Beyond the biomedical and behavioural: towards an integrated approach to HIV prevention in the Southern African mining industry

BEYOND THE BIOMEDICAL AND BEHAVIOURAL:

TOWARDS AN INTEGRATED APPROACH TO HIV PREVENTION IN THE SOUTHERN AFRICAN MINING INDUSTRY

Catherine Campbell, Social Psychology, London School of Economics, Houghton Street, London, WC2A 2AE. Phone: 0171-9557701. Fax number: 0171-9557565. E-mail c.campbell@lse.ac.uk.

Brian Williams, Epidemiology Research Unit, P O Box 30606, Braamfontein, 2017, South Africa. Phone: +27-11-4033058. Fax number: +27-11-4031285. E-mail brian@eru.wn.apc.org

ABSTRACT

While migrant labour is believed to play an important role in the dynamics of HIV-transmission in many of the countries of southern Africa, little has been written about the way in which HIV/AIDS has been dealt with in the industrial settings in which many migrant workers are employed. This paper takes the gold mining industry in the countries of the Southern African Development Community (SADC) as a case study. While many mines made substantial efforts to establish HIV-prevention programmes relatively early on in the epidemic, these appear to have had little impact. The paper analyses the response of key players in the mining industry, in the interests of highlighting the limitations of the way in which both managements and trade unions have responded to HIV. It will be argued that the energy that has been devoted either to biomedical or behavioural prevention programmes or to human rights issues has served to obscure the social and developmental dimensions of HIV-transmission. This argument is supported by means of a case study which seeks to highlight the complexity of the dynamics of disease transmission in this context, a complexity which is not reflected in individualistic responses. An account is given of a new intervention which seeks to develop a more integrated approach to HIV management in an industrial setting.

Keywords: HIV/AIDS, occupational health, mining, southern Africa, alliances, migrancy

INTRODUCTION

In many of the countries in eastern and southern Africa worst affected by HIV, migrant labour is believed to play an important role in the dynamics of its transmission (Jochelson, Mothibeli and Leger, 1991). Little is known about HIV/AIDS in the industrial settings in which many migrant labourers are employed. In this paper we examine the history of HIV/AIDS in the mining industry in southern Africa.[1] Our analysis is driven by the proposition that "HIV is not a cause in its own right, but a strong marker for action and concern in development." (Klouda 1995, p. 467) The argument that the HIV/AIDS epidemic in southern African is a social and development problem is hardly novel. However, this insight has often not been operationalised in the way in which key players in the mining industry have conceptualised or responded to the problem. In the first part of this paper we illustrate the way in such players have understood and responded to HIV/AIDS either in biomedical/behavioural terms or as a human rights issue. The second part of the paper provides a case study which highlights some of the social, economic and political factors which make southern African migrant mine workers susceptible to HIV infection, in the interests of highlighting some of the limitations of existing approaches. We conclude with an account of a recently initiated HIV intervention in the mining community of Carletonville, South Africa, which seeks to develop a more holistic approach to HIV management in an industrial setting. It does this through conceptualising HIV as a social and developmental issue to be addressed not only at the level of particular mines, but also at the level of the formal and informal communities within which the mines are located, and within which miners conduct their everyday social and sexual lives. The intervention involves the active participation not only of the managements of the two major mines in the Carletonville region and of trade union representatives, as is usually the case in industrial health projects, but also of a wide range of other 'stakeholders' – including the provincial and national health departments, local general practitioners and traditional healers, as well as representatives of a range of grassroots community organisations.

[1] In choosing the mining industry, our intention is not to single out the gold mines as the SADC region's prime 'AIDS industry', given that levels of HIV are as high or even higher in a range of other contexts. However, the mining industry is particularly important for two reasons. Firstly it gives us an opportunity to examine HIV/AIDS management in the context of an industry which is critical to the regional economy. Secondly, it is an industry which has already attempted to implement a range of HIV-prevention strategies amongst its

MINING SECTOR RESPONSES TO HIV/AIDS

Mining is central to the economies of a number of countries in the Southern African Development Community (SADC) (listed in Table 1) which was established to promote economic co-operation in the region. More recently SADC has sought to identify other areas of mutual concern and interest, including HIV/AIDS for which the mining industry is considered to be particularly vulnerable. Mining contributes an estimated 60% of the SADC region's foreign exchange earnings, an average of 10% of the regions' gross domestic products (GDP) and about 5% of total employment in the region as indicated in Table 1 (Data supplied by the SADC Mining Sector Co-ordinating Unit, November 1996). In countries where mining is important the contribution to exports is particularly high reaching 90% in Botswana and Zambia and 65% in South Africa (Fourie, 1996).

INSERT TABLE 1 AROUND HERE PLEASE

The link between migrancy and mining is especially close on the South African mines, which employ 83% of all mine workers in the SADC region (Table 1). In 1993 there were as many workers from Botswana working on South African mines as working on mines in their own country, and while Lesotho has no significant mining industry of its own, remittances from the 85,000 Basotho working in South Africa (40% of the Lesotho male labour force) contribute approximately one-third of Lesotho's gross domestic product.[2]

While few data are available concerning the prevalence of HIV on different mines, prevalences amongst mineworkers in each of these countries are believed to be high. For example, informal estimates by mine medical staff suggest that levels of HIV amongst workers on the South African gold mines might lie in the region of 25%.

---

workers over a number of years, and while these have not been as successful as hoped, a number of important lessons can be learned from their shortcomings in order to plan future programmes in industrial settings.

Drawing on 22 interviews with a number of key informants representing SADC government, mining and union representatives (see *Key Informants* listed below), as well as published and unpublished articles and reports, this section illustrates the way in which biomedical/behavioural or human rights approaches have dominated management and union responses to HIV/AIDS. The *biomedical/behavioural response* conceptualises health and illness at the level of individuals, prompting biomedical/behavioural solutions, usually from the health or social services. The *human rights response* regards HIV/AIDS as a problem concerning the rights of individuals with respect to issues such as pre-employment testing, retrenchment, unfair discrimination and so on, rather than as a public health issue, or as a development problem. In this paper we argue for a reformulation of the terms of debate, in order to stimulate discussion and suggest alternative ways of conceptualising HIV/AIDS which might lead to new directions in policy formulation, new partnerships between governments and industry and better prospects for managing the epidemic.

Management Responses

The responses to HIV/AIDS by management of the gold mining industries in the SADC region initially took the form of involvement in various education and prevention activities. More recently management has engaged in the formulation of labour policies, involving issues such as job access, grievance handling, retrenchment, and confidentiality, and has negotiated bipartite agreements with trade unions and employee organisations as well as tripartite agreements involving management, unions and governments.

Management responses to HIV/AIDS have generally been at an individual level and, on a range of platforms, they have explicitly denied any link between HIV/AIDS and migrancy or housing for example. This insistence that disease should be explained and treated at the level of the individual is consistent with the industry's broader ideological position recently expressed by a South African

[2] Some sections of the report will focus disproportionately upon the situation in South Africa. This is because this country has the biggest mining industry in the SADC region, and employs the largest numbers of workers.

Chamber of Mines' medical representative who referred to the 'profound gulf between those who come ... with an ideological perspective informed by a commitment to public health values and those whose views are informed by a primary commitment to the liberty of individuals as increasingly debated in the United States' (La Grange, 1996), explicitly aligning the mining industry with the latter position.

