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The Relationship Between Labour Market Dynamics and HIV/AIDS Prevalence: A Literature Review

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THE RELATIONSHIP BETWEEN LABOUR MARKET DYNAMICS AND HIV/AIDS PREVALENCE: A LITERATURE REVIEW

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INTRODUCTION

The impact of HIV/Aids on the South African labour market poses a potential threat to the instiutional and legislative transformation of the labour market in the post-apartheid period. Efforts directed at addressing structural problems including high levels of unemployment, the skills deficit and high levels of income inequality might now be even more complicated, by the negative impact of HIV/Aids.

The aim of this literature review is to analyse the contribution of current research and literature to an understanding of the relationship between labour market dynamics and HIV/Aids prevalence. Existing studies on the impact of HIV/Aids that extrapolate results to the labour market assume that the labour market is integrated. Thus, results that illustrate differentiated HIV/Aids prevalence levels for race, gender and skills for instance, tend to conclude that these cleavages are the predicted outcomes of differences in society, without factoring in the nature of the labour market. However, the South African labour market is highly differentiated, as illustrated by persistent high rates of unemployment, lack of growth in formal employment, the rural–urban divide, persistent labour market discrimination by race and gender, as well as other forms of labour market segmentation on the basis of education, skills, income and occupational group. Thus, when considering that HIV/Aids affects the economically active population (15-65 years) disproportionately, the interrelationship between labour market inequalities and segmentation as a risk indicator for HIV susceptibility and Aids vulnerability becomes relevant.

Current analysis focuses on the social and economic impact of the pandemic, as well as the human tragedy that is unfolding. However, much of the ongoing macro-economic impact analysis has addressed the labour market implications in a partial and somewhat 'one size fits all' manner. A previous review (Parker, Kistner, Gelb, Kelly and O'Donovan 2000) points towards a divergence in the focus of international and local literature, with the former emphasising the determinants of HIV susceptibility and groups that are at risk, while the latter focuses on HIV/Aids prevalence trends. This divergence may relate to the differentiated nature of the HIV/Aids epidemic globally. Thus, in the United States of America, for example, the epidemic has largely been located in high-risk sub-population groups, such as those practising male-to-male sex and intravenous drug users. However, in Africa, it has been of a more generalised nature, spreading across the entire population.

Parker *et al* (2000) argue that to a large extent local models make assumptions about the populations that are at risk, and lack alternative and sufficient information to verify and validate such assumptions. The basic assumptions underlying HIV risk group dynamics have remained static over the past few years, drawing mostly from predictable demographic patterns. For example, it is accepted that women are physiologically more susceptible to HIV infection than men. Also, those groups in the labour market that work under migratory and mobile circumstances are more likely to display higher levels of HIV susceptibility, given their exposure to unstable and risky working and living conditions. Other measurements such as prevalence levels by income and skill, and sector categories are derived from the demographic profile and the accompanying HIV risk profile (Abt Associates 2000). However, very little is known about the different permutations of socio-economic and demographic factors that determine HIV risk group dynamics and susceptibility in the labour market.

An understanding of these complex interrelationships is key to informing current research on Aids vulnerability. The latter increasingly looks at the relative cost-effectiveness of intervention through preventative education and awareness, voluntary counselling and testing (VCT), the impact on retirement and medical costs, as well as the provision of anti-retroviral drugs and related treatment.

This literature review highlights and assesses those factors that are determinants of HIV susceptibility and risk group formation. It further seeks to assess how these interact with cleavages in the labour market and shape current HIV/Aids prevalence trends. The projection of the future

trajectory of the HIV/Aids disease, through prevalence trends, informs strategic planning and resource allocation. Thus, vague assumptions about HIV susceptibility and risk groups may skew HIV/Aids prevalence trends, and result in inadequate assessment of Aids vulnerability in companies and sectors. These may impact on inefficient resource allocation and diffuse intervention patterns by stakeholders in the labour market. In order to contextualise the above approach, and prior to introducing specific research findings, it is useful to comment on the nature and limitations of existing data arising out of the demographic, macro-economic, sectoral and firm studies and projections.

