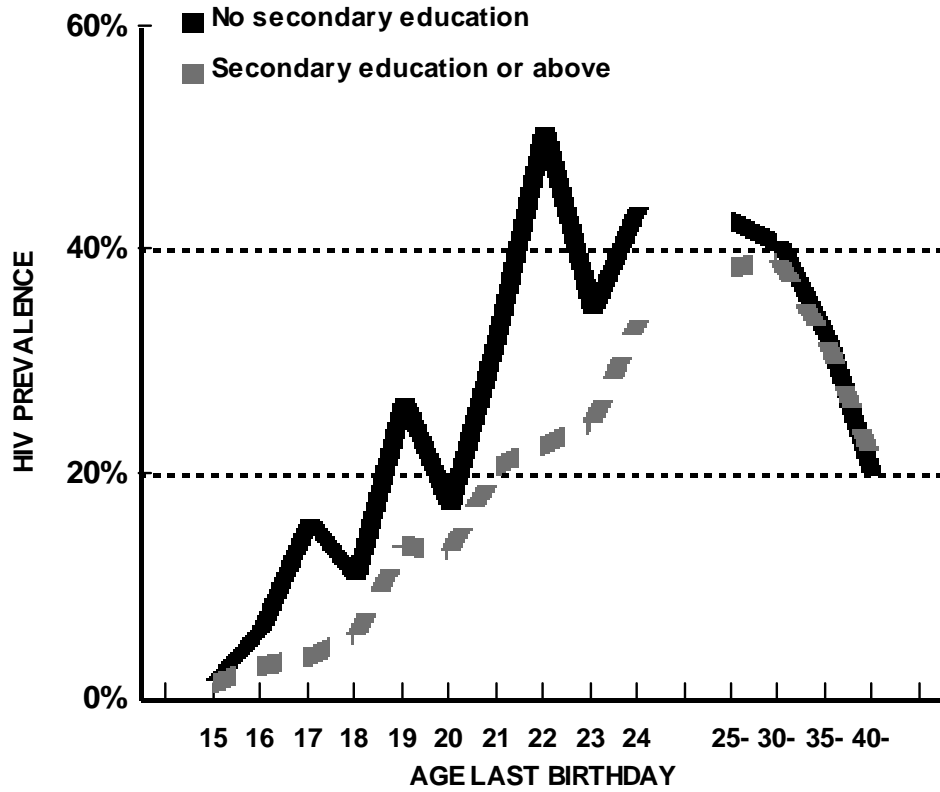


**Figure 2:** Theoretical model of the role of social capital in influencing levels of avoidance of infection at young ages in widely disseminated HIV epidemics

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**Figure 3:** HIV prevalence by age and level of education in women aged 15-44 years, Manicaland, Zimbabwe 1998-2000



**Table 1:** Candidate determinants of the social capital value of community groups

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Within group effects	Beyond group effects
External sponsorship	
Diversity of membership	
Horizontal <i>versus</i> hierarchical structure	
Formality of meeting structure	
Open or narrowly focussed meeting agenda	
Frequency and timing of meetings	
Meeting setting & alcohol consumption	
Co-operative <i>versus</i> conflictual meetings	
Interactions with similar & different groups	Interactions with similar & different groups
	Assistance for non-members

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**Table 2:** Age-adjusted odds ratios for behaviours protective against HIV infection in women aged 15-24 years given selected psychosocial attributes

Psycho-social attribute:	Not started sex	Monogamous since started sex			Monogamous partner <sup>2</sup>	Avoided HIV infection			
	<i>p</i>	All <sub>2</sub> <i>p</i>	Never married <i>p</i>	Ever married <sub>2</sub> <i>p</i>	<i>p</i>	All <sub>2</sub> <i>p</i>	Never married <i>p</i>	Ever married <sub>2</sub> <i>p</i>	
Knowledge about HIV	1.01 < 0.001	1.00 0.701	1.00 0.991	1.00 0.649	NA -	1.01 0.024	1.01 0.116	1.01 0.101	
Risk perception	0.62 < 0.001	0.77 0.039	0.46 0.003	0.90 0.455	NA -	0.91 0.441	0.89 0.670	0.94 0.677	
Self-efficacy:									
Possible to avoid HIV	2.99 < 0.001	1.34 0.039	2.03 0.033	1.22 0.214	NA -	1.23 0.137	1.33 0.381	1.18 0.271	
Possible to persuade partner to avoid unprotected casual sex	NA -	NA -	NA -	NA -	1.66 0.003	1.33 0.047	2.58 0.010	1.18 0.300	
N	2,272	1,302	252	1,049	671	2,266	1,195	1,070	