The position of mine management in relation to HIV is complex. In South Africa, for example, the mines have a long history of providing excellent curative and tertiary health care (Fourie, 1996) but less emphasis has been given to preventive medicine and primary health care. In South Africa, for example, the recorded incidence of tuberculosis is amongst the highest in the world at over 1% per annum on some mines (Packard and Coetzee, 1995), the average gold miner has a one in forty chance of being killed, a one in three chance of suffering a reportable injury and a one in three chance of developing first degree silicosis, in a twenty-year mining career (based on Chamber of Mines accident statistics for the years 1984 to 1993, Chamber of Mines 1994). While the excellent hospital facilities are in principle available to workers even after they have left the mines the reality is that few ex-miners, especially those living in remote rural areas, have the wherewithal to avail themselves of this service. Furthermore, while the mines provide compensation for workers who contract occupational illnesses such as silicosis and TB, many workers who contract these diseases after they have retired from the mines are not aware of these rights, and do not claim compensation. Thus, the mines have effectively externalised many of the long term costs of occupational illnesses which fall on ex-miners' households and health services in their (often rural) places of origin (Arkles, 1993; Davies, 1992; Steen *et al.*, 1996; Trapido *et al.*, 1998).

The HIV/AIDS epidemic has disrupted this pattern of response to illnesses. Very early in the epidemic the mines made substantial efforts to establish HIV prevention programmes (Stein and Steinberg 1995, Gahagen, 1996), several years before any government prevention programmes (Decosas, 1994) including large-scale educational campaigns, which all mineworkers have to attend, and widespread condom distribution. Nevertheless, the results have been disappointing (Crisp, 1996) and while factual awareness regarding HIV/AIDS has increased, they have not shown demonstrable

behaviour change l*et al.*one any impact on the epidemic. On some mines attempts have been made to improve STD surveillance and treatment but levels of STDs have remained high (Ballard, 1996). Furthermore, while many of the health costs of long-term occupational diseases, such as TB and silicosis, were effectively externalised in the past, this may not be possible for HIV/AIDS. Although HIV is not, by definition, an occupational disease, HIV-positive workers may develop serious AIDS-related illnesses that are expensive to treat while in employment. Given the tradition of providing free health care to miners, this will, at the very least, necessitate a rethinking of the levels of treatment that the mines can continue to provide. Just how the mines are going to respond to these issues is not yet clear but will be determined by economic considerations, for as a Mines' representative recently noted 'AIDS is neither a human rights issue nor a health issue. For the mining industry, AIDS is a business issue' (cited in Crisp, 1995).

The HIV/AIDS epidemic could affect the economy of the mining industry in several ways, including labour, benefit and care costs. Here we consider some of the potential implications.

Human resource implications

The loss of labour, through AIDS deaths, will probably not affect the overall economy of the mining industry. The gold mining industry has other more immediate concerns, notably maintaining its viability given significant declines in the prices of gold and increased labour costs in recent years. Given the depth at which gold is mined in South Africa, production costs are substantial. Foster (1996) has estimated that HIV/AIDS will increase worker turnover on the South African gold mines from 3% to 6% per year but since there is a large pool of unemployed people, this additional cost will be manageable. More people will need time off as a result of AIDS related illnesses or to fulfil social demands such as attending funerals. To deal with these problems mines in Botswana, for example, are promoting 'multi-skilling' so that workers are trained for a range of jobs, and 'pool-groups' are set up to provide a reserve of people who can be called on to perform different jobs at short notice. In some settings in Zimbabwe two people are trained for each skilled job to minimise vulnerability to the sudden loss of skilled individuals.

Production losses

Currently the cost of producing gold in South Africa is about 25% higher than in the United States, Canada and Australia (Baxter, 1996). The copper mines in Zambia are even more marginal, particularly in the light of the ongoing turbulence of the world copper market. AIDS related illnesses will lead to the disruption of working shifts and a preliminary analysis by Foster (1996) indicates that the overall loss of productivity due to HIV on the South African gold mines may be about 2.5%. and while this is important, mine managers believe that the overall impact should still be manageable. The chairman of Anglo-American's gold division, was recently quoted in *The Star* newspaper (13/11/95) as saying: "If you are asking me whether I think the AIDS epidemic will destroy the mining industry, the answer is 'No'. We'll revise our death benefits and medical aids to be able to cope."

Death benefits

The issue of death benefits has not been a major issue in the region except in South Africa where this has driven debates about HIV. In 1995 the Old Mutual Assurance Company suggested increasing by 30% contributions to the death benefit scheme (under which the employers pay 70% and the workers pay 30% of the premiums). Neither employers nor the unions wanted to bear the increased costs and the union called into question the data on which these figures were based. Extensive negotiations followed concerning possible ways forward. After much debate, a special working group was set up, and it was agreed that benefit contributions would not be increased. (Sazi Jonas, pers. comm.).

Compensation

Historically, the mines compensated workers for occupational diseases such as TB and silicosis which are directly linked to working conditions. While some trade unionists argue that HIV-positive workers should be compensated when they are forced to retire on grounds of ill-health, it is unlikely that the unions will be able to argue that a complex multi-causal illness like HIV/AIDS is an occupational disease (which would put the responsibility onto the industry). The debate is complicated by the fact that TB is compensatable (in a limited sense) and, given the association between TB and HIV, there is

reason to believe that TB rates will continue to escalate. The South African Chamber of Mines has argued for pre-employment HIV testing to protect HIV-positive workers from exposure to high levels of TB to which they are particularly vulnerable (La Grange, 1996) while others have strongly contested the scientific basis of this argument (London *et al.*, 1996).

Care

The care of people who develop AIDS-related diseases while in employment may present the greatest economic threat to the mines: treating one HIV-positive miner for cryptococcal meningitis, for example, costs an estimated R40,000 (US$8,800).[3] Whiteside (1992) points out that expenditure on health care for AIDS patients is closely correlated with the wealth of a country through the level of service that is provided and the diseases that are treated, so that in 1992 the lifetime expenditure per case in Malawi was US$210, in Jamaica US$1807, and in the USA US$68,000. A more recent estimate of this expenditure in the USA is US$95,000 (Gable *et al.* 1996). The traditionally free provision of the best available treatment on the South African and other large mines in the region would make the costs of such treatment more like the costs in the USA which would be quite prohibitive. Once people with HIV are no longer fit to work they will be retired on disability grounds after which the mines will no longer be responsible. Hard decisions will have to be made concerning the diseases that mines can afford to treat. What form these decisions will take, and how they will be managed by the industry and by worker representatives remains to be seen. It appears that neither the industry nor the unions have addressed this issue seriously.

Union Responses

Historically, trade unions have responded to HIV/AIDS through negotiating human rights policies and developing agreements with management around such issues. As early as 1988 the South African National Union of Mineworkers argued for a link between migrancy and housing, and AIDS, but there has been no significant changes in either area as a result. Unions have generally been reactive rather

than proactive. In South Africa, for example, the unions' first response to HIV/AIDS was in reaction to the Chamber of Mines study which found that the prevalence of HIV amongst Malawians was about 4% compared to less than 0.03% for workers from other countries (Brink and Clausen, 1987). This led the previous government of South Africa to call for the repatriation of HIV-positive foreign workers and HIV was added to the list of diseases for which people could be excluded from the country. In an unusual alliance the Chamber of Mines and the Unions disagreed strongly with the government position and insisted that HIV-positive workers already in employment should not be repatriated although the Chamber maintained that HIV-positive people should not be recruited to new jobs. Since all mineworkers are on short term contracts of one year or less, this effectively meant a form of delayed repatriation. Within three years there were virtually no Malawian workers left on the mines, a situation which persists today. In response to the proposed policy of pre-employment testing the unions argued strongly against what they claimed was a discriminatory practice. In this they were successful and the prohibition of pre-employment testing has now been formalised in agreements between the NUM and the Chamber of Mines.

In 1995 there was a second flurry of union activity in South Africa in response to the Old Mutual's expressed intention to increase premiums– discussed above. This debate continues and the unions, management and insurance companies are seeking agreement on the form that premiums and death benefits should take in the future. This, more than anything else, has led the unions to acknowledge the gravity of the situation and has encouraged them to debate the kinds of data that are needed to make these decisions and hence to express a willingness to consider both prevalence surveys and wider prevention programmes. More recently a series of regional meetings have been held to develop regional union positions and mining codes on HIV/AIDS The ultimate impact of these discussions remains to be seen.