Nature and limitations of current data

In a speech at a recent statistics conference, the Minister of Finance, Trevor Manuel, highlighted the critical lack of 'reliable' statistics on the prevalence and impact of HIV/Aids needed to facilitate public policy-making and resource allocation (*Business Day* 2002). The collection of sufficient, relevant and reliable labour market data is a perennial problem in the South African policy-making sphere, and HIV/Aids is no exception. Thus, HIV/Aids research suffers from a number of constraints and limitations regarding the quantity and quality of source data (Parker *et al* 2000; Abt Associates 2000). The following section briefly introduces the main demographic models, and assesses some limitations of the underlying data, especially that derived from the Antenatal Clinic (ANC) surveys, as well as at firm and sector levels.

The main demographic models used locally include the Doyle-Metropolitan model (a private, proprietary product) and the Actuarial Society of South Africa (ASSA) suite of models. The ASSA model derives from the Metropolitan model, but it includes updated versions, namely ASSA500, ASSA600 and ASSA2000. Whereas the two models generally share similar assumptions, in some respects they differ, such as the inclusion of migration dynamics in the ASSA suite of models. Both assume heterosexual transmission of HIV and are updated with the latest available information on mortality and fertility. Other advances in the models include 'change' and 'no change' scenarios, which now consider the impact of significant behavioural interventions, such increased condom usage (Bureau for Economic Research [BER] 2001). Most business impact, risk assessment and macro-economic projections derive from these two demographic models.

The basis of the demographic models is primary source data obtained from the annual ANC survey. The latter collects sero-prevalence data on HIV and sexual transmitted infections (STI) amongst pregnant women attending state health clinics (Department of Health 2001). The anonymous, voluntary and unlinked antenatal survey is widely used in developing countries (Dorrington and Johnson 2002) and is generally regarded as the most reliable source of HIV prevalence data, currently available. Given that the sampling population consists of predominantly African women, the data is adjusted or calibrated to be more representative of the national population (Department of Health 2001). The demographic models extrapolate national population projections from the ANC data *via* demographic and occupational information from the Census 1996, the October Household Surveys (OHS) 1995 and 1997, and the South African Demographic and Health Survey (SADHS), as well as fertility and mortality estimates (Abt Associates 2000 ; BER 2001). However, Whiteside (2002) argues that uncertainties and weaknesses in source data are carried over into final projections at a macro-economic, firm or sector level.

The ANC data has been criticised on a number of levels. Firstly, some argue that it is still not sufficiently representative of potentially different prevalence dynamics amongst sub-population groups, and may in fact overestimate prevalence in the general population (Abt Associates 2000). Given the predominantly African sampling population, the ANC data may underestimate HIV prevalence in other population groups (Dorrington and Johnson 2002), and is thus not fully representative of the demographic profile of either the population or the labour force. In addition, the ANC data excludes important risk categories with different risk dynamics and potentially different HIV prevalence levels. These include men, better-off pregnant women using the private health sector, as well as children who are not yet sexually active or the elderly who may have less sexually active lives, all categories that generally have lower risks of infection (Abt Associates 2000). Women who are not pregnant, but are susceptible to HIV infection are also excluded from

the data. Furthermore, HIV/Aids lowers the fertility rate, so that fewer women may be presenting themselves at public health clinics. In addition, the ANC data in itself does not sufficiently reflect other socio-economic characteristics such as income, skills and occupation.