<sup>1</sup> Age-adjusted odds ratios for having avoided HIV infection in: (a) women reporting not having started sex versus those who have started; (b) women reporting only one sex partner since first becoming sexually active versus those reporting multiple partners; and (c) currently married women reporting a partner who does not have extra-marital relationships versus those reporting an unfaithful partner are 8.85 ( $p < 0.001$ ); 2.80 ( $p < 0.001$ ); and 1.77 ( $p = 0.007$ ), respectively.

<sup>2</sup> Odds ratio adjusted for age and current marital status: married, divorced or widowed.



**Table 3:** Age and socio-economic stratum-adjusted odds ratios for psychosocial attributes associated with avoidance of HIV infection given membership of a well-functioning community group by type of group in 2,272 women aged 15-24 years

Type of community group:	Psycho-social attribute:			HIV-		HIV knowledge		Risk perception		Self efficacy:			
	N	Married	Secondary	OR	<i>p</i>	Co-eff	<i>p</i>	OR	<i>p</i>	Avoid HIV		Persuade partner	
		(current)	educated							OR	<i>p</i>	OR	<i>p</i>
Any group	1,742	36	76	<b>1.33</b>	<i>0.04</i>	<b>+ 0.034</b>	<i>&lt; 0.001</i>	1.15	<i>0.20</i>	1.07	<i>0.55</i>	1.04	<i>0.81</i>
Youth groups	221	2	89	<b>2.82</b>	<i>0.01</i>	<b>+ 0.019</b>	<i>0.05</i>	<b>1.47</b>	<i>0.05</i>	<b>2.40</b>	<i>&lt; 0.001</i>	1.18	<i>0.73</i>
Sports clubs	112	8	94	1.97	<i>0.16</i>	<b>+ 0.046</b>	<i>&lt; 0.001</i>	0.68	<i>0.12</i>	<b>1.83</b>	<i>0.05</i>	1.26	<i>0.67</i>
AIDS groups	35	20	97	1.47	<i>0.61</i>	<b>+ 0.095</b>	<i>&lt; 0.001</i>	1.65	<i>0.17</i>	1.79	<i>0.28</i>	<i>0.53</i>	<i>0.33</i>
Women's groups	55	76	67	1.41	<i>0.34</i>	<b>+ 0.017</b>	<i>0.35</i>	<b>0.60</b>	<i>0.08</i>	0.63	<i>0.11</i>	<b>1.94</b>	<i>0.07</i>
Church groups	1,628	35	77	<b>1.35</b>	<i>0.10</i>	<b>+ 0.032</b>	<i>&lt; 0.001</i>	1.15	<i>0.18</i>	1.13	<i>0.27</i>	0.93	<i>0.62</i>
Co-operatives & farmers groups	41	85	59	1.25	<i>0.58</i>	-0.017	<i>0.41</i>	0.91	<i>0.77</i>	<b>0.56</b>	<i>0.08</i>	1.38	<i>0.39</i>
Burial societies	137	84	73	0.82	<i>0.36</i>	<b>+ 0.005</b>	<i>0.68</i>	<b>1.43</b>	<i>0.06</i>	<b>0.49</b>	<i>&lt; 0.001</i>	0.74	<i>0.14</i>
Savings & rotating credit societies	162	72	62	0.79	<i>0.23</i>	<b>-0.020</b>	<i>0.07</i>	1.18	<i>0.35</i>	<b>0.58</b>	<i>0.002</i>	1.00	<i>1.00</i>
Political parties	21	57	38	<b>0.32</b>	<i>0.02</i>	-0.019	<i>0.51</i>	0.80	<i>0.64</i>	1.41	<i>0.51</i>	1.28	<i>0.63</i>

<sup>1</sup> Poisson regression co-efficient after adjusting for the effects of age and socio-economic stratum. ORs in italics: less than 20 members in group started sex.