To a limited extent, unions have been involved in prevention activities but these have been initiated and funded by management or outside agencies such as NGOs, and unions must deal with the lack awareness of the urgency of HIV/AIDS among their members. Poor awareness of health risks amongst

[3] At the time of writing (1997) the rand-dollar exchange rate was R4.48 = US$1.

rank and file union members has long been cited as a problem facing trade unionists concerned with health and safety issues (Zwi, Fonn and Steinberg, 1988). While knowledge about HIV, its mode of transmission and it consequences, seem to be relatively high amongst mine workers, the difficulty of organising workers at the grassroots level around HIV/AIDS has been articulated by a number of union leaders in a range of countries. For preventive interventions to work, there has to be grassroots ownership and implementation, but many obstacles stand in the way of achieving this. One management representative cited the unwillingness of workers to be involved in prevention programmes as a key obstacle.

Joint responses

There have been a number of bipartite (management and unions) and tripartite (government, management and unions) meetings both nationally and inter-nationally in the SADC region resulting in a range of resolutions, policy declarations and codes and in particular a Southern African Code on AIDS and Employment adopted unanimously by government, union and management delegates from Botswana, Namibia, South Africa, Zimbabwe and Zambia.

Most union and management representatives express some degree of scepticism regarding the extent to which high level meetings are worthwhile. Management AIDS workers complain that while they come back from such meetings 'all fired up', it is difficult to sustain this momentum when top management is not particularly committed to fighting HIV/AIDS. Union members complained that these meetings are aimed only at top level officials, and do not address the essential problem of getting grassroots workers involved and that insufficient attention is being given to the gap between policy and implementation.

Responses of key players within the mining sector: summary and conclusion

To what extent have management and union activities had any impact on the epidemic? Great progress has been made concerning the rights of individual workers and the Southern African Code on Aids

and Employment, for example, provides an essential framework for the negotiation of human rights issues across the region. However, there is little evidence that management or trade union activities have significantly altered the course of the epidemic. Given the limited available data HIV prevalence within the mining industry appears to be following the same kind of logistical growth as in the broader societies in which the industries are located. With the benefit of hindsight a number of reasons may be offered for this situation.

Lack of leadership from governments

The failure of many governments in the region to provide leadership and vision for HIV/AIDS activities, has meant that management and union attempts to fight HIV/AIDS have not had the support of a broader social initiative Although the epidemic is at a different stage in each country it is broadly true that governments have initially located primary responsibility for HIV/AIDS within Departments of Health (as is currently the case in South Africa, Namibia and Lesotho). In countries where the epidemic is more advanced, governments have realised that many of the causes and consequences of HIV are beyond the scope of health ministries, and in Zambia and Botswana explicit multi-sectoral plans have been developed to draw in a range of government ministries, and these are in the process of implementation.[4]

Zambian multi-sectoral approaches to HIV/AIDS have been based on the premise that 'HIV/AIDS is not just a health problem, as there is currently no cure, and factors that facilitate the spread of HIV/AIDS like prostitution, casual sex, cultural practices, poverty and others are beyond the scope of health administrations' (Sampule, 1995, p. 26). Nevertheless several obstacles have been encountered. One is that Zambia's current economic uncertainties and attempts to restructure the economy have tended to focus national attention on macro-economic variables, often at the expense of other equally important concerns such as fighting HIV/AIDS. Another relates to the current restructuring of the health services in Zambia, which has absorbed the limited capacity and resources in the health sector which might otherwise have focused on HIV management and the co-ordination of multi-sectoral

activities. Furthermore, when ministries do have the finances and capacity to undertake HIV/AIDS-related activities, these usually involve the distribution of information, education and communication materials, and condoms, sensitisation seminars and the training of peer educators (Sampule, 1995). These activities are important, and Zambia sets a laudable example for many other countries in the SADC region, but they do not depart from the conventional biomedical/behavioural interventions which have serious limitations. The Zambian interpretation of multi-sectoralism is likely to be of limited effectiveness if it simply spreads a limited range of educational activities into a greater number of ministries, and does not develop innovative approaches that address the broader social, cultural and economic factors that provide the context for HIV-transmission.

In Botswana, the National AIDS council chaired by the Minister for Health with the Minister for Housing as deputy and including several other ministries, is responsible for implementing a multi-sectoral approach. Each ministry attempts to assess the impact that HIV is going to have in its area of operation, and incorporate this into their development planning process. We suggest that this form of multi-sectoralism is still reactive in nature, aimed at accommodate the impact of the disease, rather than taking the approach advocated by Klouda (1995) which would involve proactively addressing the social determinants of HIV/AIDS and developing policies that would be likely to minimise the continued spread of HIV infection through innovative and creative social policy and planning.

The response of other governments has been mixed. It appears that that the Zimbabwean Department of Education leads the region in providing HIV education and programmes are now in place for all schoolchildren from the ages of 6 to 18 years. In South Africa it is hoped that HIV/AIDS education programmes will be in place in all high schools by 1998. Although President Mandela identified the fight against HIV/AIDS a top priority and committed a large amount of money to the Ministry of Health to promote AIDS-related activities, very little has been achieved.

[4] There have been some attempts by development agencies to implement multi-sectoral HIV/AIDS projects in Zimbabwe also. However these initiatives have not got very far in any ministries apart from Education (discussed later in the section).

The failure of South African governments, both pre- and post-apartheid, to take up the issue of HIV/AIDS in a meaningful way has been unacceptably negligent. The epidemic in South Africa has developed five years to ten years after the epidemics in other East, Central and southern African countries so that South Africa has had time to learn from experiences of others and has had a window of opportunity in which to implement HIV prevention and management programmes (CITE MAPUTO DECLARATION HERE). Furthermore, the resources available to those wishing to implement interventions in South Africa exceed those available to most other countries in the region.

This lack of government leadership has impacted on all sections of the society including the mining industry. In South Africa, for example, the almost R15 million spent by the Department of Health on the unsuccessful AIDS play Sarafina might have been spent to better effect in the rural areas from which many miners originate and to which they return; it might have been made available to unions and others for community based theatre or used in any number of other ways to develop and refine innovative approaches to HIV-prevention.

Financial constraints have impacted on the South African government's earlier willingness to supply free condoms to the mining industry. One senior mine manager reported that while the government had supplied free condoms to workers on his mine for some years they recently announced, with no warning, that free condoms should only to be made available for those out of work and that the mining industry should now pay for their own condoms.

Lack of unifying vision and growing despondency

HIV interventions are most likely to succeed where there is a unifying vision and a common approach, between government, unions and management. As noted above, governments have generally not provided leadership or vision in support of HIV/AIDS management activities on the mines. Unions must deal with denial and stigma among their members and where unions have attempted to generate a sense of HIV/AIDS as a social problem, and to link it to issues such as migrancy and housing, such moves have often conflicted with the management tendency to regard HIV/AIDS as a problem facing individual workers most appropriately dealt with at the biomedical/behavioural level. Furthermore,

particularly in countries such as Zimbabwe and Zambia, there is increasing despondency in the face of the relentless and seemingly unstoppable advance of the epidemic One AIDS worker captured the not uncommon sense of hopelessness: 'We are beyond the stage of bothering about prevention now. What we really need to turn our minds to is the issue of care and treatment' and a worker-leader said: 'In our country we have done everything we know of ..... All these good programmes, but they have had no impact on the epidemic.' These feelings were echoed by a health educator, saying: 'We sometimes feel as if we are wallowing in the futility of it all.'