At a micro-level, there is also an absence of sufficient and representative data at household, firm or sector level to inform more reliable projections and correct some of the deficiencies related to ANC data. Information on the labour market impact at a company or sector level is not comprehensive; it is unevenly spread, sometimes of an anecdotal nature and not always in the public domain. It is mostly large, formal sector companies that conduct either actuarial risk projections or HIV prevalence surveys, so that little is known about the impact on the informal sector or small and medium-sized companies. A survey initiated by the SA Business Coalition on HIV/Aids [SABCOHA] (Deloitte and Touche 2002) shows that only 27 per cent of 110 surveyed companies have conducted a HIV/Aids risk assessment and less than ten per cent have conducted a HIV prevalence survey through unlinked blood or saliva screening. The lack of HIV prevalence testing may be ascribed to workforce resistance, including suggestions that trade unions are wary of workplace-based prevalence testing, given the stigma attached to HIV status and possible discriminatory employee practices (Elias and Taylor 2001). In addition, in some cases, companies interpret restrictions on HIV testing, in terms of the NEDLAC code of good practice on HIV/Aids in the workplace, as a complete ban outlawing voluntary, unlinked and anonymous HIV testing (Heywood 2000).

The SABCOHA study (Deloitte and Touche 2002) also shows that, more than half of the surveyed companies had a formal HIV/Aids policy, especially large (more than 500 employees) companies (80 per cent), as opposed to 6.5% of smaller companies (100 and less employees). This apparent contradiction between a lack of test data and the existence of a HIV/Aids policy may be attributed to the fact that companies tend to disassociate low mortality rates and high prevalence rates, because of the lag time between HIV infection and the onset of Aids (Elias and Taylor 2001). They further suggest that in the absence of a visible increase in the death rate of their employees, companies tend not to regard the situation as serious. This is especially the case if such deaths mainly occur among unskilled employees, who are regarded as easily replaceable, a perception unlikely to change until the impact on skilled labour becomes more noticeable. This discrepancy indicates that company HIV/Aids policies derive largely from 'guestimates' or 'subjective ' monitoring of employee deaths to track trends (Elias and Taylor 2001), even though these may or may not be AIDS-related. In this context, companies obviously do not have a concrete sense either of the susceptibility of their workforces, or the vulnerability of their businesses in terms of the total cost impact. The point is underscored when a related finding from the SABCOHA survey shows that about half of the surveyed companies anticipate a 'moderate' impact, whilst only five per cent expect HIV/Aids to have an 'extreme' impact on their companies (Deloitte and Touche 2002).

Management information systems that systematically capture relevant primary source data regarding trends in illness-related absenteeism, Aids-related deaths and productivity do not exist or have little monitoring capability. Thus, a study in the mining and minerals sector shows that companies are not systematically monitoring 'illness-related absenteeism' in order to track HIV/Aids-related trends (Elias and Taylor 2001).

One of the most pervasive problems is the reluctance of both private and public sector organisations to release HIV/Aids statistics and impact assessments into the public domain. However, in the private sector, according to recommendations from the second King Report on Corporate Governance, the Promotion of Access to Information Act 2000, as well as the SA Institute of Chartered Accountants and the Johannesburg Securities Exchange (JSE), companies will in future be required to disclose their HIV/Aids risk exposure and management strategies in their annual financial reports (Temkin 2002).

At sector level there is even less information except for high-risk sectors such as mining and transport. Some cross-country studies (Evian, Slotow, Rosen, Thea, Fox, Macleod and Simon 2002) in Southern Africa have been done cutting across the mining, heavy manufacturing and

transport sectors. However, many studies are not based on representative samples and tend to artificially aggregate results from company studies into sectoral conclusions.

In the public sector, past and ongoing risk assessment studies have been conducted on the impact on the broad government sector, education (schooling and higher education) and the health sector (Fowler 2001; Henscher 2000). These have not included large-scale HIV prevalence surveys, although isolated testing has taken place, for example, on certain military units in the South African National Defence Force (Heywood 2000).

In general, both public and private sector organisations tend to limit information to aggregate HIV/Aids prevalence rates with little or no information about the demographic, skills and occupational distribution of HIV/Aids. This has implications for succession planning and training, especially given the potential need for future labour and skills replacement, given Aids-related losses and the current skills shortage. This absence of detailed information tends to complicate impact analyses of future labour market developments.

In general, aggregate information may provide a general understanding of the dynamics of the broader HIV risk environment in the labour market. However, this may not be sufficient to identify underlying risk factors that may play themselves out in a different manner depending on the specific sectoral or firm context.