**Table 4:** School education & psychosocial mediators of behaviours protective against HIV Infection in women aged 15-24 years

Education level:	Knowledge		Risk perception		Self-efficacy:		<i>N</i>		
	<i>p</i>		<i>p</i>		Possible to avoid HIV infection	Possible to persuade partner to avoid unprotected casual sex			
None	43.9		33.3		33.3	26.7	15 (15)		
Primary	53.2		35.4		62.9	60.9	578 (371)		
Secondary	61.8		36.1		83.3	66.2	1663 (884)		
Higher	66.3		50.0		81.3	75.0	16 (8)		
Test for trend with increasing education	0.15 <sup>1</sup>	< 0.001	1.14 <sup>2</sup>	0.186	2.81 <sup>2,3</sup>	< 0.001	1.39 <sup>2</sup>	0.005	2272 (1278)

<sup>1</sup> Poisson regression co-efficient after adjusting for age.

<sup>2</sup> Odds ratio adjusted for age.

<sup>3</sup> Among currently married and unmarried women, the age-adjusted odds ratios for reporting that it was possible to avoid HIV infection were: 1.89 (95% CI: 1.45, 2.48; N= 846) and 3.84 (2.82, 5.22; N= 1417), respectively.

**Table 5:** Age and socio-economic stratum-adjusted odds ratios for psychosocial attributes associated with avoidance of HIV infection given membership of a well-functioning community group by type of group in women aged 15-24 years: by level of school education

Psycho-social attribute:	Women with secondary education (n= 1679)								Women with no secondary education (n= 593)											
	HIV-		HIV knowledge		Risk perception		Self efficacy:		HIV-		HIV knowledge		Risk perception		Self efficacy:					
	OR	p	Co-eff	p	OR	p	OR	p	OR	p	Co-eff	p	OR	p	OR	p				
Type of community group:																				
Any group	1.51	0.02	+ 0.017	0.03	1.30	0.05	0.96	0.81	0.87	0.46	0.95	0.84	+ 0.029	0.02	0.91	0.63	1.00	0.98	1.33	0.22
Youth groups	2.17	0.06	-0.005	0.58	1.44	0.03	1.92	0.02	0.94	0.91	5.54	0.11	+ 0.032	0.26	0.95	0.92	2.13	0.15	2.69	0.37
Sports clubs	1.85	0.25	-0.000	0.99	0.63	0.08	1.14	0.69	1.04	0.95	1.19	0.88	+ 0.229	< 0.001	1.27	0.77	2.80	0.35	0.94	0.18
AIDS groups	1.06	0.94	+ 0.052	0.02	1.57	0.23	1.09	0.88	0.43	0.22	-	-	-	-	-	-	-	-	-	-
Women's groups	3.21	0.06	+ 0.054	0.01	0.67	0.27	0.49	0.04	1.31	0.53	0.71	0.51	-0.064	0.06	0.48	0.17	1.09	0.87	4.85	0.04
Church groups	1.47	0.02	+ 0.013	0.08	1.28	0.05	1.03	0.87	0.85	0.34	0.82	0.37	+ 0.036	0.002	0.92	0.65	1.05	0.80	1.07	0.78
Co-operatives & farmers groups	1.19	0.76	-0.002	0.94	1.10	0.83	0.43	0.06	0.81	0.66	1.63	0.39	-0.002	0.95	0.72	0.54	0.92	0.87	3.56	0.06
Burial societies	0.82	0.47	-0.004	0.76	1.46	0.09	0.47	0.001	0.76	0.27	0.87	0.71	+ 0.045	0.06	1.38	0.38	0.60	0.16	0.66	0.27
Savings & rotating credit societies	1.00	1.00	-0.005	0.72	1.42	0.11	0.57	0.02	0.98	0.95	0.62	0.12	-0.011	0.56	0.84	0.55	0.71	0.21	1.01	0.97
Political parties	0.53	0.41	+ 0.056	0.20	1.40	0.64	0.47	0.32	1.43	0.66	0.27	0.04	-0.000	0.99	0.54	0.33	3.96	0.08	1.44	0.57

<sup>1</sup> Poisson regression co-efficient after adjusting for the effects of age and socio-economic stratum.