Lack of awareness; stigma around HIV/AIDS; lack of openness at all levels

Several trade unionists cited difficulties in mobilising workers' interest around the HIV/AIDS issue. They suggested three main reasons for this: (i) the lack of perceived vulnerability by some workers—either due to a lack of knowledge, or to complex forms of denial—which makes healthy workers less likely to take an interest in HIV/AIDS-preventive activities; (ii) some workers' feelings of powerlessness in the face of yet another disease in a social context where high levels of disease and injury, as well as a range of more immediate social stresses and demands, may put concerns about HIV low down on the list of peoples' priorities, resulting in what some might describe as an apathetic acceptance of the inevitability of problems such as HIV/AIDS; and/or (iii) the stigma associated with being HIV-positive, which makes workers who know that they are infected unwilling to identify themselves to their peers. A union leader told us of a recent high-level union meeting where organisers put condoms in the conference packs provoking an extremely negative response from senior union delegates. He said that their reaction illustrated a lack of sensitivity even at a relatively high level within the union to AIDS educators' on-going struggles to normalise condom usage at all levels of society.

A fear of the stigma of HIV/AIDS was reported not only amongst workers, but also amongst senior figures in the mining industry, who are extremely anxious that the mining industry does not become scapegoated as the southern African 'AIDS industry', with senior officials continually emphasising in newspaper reports and informal conversations that levels of HIV/AIDS are often equally high in

industries and communities unconnected to mining. This is clearly the case, and we would by no means seek to single out the mining industry in this way (see footnote 1 above).

Limiting discourses

Returning to the central thesis of this paper there is the tendency to regard HIV/AIDS as a problem to be dealt with at the *biomedical/behavioural level* or as an *individual human rights issue* rather than seeing it as a broad *social and developmental issue*. To highlight the shortcomings of the current ways of dealing with HIV/AIDS within the SADC mining sector we present a case study that illustrates how the negotiation of sexual encounters by mineworkers cannot be understood independently of a broad range of contextual factors which are not taken account of in individualistic approaches.

REFRAMING THE DEBATE

Seidel (1993) emphasises the negative role played by unduly limiting discourses in distorting responses to HIV/AIDS in a range of sub-Saharan African contexts (including intervention and policy responses, as well as research agendas). In the SADC mining context, there is no evidence that the biomedical/behavioural/individualistic responses outlined above have made any impact on the epidemic, and while the human rights issues are clearly important and must be fully addressed, there are wider political, social, economic and development issues that need to be taken into consideration if new and more effective approaches to HIV management are to be developed in the next decade. By emphasising the importance of a less limiting conceptualisation of the problem we hope to stimulate debate about areas within which policy-making may reshape some of the contextual factors in which health and sexuality are negotiated and so reduce the growing vulnerability of large numbers of southern Africans to HIV-infection.

We suggest that HIV/AIDS needs to be seen as *a Bio-Psycho-Social* problem and that the disease as well as interventions need to be understood at all three levels: biomedical, psychological and social. We do not dwell on the *biomedical* dimensions of HIV here other than to say that in the context of the

mines, the most important diseases associated with HIV/AIDS are other STDs, which increase one's vulnerability to HIV-infection, and TB which is the commonly associated with HIV infection. Both were highly prevalent on the mines in southern Africa even before the epidemics of HIV took off. Attempts to control STDs and TB on the mines have met with little success. On some South African mines, intensive efforts are underway to improve control base on syndromic management of STDs (Ballard 1996) and directly observed treatment with short-course therapy (DOTS) to improve compliance with TB treatment (Churchyard 1996, Mqoqi 1995). Such efforts have yet to be evaluated.

At the *psychological* level, a range of behavioural interventions (in particular the information-based educational programmes) have been implemented on the mines in all the SADC countries. These programmes typically provide information about HIV/AIDS with the intention of changing individual sexual behaviour. Success has been limited: while they have improved peoples' knowledge, they have not resulted in large-scale change in sexual behaviour. We argue that such programmes are informed by weak and inappropriate social psychological theories which assume that sexual behaviour is determined by rational choices made on the basis of the available health-related information. The weakness of such assumptions is highlighted by the fact that many people continue to have unprotected sex, often with casual partners, despite having extensive knowledge about HIV/AIDS its determinants and consequences (Gillies, 1996). In the case study below, we seek to show that the psychology of human behaviour, especially in relation to sexuality, is far more complex than many prevention programmes acknowledge. In relation to HIV/AIDS, both physical health, as well as psychology (particularly in relation to sexuality), cannot be understood independently of the *social dimension*, incorporating a range of cultural, economic, sociological and normative factors all of which need to be taken into account in attempts to manage the epidemic. The challenge facing SADC governments is to develop policies that impact on the cultural, economic, social and normative factors that make so many southern Africans vulnerable to HIV/AIDS.

Case study: the psycho-social context of HIV transmission on the South African gold mines

P was one of 40 mineworkers interviewed for the Epidemiology Research Unit's Perceptions of Health Project (see Macheke and Campbell 1998, for a more detailed account of this project). An account of P's life has been constructed from this interview in the interests of highlighting the psycho-social context of sexuality in the mining context. Campbell (1997) has discussed some of these issues in detail in a recent study of why mineworkers have sex without condoms, and we draw on that work here.

INSERT BOX HERE PLEASE

CASE STUDY.

P is 23 years old, and he comes from a rural district in Lesotho. He works on a gold mine about an hour's drive from Johannesburg, South Africa. He has worked on the mines for six months. He is tall and thin with a distinctive sense of humour, and much of his conversation is couched in the form of jokes and delivered with much laughter and clowning. He describes himself as a happy person. He does not have a special girlfriend or any children. He seems lonely on the mines and says that he misses his family, especially his parents. He has an excellent relationships with his parents, despite the fact that they are very strict. In the mine compound he shares a room with 11 other men, and while he likes these men and appreciates the advice and support they often give him, they are all older than he is and he does not have much in common with them. He has one friend of his own age group who lives in another room in the same hostel. They spend their spare time together, playing *morbaraba* (fingerboard) in the compound or washing their clothes. P is religious, and is part of church group that meets almost every day in the veld outside the mining compound.

He describes his job as the *pikinini ya square*—inserting dynamite into the rocks after the holes have been made. He gets paid about R800 per month. He does not enjoy this work, but says he has no option but to continue with it because his family in Lesotho have serious money problems. His father had been a mineworker in his youth, but had lost his job: "I was told that my father had been a loafer." Opportunities for making a living in rural Lesotho are limited. P says his options regarding work are particularly limited because he has had little formal schooling. "Unfortunately, my father could not take me to school because he was interested in women here in Johannesburg. So I had to herd cattle as I was growing up." He says that currently his main worry is that he would like to have his own wife and his own possessions. However he says that it is difficult to "chase two hares" (viz.: support both his parents and siblings on the one hand, and a wife and children on the other). "Given the salaries we get one cannot satisfy all their needs, that is why I am concentrating first on my parents. I did

not go to school myself, so I want my younger brothers and sisters to get education, so as not to do the kind of work I am doing, but to get better jobs. The job I am doing is not for people with education, but for those who did not go to school. I do not want them to suffer like me, but to find themselves certain positions."

At first he found underground work frightening—"the underground surprised me, and I felt like running away, but I could not until I got used to it". He said that his colleagues played an important supportive role in consoling him, and encouraging him to be strong in the face of his anxieties. He and his colleagues are constantly aware of the danger of accidents. He says that he deals with this fear by never talking about it. "We do not talk about injuries because if we did we would be too afraid to work underground." While he himself has never been underground when an accident happened, he has seen the bodies of dead and injured people being brought out of the mine.

He is not satisfied with his working conditions, particularly since he says that he frequently has to work much longer that the eight hour shift he is paid for—often up to 10 or 12 hours. However he says that he and his colleagues have limited channels for airing their grievances: "We usually complain to our 'baasboy' (supervisor) and he usually does not take further steps. When he really tries to put forward our complaints he reaches a deadlock with those in authority."