HIV/AIDS PREVALENCE AND LABOUR SUPPLY

HIV/Aids prevalence trends track changes in the number of HIV-infected persons at a particular point. Prevalence trends thus give an indication of the potential scale and impact of HIV/Aids on growth in the quantity and quality of labour supply. This section compares reported HIV/Aids prevalence trends in the labour force (as reported in selected company or sector studies) with projections based on macro-economic modelling studies.

The crisis of HIV/Aids locates itself amongst the economically active population as it disproportionately affects those who are in their most sexually active, reproductive and economically productive years. The ASSA2000 projections show that current prevalence among the total population stands at 13 per cent and is projected to peak at just over 16 per cent by 2006 (ASSA2000). However, current adult prevalence rate (20-65 years) is even higher, at about 22.3% and projected to peak at 27 per cent, with a particular concentration among those aged 15-49 years (ASSA2000). The latest extrapolations from the ANC data show that 4.74 million adults aged 15-49 years are HIV- infected, of which 2.65 million are women and 2.09 million are men (Department of Health 2001). The Doyle-Metropolitan model, although at slightly lower levels, predicts a doubling of HIV prevalence levels in the labour force (15-64 years) between 1999 and 2010, and a five-fold increase in the proportion of adults who have contracted Aids-related illnesses between 1999 and 2010 (see Table 1).

Table 1: Impact of HIV/Aids on the South African workforce 1999-2010(age 15 –64 years) (Doyle-Metropolitan model)

	1999	2005	2010
HIV prevalence (%)	11%	18%	21%
Aids sick (%)	0.6%	1.8%	2.9%
Aids incidence (Aids cases) per year ('000)	175	461	580

Source: Moore, D.1999

Impact on labour supply

Macro-economic modelling results indicate that given the impact of HIV/Aids, labour force growth will decline, resulting in a smaller labour force when compared to a no-Aids scenario (BER, 2001). Quattek (2000) predicts an 18 per cent decline in the labour force by 2015, while Abt/Metropolitan predicts a decline of 21 per cent by 2015 (BER 2001). The projected reduction in the labour force flows out the projected reduction in the population growth rate to zero per cent in 2009, and negative growth of –0.5% by 2015 (BER 2001). The most recent mortality data from the Medical Research Council [MRC] (Dorrington, Bourne, Bradshaw, Laubscher & Timaus 2001:6) suggests that in 2000, 40 per cent of adult deaths in the age range 15-49 could be attributed to HIV/Aids, as well as 20 per cent of all adult deaths. The MRC describes Aids as the 'single biggest' cause of death within the entire population.

Furthermore, as a result of increased mortality rates among adults, average life expectancy will decline drastically to 37 years and 38 years for women and men respectively, as shown in Table 2 (BER 2001). The ASSA2000 predictions for life expectancy at birth among the general population are slightly less severe, declining from 55 years in 2001 to 46 years in 2005 and 41 years in 2010 and 2015 (ASSA2000).

Table 2: Projected life expectancy (1999-2010)

	1999	**2005**	**2010**
Life expectancy: female (Abt/Metropolitan)	54 years	43 years	37 years
Life expectancy: male (Metropolitan)	50 years	43 years	38 years
Life expectancy: general population (ASSA2000)	55 years	46 years	41 years

Source: Moore, D. 1999; ASSA2000

Whiteside (2002) characterises the progression of HIV prevalence, Aids morbidity and deaths through a population and the labour force as the 'long wave' effect as shown in Table 3. HIV/Aids is characterised by two epidemic curves as a result of the relatively long average incubation period (8-10 years) between initial HIV infection and subsequent Aids-related illness and death. Calculations of this gap differ, but in the absence of significant interventions, conservative estimates set it at about 6-8 years, whereas more optimistic calculations set it at 7-10 years from the time of initial HIV infection (Whiteside and Sunter 2000; Rosen, Simon, Thea, MacLeod & Vincent 2001).

As shown in Table 3, the progression of HIV/Aids in the labour force implies that an initial wave of HIV infection will be followed after some time by increased Aids morbidity, as the infected workforce contracts secondary Aids-related infections and illnesses. This is followed by full-blown Aids, approximately 1-2 years before death or ill-health retirement (Rosen *et al* 2001).