He describes his health as poor, and finds working in the mines strenuous. The intense heat underground gives him headaches, and at the end of the day his body is full of pains, and his feet get very swollen. He ascribes the pains and the headaches to underground work and has recently sought treatment for these at the mine medical clinic. He ascribes the swollen feet to witchcraft practised on him by an old woman in his home district in Lesotho. He has consulted a number of *sangomas* (traditional healers) about his swollen feet, paying them between R200 and R500 per consultation, to no avail. Currently he is consulting a faith healer, who is attempting to treat him through prayer. He says he struggles with medical doctors because he does not speak English, but he deals with this problem by making sure that someone accompanies him to the doctor to explain his problems.

P has many sexual encounters with commercial sex workers on the mines. He gives two reasons for what he described as his frequent sexual activity. The first is that he enjoys the sexual freedom he has away from the control of his parents—who were very strict and prohibited him from moving around freely. The second reason is that "this is the way that men were made—to always have desire for women". He says that casual commercial sex is easy to find. At every stage of his journey to and from Lesotho, large numbers of women gather, selling sex to workers. In particular women wait for men in Maseru on their way home from the mines with money in their pockets. At the mines, women also market sex in great numbers, and hang around near the liquor shop where people are drinking. "All you have to do outside the compound is to call someone—they all sell for ten Rand a round, especially those who do not insist on a condom, we like to do it *nama nameng* (flesh to flesh). I think a condom is wasting my time." He says that condoms are freely available at the compound gate at no cost, but they are not to his taste. He tried using a condom once, but in the middle of the sexual encounter the woman ran away, saying that she feared

that if he ejaculated in the condom, the condom would be left inside her. This, in addition to the fact that he did not feel pleasure with the condom on, has made him unwilling to use them again.

His knowledge about HIV/AIDS was patchy. In response to questions about HIV/AIDS, its symptoms and its causes, P said that HIV/AIDS was caused by having sex with many women, and that its main symptoms were that it caused the skin to peel off. He said it was an extremely serious disease, not curable by traditional healers, but he believed that if one went quickly to the medical doctors there might be some chance of them healing it. He said that he himself worried that he might get AIDS due to his sexual activities—but that these fears did not deter him. "The truth is that I do not think anything when I am having sex. It is only when I am finished—that is when I start to think about AIDS." When asked why he knowingly took such risks, he commented that "the truth is that a man is a dog - meaning that he does not get satisfied ... when a man sees a dress, he follows her ... basically it is the body that has that desire".

This case study is provided to illustrate our claim that a mine worker's risk of contracting HIV is affected by a range of social and psycho-social circumstances which existing HIV-prevention programmes do not take into account. Figure 1 provides a graphical summary of some of the mediating links between the social context in which migrant mineworkers live their lives and their sexual health, based on the case of P outlined above. Social factors include: economic factors, working conditions and gender dynamics. The link between these social factors and unsafe sexual behaviour is mediated by a range of psychosocial processes, in particular low levels of self-efficacy, knowledge and beliefs that compete with health educational messages, and masculine identities — all of which predispose miners to having unsafe sex. Unsafe sex exposes the miner to a range of sexually transmitted diseases which increase the danger of HIV-infection, or may result in direct HIV infection unmediated by other STDs. Each of these factors is discussed in turn below.

INSERT FIGURE 1 AROUND HERE PLEASE

Starting with economic factors, conditions of rural poverty mean that many people are forced to become migrant workers, and with high levels of unemployment, work in the mining sectors is one of the few options available to people with little formal education. Against this background, work on the mines, despite its stresses and dangers, provides the best financial option for many men.

Working conditions are grim, with long hours of physically taxing and dangerous work, often in confined spaces, using heavy machinery under conditions of great heat and high humidity. Miners live in daily fear of accidents. Many have witnessed accidents in which friends or co-workers had been killed or injured. Miners we interviewed pointed out that in a context where illness, death and injury are such a routine part of everyday life, people are less likely to be motivated to avoid a disease which might only affect them in five years time. HIV/AIDS is simply one of many problems facing most miners, and far less immediate than many others such as accidents for example. In an extremely high stress situation, where workers need to unwind and relax at the end of the day, drinking and sex seem to be two of the few diversionary activities that are easily available, and the strong association between the use of alcohol and unsafe sexual practices is well documented.

On the Johannesburg gold mines, more than 90% of workers live in single sex hostels. Between 12 and 18 people shared rooms on the mine where P was interviewed. Women are not allowed in the hostels. Hostel life provides few opportunities for social support and intimacy. A large literature points to a correlation between unprotected sex and a desire for intimacy. Given that their wives and families are some distance away, commercial sex is often the most convenient option for men living in large single-sex hostels, often some distance away from towns. For women, who have even less access to work opportunities than men, commercial sex work may be the only way in which many women can make a living for themselves and their children, and large numbers of women flock to the mines from rural areas, particularly Lesotho, in search at best to establish a relationship with a man who will support them, and at worst to make their living selling sex. The mine hostels, housing large numbers of single men, are regarded as one of the key sources of potential boyfriends or customers. Furthermore, given that many men do not like to use condoms, women will often agree to unprotected sex because they need the money. In interviews with commercial sex workers on a Johannesburg mine earlier this year, Campbell (1998) found that it was not uncommon to find Basotho sex workers, with up to 30 mine worker sexual contacts a month, who had never used a condom in their lives, despite fears of HIV/AIDS, because mine worker customers were unwilling to pay for protected sex. Furthermore, given the gender dynamics in southern Africa, regular girlfriends and wives also feel

reluctant to insist on the use of condoms, even when they know that their husbands have multiple partners. This is particularly the case in women who have low self-esteem, who have been socialised into accepting male dominance in relationships, or who feel insecure in a relationship (this could be for a range of reasons e.g. economic dependence on a sexual partner might deter a woman from displeasing him). Such gender dynamics are an additional factor that might militate against the use of condoms in sexual encounters.

Campbell (1997) argues that such gender dynamics are exacerbated in the mining context, insofar as masculine identities serve as an important coping mechanism whereby miners deal with the stresses and dangers of their working lives. P mentions that he was scared when he first started working and that he was consoled and encouraged by his fellow workers. Other informants told us that a key means of encouragement in such a situation is for men to remind each other that they are men — brave, strong, prepared to take risks for the sake of their families. Workers actively reinforce a sense of macho identity as a coping mechanism for dealing with tiring and often frightening working conditions. Ironically this positive aspect of masculinity is associated with a potentially health damaging aspect — the view that men have an insatiable need to have unprotected sex with many women ('unprotected' carrying connotations of fearlessness in the face of risks). While this was not mentioned in P's interview, many of our other informants stressed that health depended on maintaining a good balance of blood and sperm in the body, and that frequent sex was important in order to maintain this balance.

Working and living conditions on the mines lead to low levels of perceived self-efficacy amongst mine workers. The more people feel that they are in control of their lives, the more likely they are to take measures to protect their health. Mineworkers feel powerless in a range of contexts in their lives. Many feel that they have limited power to address what they regard as injustices at work (e.g. having to work longer hours than contracted, having to work in dangerous conditions). *Induna's* (worker team leaders) frequently do not take up their complaints, and when they do, they often have little success. Most mining unions have had little success in fighting for safer working conditions, or for taking up workers' complaints about issues such as food and housing. Most miners say that they do not enjoy

their work, but feel they are forced into it given poverty at home and high levels of unemployment. We have already spoken of fear of accidents, and many workers also feel that they are at high risk of tuberculosis, and that there is little that they can do to avoid it. A perceived lack of control in one's life in general may extend to a sense of lack of control of one's health, and the increased likelihood of unsafe sexual behaviour.

Interviews with mineworkers highlighted a range of beliefs and knowledges which competed with the health educational messages of HIV-prevention interventions on the mines. Macheke and Campbell (1998) illustrate the way in which mineworkers in southern Africa are often located within a plurality of healing systems - seeking care and treatment from traditional healers, biomedical healers, church healers (prophets) and so on. The majority of HIV/AIDS intervention strategies are strongly associated with the western biomedical approach - which may only play a limited role in a mine workers perceptions of health and healing. More care needs to be paid to traditional cultural beliefs and practices which may not be consistent with the health messages or healing practices of biomedical practitioners. In addition people may feel less than comfortable with biomedical doctors from other cultures who seem unfamiliar with or insensitive to their needs and beliefs.

This case study has sought to highlight the complex chain of factors which make mineworkers vulnerable to HIV/AIDS, many of which fall beyond the reach of current HIV prevention programmes on the mines, with their predominant focus on information-based education and STD detection and treatment. In the next section we will point to some of the implications of this case study for HIV management in the mining industry.

CONCLUSION

In the first part of this paper we examine the way in which HIV/AIDS has been conceptualised in the SADC mining sector, by management, unions, the state and health professionals, and argue that this conceptualisation needs to be critically revised as a matter of urgency – illustrating our argument with

a case study presented in the second part of the paper. Since the SADC mining sectors do not represent a homogenous grouping it is difficult to make generalisations, and there will no doubt be a range of country-specific and industry-specific exceptions to many of the trends that we have sought to outline in the paper. However we are confident that the majority of mining industry-related responses to HIV/AIDS have been dominated by the conceptualisation of HIV/AIDS as either *a biomedical/behavioural problem*, prompting biomedical/behavioural solutions or else as *a human rights issue*. Since they do not take adequate account of the social factors that shape the biomedical and behavioural dimensions of HIV/AIDS amongst mineworkers, they may have resulted in an unduly limited range of responses to the problem.

Tawil *et al.* (1995) point to the need for a shift in the discourses that shape sexual health promotion campaigns, away from biomedical and behavioural interventions and towards so-called 'structural interventions' and 'enabling approaches'. Tawil *et al.* (1995) define enabling approaches as those that rather than trying to *persuade* people to change their behaviour through education programmes, or through encouraging them to attend STD clinics, sexual health promoters turn their attention to the possibility of creating circumstances that *enable* behaviour change to occur. Such approaches focus on the social and environmental determinants that facilitate or impede behavioural choice, and aim to remove structural barriers to health-protective action as well as constructing barriers to risk taking. Tawil *et al.* illustrate their argument with a review of the context of HIV transmission in developing countries, arguing that enabling approaches should focus on the economic development of at-risk groupings, as well as on development policy. Focusing on the powerlessness of many women to protect themselves against HIV-infection, they focus on a range of economic and policy strategies aimed at improving women's access to resources and their subsequent financial dependence on male partners who are unwilling to use condoms for a complex mix of reasons. The discourse of "enabling approaches" provides a useful basis for a shift in thinking about HIV-prevention in the mining context.

This gradual shift in discourse is slowly filtering through to debates about the role of both national governments and industry in HIV-prevention. At the government level, Whiteside (1992) has long warned of the dangers of the tendency to view HIV/AIDS as a medical/behavioural problem, allocating primary responsibility for sexual health within health departments (as has historically been the case in South Africa), rather than trying to involve a much broader range of government

departments in multi-sector attempts to create more health-enabling environments. Our case study has sought to illustrate his claim through showing that many of the contextual factors leading to HIV/AIDS lie outside the province of health departments and outside the reach of biomedical/behavioural interventions. We argue that much scope exists for imaginative multi-sectoral policies which aim at reshaping features of society that make particular individuals or groups – in this case mineworkers and their sexual partners – so susceptible to HIV infection. This might involve focusing on issues such as migrancy and housing, the economic dependence of women, high levels of rural poverty, under-development and mis-development, the possibility of establishing stricter safety legislation for workers.

The links between these factors and health are often indirect, and not immediately obvious, and linking them to health and HIV/AIDS clearly requires breadth of vision and careful thinking. Each ministry in each region will be best placed to think carefully about its policies and their implications for the health of their fellow citizens in their particular local context. Decosas (1994) argues that it is particularly important that HIV-management initiatives are formulated by local stakeholders, rather than by academics or by 'the shock troops of international experts' or by donor agencies, who he argues have played too central a role in shaping HIV-management plans in southern Africa thus far, despite the fact that they too often have an inadequate grasp of local dynamics and local understandings of the situations in which such HIV-management plans must be implemented. He emphasises the importance of promoting opportunities for African countries to learn from one another and to formulate responses that are appropriate to local experiences and knowledge. SADC is one inter-national grouping that is currently taking up this challenge.

Zambia and Botswana have taken the lead in the development of multi-sectoral approaches - and there is much to be learned from the successes and failures of these new initiatives, and Zimbabwe and South Africa are currently debating ways of spreading responsibility for HIV-prevention over as many government sectors as possible, rather than laying too much emphasis on health ministries. We have argued here however that the type of multi-sectoralism as developed in Zambia, for example, needs to be extended further than simply implementing HIV educational and awareness programmes in a range

of ministries. Ministries need to look at the way in which their policies impact on broader social issues such rural poverty, educational disadvantage and the economic position of women which facilitate the practice of unsafe sexual behaviour, and hence HIV-transmission.

At the level of particular mining regions, there are currently a range of initiatives attempting to conceptualise HIV/AIDS in a way that moves beyond individualistic perspectives. One of these is the HIV-prevention programme that is about to start in Carletonville in the Johannesburg region (Williams and Campbell, 1996). The activities of this project are fairly typical – aggressive syndromic management of STDs, health education and condom distribution. However this project aims to improve on existing interventions in a number of ways that take account of the broader context of sexual activity than traditional HIV management programmes on the mines have tended to do. Firstly the project will be aimed not just at mineworkers – but also at members of the communities surrounding the mines, and in which miners conduct their social and sexual lives. Secondly the project will be managed not only by mine managements as is usually the case, but by an alliance of management, trade unions, grassroots community organisations, and representatives of the provincial and national health services (Williams and Campbell, 1998). Thirdly attempts will be made to involve a wide range of traditional and biomedical practitioners in the project's activities. Fourthly, rather than relying on information-based HIV-education, community-based outreach and peer education strategies will be used, and every effort will be made to ensure that target audiences participate as fully as possible in the design and implementation of these strategies, increasing workers' sense of self-efficacy in relation to their health through maximising their leadership and participation in health-related projects (Dube and Wilson, 1996). Furthermore community-based peer education programmes are designed in explicit opposition to information-based education programmes - aiming to provide the enabling conditions for the re-negotiation of sexual cultures at the collective level rather than attempting to persuade people to make an individual decision to change their behaviour by providing them with information about health risks. The project will make every effort to conceptualise and design its interventions in a way that views HIV-transmission as a community problem rather than an

individual problem, and to maximise networking between this local initiative and HIV-prevention initiatives at a provincial and national level.

Whether or not the project succeed in making more impact on levels of HIV and other STDs than previous mine-base interventions remains to be seen. One shortcoming of the project is the fact that it cannot extend its activities to the wide range of rural areas in the range of southern African countries where migrant workers on the South African mines have their homes (given that migrant mineworkers are drawn from a wide pool of southern African countries). Thus while miner's town girlfriends and partners will be exposed to the intervention, their rural girlfriends and partners will not. The success of the project will depend very much on the density of networking between all the project's different stakeholders at the community, provincial and national levels, and the extent to which this networking succeeds remains to be seen. Furthermore it will depend on the extent that national efforts to develop multi-sectoral HIV-prevention policies get off the ground in South Africa – given that local industry-based initiatives need to be located within supportive national and provincial policies, to reinforce the impact of work done at the local level.

The outline of the history of HIV-prevention in the southern African mines also raises some thorny nettles which need to be grasped, and which will certainly present a range of conundrums and challenges for the Carletonville project. Why has there historically been so little real interest in HIV/AIDS amongst SADC governments at the national level? Why is it that stakeholders in the mines, ranging from top management to grassroots workers, have historically been so reluctant to 'own' the problem of HIV/AIDS? Why has it been so difficult for HIV/AIDS educationalists on the mines to get the support of top management for their activities? Why is it so difficult for the unions to get workers to participate in HIV-interventions? And turning to the broader context in which mines are located, why do the vast majority of government ministries throughout the region so frequently place HIV/AIDS so low down in their agenda of pressing concerns? Much work remains to be done in developing understandings not only of the broader contextual factors that lead to HIV transmission, but also of the broader contextual factors within which health promotion programmes are implemented.

Acknowledgements

This paper grew out of discussions with Anthony Klouda who provided us with the insights and ideas that led to this paper, which formed a component of the research conducted for a European Union sponsored conference on HIV/AIDS in the SADC region, held in Malawi in late 1996. Klouda's understandings of the social context of health and illness have contributed greatly to the way in which we understand HIV. Particular thanks also to Alan Whiteside for generous access to his resource centre at the University of Natal (Durban) and his written reports. Whiteside's writing, as well as his publication *AIDS Analysis Africa (Southern African Edition)* have provided an invaluable and essential resource for our understanding of HIV/AIDS in the southern African region. Thanks to Gavin Williams and Anthony Zwi for comments on an earlier draft of the manuscript.

The following people acted as Key Informants for the study, and we would like to thank them for sharing their time and expertise with us: Chanda, John. SADC Sector Coordinator for Mining, Zambia; Crewe, Mary. Esselen Street Clinic, South Africa; Crisp, Jenny. AIDS Coordinator, Anglo-American Corporation, South Africa; De Beyer, Joy. University of California, San Diego; Gabasiane, B. Botswana Mine Workers Union, Botswana; Gondwe, Mavuto. Director for Health and Safety, Mineworkers Union of Zambia, Zambia; Heywood, Mark. Centre for Applied Legal Studies, Johannesburg, South Africa; Jonas, Sazi. Health and Safety Officer, NUM, South Africa; Loewenson, Rene. ZCTU, Zimbabwe; Mandevu, Rose. Chief Health Officer, Primary Health Care/AIDS Unit, Ministry of Health, Botswana; Moorhead, Sue. National Union of Mineworkers, South Africa; Motlanthe, James. President, National Union of Mineworkers, South Africa; Motlatse, Kgalema. General Secretary, National Union of Mineworkers, South Africa; Mushininga, Patrick. President/General Secretary, Associated Union of Mineworkers (Zimbabwe), Zimbabwe; Naholo, Peter. Secretary General, Mineworkers Union of Namibia, Namibia; Palane, Archie. Health and Safety Coordinator, National Union of Mineworkers, South Africa; Santon, Tsetsele. Group Human Resources Manager, Debswana Diamond Company, Botswana; Timana, Jeremiah, Sinticim

(Mozambique), Mozambique; Van Heerden, Karel, JCI, Chamber of Mines, South Africa; Webster, Cliff. Chief Medical Officer, NAMDEB Diamond Corporation, Namibia; Whiteside, Alan. Economic Research Unit, Durban, South Africa; Wilson, David. Department of Psychology, University of Zimbabwe, Zimbabwe.

The opinions expressed and conclusions drawn are entirely the responsibility of the authors.

References

Arkles, S. The social consequences of industrial accidents: disabled mined workers in Lesotho. Unpublished MA Thesis, University of the Witwatersrand, Johannesburg.

Ballard, R. (1996) STDs on the mines: the nature of the problem. In *HIV/AIDS Management in South Africa: Priorities for the Mining Industry*, ed. B. Williams and C. Campbell, pp. 111-114. ERU, Johannesburg.

Baxter, R. (1996) The economics of the South African mines. In *HIV/AIDS Management in South Africa: Priorities for the Mining Industry*, ed. B. Williams and C. Campbell, pp. 42-50. ERU, Johannesburg.

Brink, B and Clausen, L (1987) The acquired immune deficiency syndrome. *Journal of the Mine Medical Officers' Association*, **63**, 10-17.

Campbell, C. (1997) Migrancy, masculinity and HIV: the psycho-social context of HIV-transmission on the South African gold mines. *Social science and medicine* **45(2)**, 273-283.

Campbell, C (1998) Selling sex in the time of AIDS: identity, sexuality and commercial sex work on the South African gold mines. Epidemiology Research Unit, Research report series. Number 36. ERU, Johannesburg.

Chamber of Mines (1994) *Statistical Tables*. Chamber of Mines, Johannesburg.

Churchyard, G. (1996) Of soil and seed: HIV related TB on the mines. In *HIV/AIDS Management in South Africa: Priorities for the Mining Industry*, ed. B. Williams and C. Campbell, pp. 117-119. ERU, Johannesburg.

Crisp, J. (1996) AIDS programmes in the mining industry: an overview. In *HIV/AIDS Management in South Africa: Priorities for the Mining Industry*, ed. B. Williams and C. Campbell, pp. 91-92. ERU, Johannesburg.

Davies, J. C. A. (1992) Occupational lung disease and TPB and Tintswala Hospital and in the Eastern Transvaal Lowveld. National Centre for Occupational Health Internal Report Number 1. Johannesburg: NCOH.

Decosas, J (1994) The answer to AIDS lies in united commitment. *Aids Analysis Africa (Southern African Edition)* **5 (1)**, 3-4, June/July.

Dube, N. and Wilson, D. (1995) Peer education programmes among HIV-vulnerable communities in Southern Africa. In *HIV/AIDS Management in South Africa: Priorities for the Mining Industry*, ed. B. Williams and C. Campbell, pp. 107-110. ERU, Johannesburg.

Foster, S. (1996) Economic and financial implications of HIV. In *HIV/AIDS Management in South Africa: Priorities for the Mining Industry*, ed. B. Williams and C. Campbell, pp. 107-110. ERU, Johannesburg.

Fourie, I. (1996) Health care in the mining industry. In *HIV/AIDS Management in South Africa: Priorities for the Mining Industry*, ed. B. Williams and C. Campbell, pp. 53-58. ERU, Johannesburg.

Gable, C.B., Tierce, J.C., Simison, D., Ward, D. and Motte K. (1996) Costs of HIV/AIDS at CD4(+) counts disease stages based on treatment protocols. *Journal of Acquired Immune Deficiency Syndromes & Human Retrovirology*, **12(4),** 413–420.

Gahagen, P. (1996) An Integrated Approach to HIV/AIDS Prevention Programmes: the New Vaal Experience. In *HIV/AIDS Management in South Africa: Priorities for the Mining Industry*, ed. B. Williams and C. Campbell, pp. 13-18. ERU, Johannesburg.

Gillies, P, Tolley, K and Wolstenholme, J (1996) Is AIDS a disease of poverty? *AIDS care*, 8 (3), 351-363.

Jochelson, K., Mothibeli, M. and Leger, J-P. (1991) Human immunodeficiency virus and migrant labour in South Africa. *International Journal of Health Services, 21 (1),* 157-173.

Klouda, A. (1995) Responding to AIDS: are there any appropriate development policies? *Journal of International Development,* 7, 467–487.

La Grange, M.A.C (1996) Reply to London, L., Maartens G. Myers J.E. and Bereleowitz T. 'HIV infected individuals in industries at high risk for TB: a rejoinder' *Occupational Health South Africa,* **2,** 8-10.

London, L., Maartens G. Myers J.E. and Bereleowitz T. (1996) HIV infected individuals in industries at high risk for TB: a rejoinder. *Occupational Health South Africa,* **2,** 6-8.

Macheke, C. and Campbell, C. (1998) Perceptions of HIV/AIDS on a Johannesburg gold mine. *South African Journal of Psychology*, in press.

Mqoqi N. (1995) Compliance with TB treatment on a South African gold mine. *IXth International Conference on AIDS and STDs in Africa*, Kampala, 10–14 December.

Packard, R. and Coetzee, D. (1995) White plague, black labour revisited: TB and the mining industry. In *Crossing boundaries: mine migrancy in a democratic South Africa.* ed. J. Crush and W. James, pp. 101-115. IDASA-IDRC, Cape Town.

Sampule, A. (1995) Case Study 1: Planning in Swaziland. In *Workshop proceedings: HIV/AIDS and development planning.* ed. L. Fransen, and A.W.Whiteside, pp.18-29. Economic Research Unit, Durban.

Seidel, Gill (1993) The competing discourses of HIV/AIDS in sub-Saharan Africa: discourses of rights and empowerment vs discourses of control and exclusion. *Social Science and Medicine,* **36 (3)**, 175-187.

Steen, T., Gyi, K., White, N., Gabosianelwe, T., Ludick, S., Mazonde, G., Mabongo, N., Ncube, M., Monare, N., Ehrlich, R. and Schierhout, G. (1996) Prevalence of occupational lung disease amongst Botswana men formerly employed in the South African mining industry. Unpublished manuscript.

Stein, J. and Steinberg, M. (1995) Response of the mining sector to the HIV/AIDS epidemic in South Africa. Unpublished report to the Human Resources Development Division, Economic Development Institute, World Bank and Policy and Planning Co-ordination Unit, Global Programme on AIDS, World Health Organisation.

Tawil, O, Verster, A and O'Reilly, K (1995) Enabling approaches for HIV/AIDS promotion: can we modify the environment and minimise the risk? *AIDS*, 9, 1299-1306.

Trapido, A., Goode, R. and White, N. (1998) The costs of gold mining related occupational lung disease to industry and society in South Africa. *Journal of Mineral Policy, Business and Environment*. 13:2, 26-33.

Whiteside, A (1992) The macro-economic effects of HIV/AIDS. *Aids Analysis Africa (Southern Africa Edition),* **3(3)**, 2.

Whiteside, A. (1995) The macro-economic impact of HIV/AIDS. *Workshop on HIV/AIDS sponsored by the Zambian Federation of Employers, Savonga, Zambia*. Economic Research Unit, Durban.

Williams, B. and Campbell, C. (1996) Mines, migrancy and HIV in South Africa - managing the epidemic. *South African Medical Journal*, **86**, 1249-1251.

Williams, B. and Campbell, C. (1998) Creating alliances for disease management in occupational health settings. *International Journal of Occupational and Environmental Health*, in press.

Zwi, A., Fonn, S. and Steinberg, M. (1988) Occupational health and safety in South Africa: the perspectives of capital, state and unions. *Social Science and Medicine*, **27(7),** 691-702.

TABLE 1

Table 1. Economic importance of the mining sector in SADC countries. Data supplied by the SADC Mining Sector Co-ordinating Unit. The number of people from other countries working on South African Chamber member mines are taken from Chamber of Mines (1996) *n.d.*: no data available.

	Mining output as a % of				Labour on South
	GDP	Export	Employment	Labour	African Mines
Angola	9	*n.d.*	*n.d.*	*n.d.*	0
Botswana	40	90	6	13,000	12,930
Lesotho	0.4	*n.d.*	*n.d.*	1,000	85,017
Malawi	0.3	*n.d.*	0.1	3,500	0
Mauritius	*n.d.*	*n.d.*	*n.d.*	*n.d.*	0
Mozambique	0.2	2.9	6.2	*n.d.*	49,703
Namibia	30	54	5	12,000	0
South Africa	9	65	4.3	600,000	—
Swaziland	2	*n.d.*	*n.d.*	*n.d.*	15,894

Tanzania	2	1	1	*n.d.*	0
Zambia	13	90	15	44,000	0
Zimbabwe	8	45	4	50,000	0

FIGURE 1

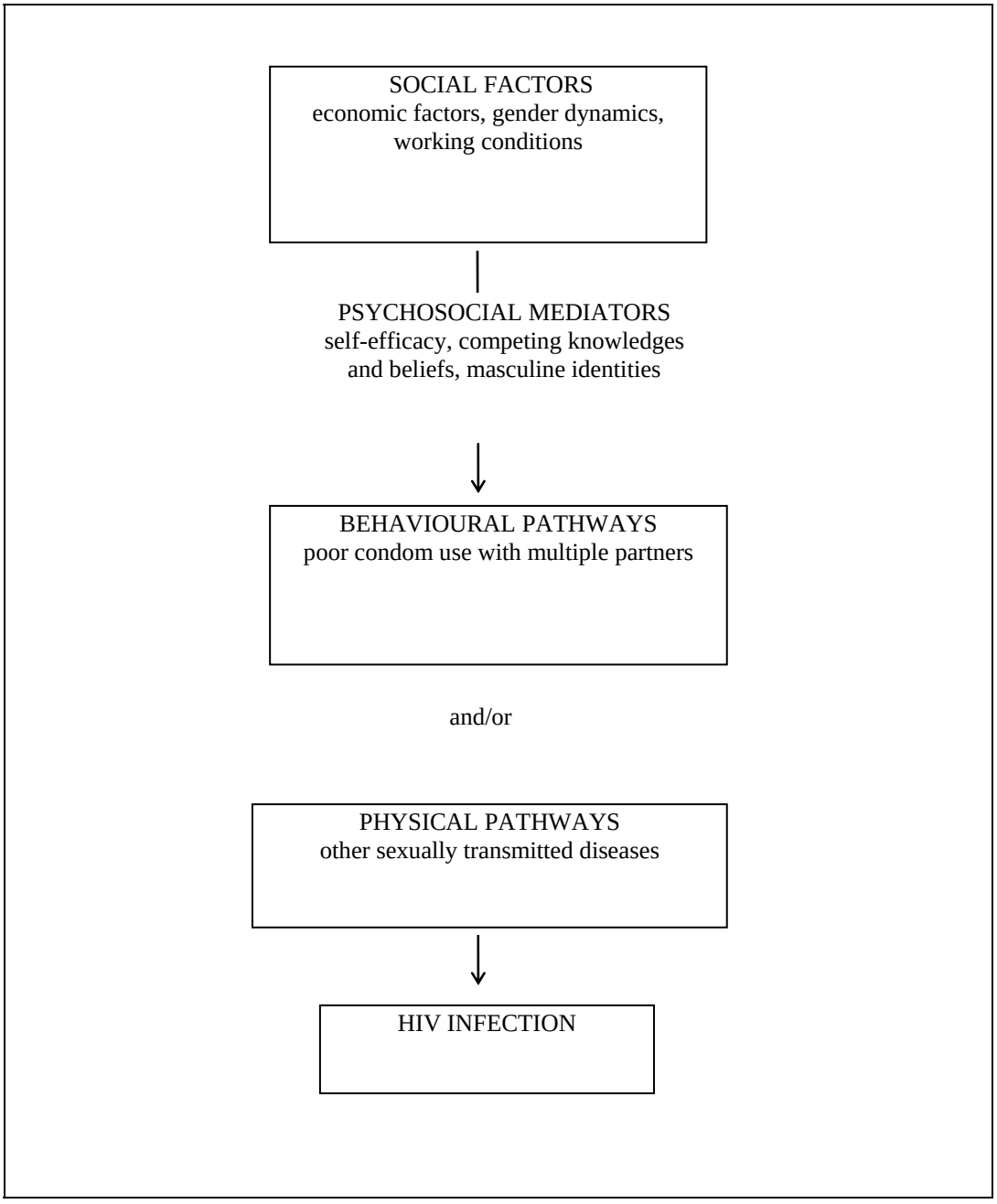

Figure 1: PATHWAYS BETWEEN SOCIAL CONTEXT AND HIV INFECTION IN THE SOUTHERN AFRICAN MINING CONTEXT