Table 3: Progression of HIV/Aids in the labour force

Timeframe	**Projected effect on the workforce**	**Effect on company costs**
Year 0	Employee becomes infected with HIV.	No cost to company.
Year 0-7	Morbidity begins (secondary infections, increased absenteeism, sick and compassionate leave)	Morbidity-related costs including absenteeism, individual and workforce productivity, management resources, medical care and benefits
Years 7 -10	Employee leaves workforce by	Termination–related costs including

	resigning, retirement or death due to Aids.	death benefits, retirement benefits, funeral costs, loss of morale, loss of skills and experience, loss of workplace cohesion.
Years 7-10	Company hires replacement employee.	Turnover costs including recruitment, training, loss in productivity.

Source: Rosen et al.2001

The excess attrition in the workforce arises as a result of increased morbidity as increasing numbers of workers are absent due to Aids-related illnesses, caring for infected relatives or attending funerals of colleagues or relatives and friends. This results in lower levels of labour productivity, given absenteeism, a decline in skills and experience. Labour turnover and productivity losses are consolidated when workers develop full-blown Aids and die, constituting absolute losses to the labour market. There is a cumulative process of labour losses, given the average incubation period between initial HIV infection and death due to Aids.

Reported HIV prevalence trends in the private sector

HIV/Aids estimates, whether based on company or sector information, as well as macro-economic impact studies, confirm that HIV/Aids prevalence rates are generally high, sometimes higher than either the current population HIV prevalence rate of 13 per cent or the adult (20-65 years) prevalence rate of 22.3% (ASSA2000). A further common conclusion is that HIV/Aids prevalence rates vary by sector, suggesting a sector gradient as well as relatively different trends in the reduction of respective sector labour forces.

Thus, high HIV prevalence sectors commonly include the transport, mining and construction sectors, given that the general work environments create conditions for high HIV susceptibility. A highly susceptible risk environment includes a migratory and mobile workforce, who are away from their partners and families for extended periods and who have sufficient disposable income to spend on sex workers or engage in multiple sexual relationships (Elias and Taylor 2001). For instance, long-distance distance truck drivers are among the worst affected, with HIV prevalence levels at 30 per cent (Lifeworks as cited by the SABC news 2002). Similarly, while HIV prevalence levels are not known, given the mobility and seasonality of construction work, this sector is at high risk, as shown in the ING Barings study (Quattek 2000). HIV prevalence levels reported by selected mining companies are similarly high and rising. Anglo American estimates that about 23 per cent of its 134 000 workforce are HIV-positive (Bain 2002). Lonmin Platinum reports current HIV prevalence rate at 26 per cent, rising to 45 per cent (8 000 workers) in 2005, whereas Goldfields is at 26 per cent rising to 40 per cent by 2009 (Connelly 2002:5,7). At Anglogold, the HIV prevalence level ranges between 25–30 per cent among its 44 000 mostly male, South African workers, whereas Anglo Platinum reports a HIV prevalence range between 7-24 per cent, averaging at about 18 per cent, at an annual cost of R75 million (AngloGold 2002; Bain, 2002).

Sasol indicates an estimated workforce prevalence rate of 15 per cent (2 800 employees) in 2000, ranging between 3 and 21 per cent across divisions, expecting to peak at 18 per cent in 2007 (Dickinson 2002: 14, 45). The relatively low average Sasol rate may be skewed by lower prevalence rates in its fuel and chemical divisions, alongside its mining subdivision. Eskom projects a 26 per cent prevalence level by 2005 among its 38 000 workers (UNAIDS 1999 cited in Bloom *et al* 2002).

The agricultural sector is also regarded as high risk, given the seasonality and mobility of commercial agricultural workers. A study of an agriculture workforce of 5 000–10 000 in KwaZulu-Natal (KZN) in 1999 reports an overall prevalence rate of 22.9% (Rosen *et al* 2001). A well-known study of male sugar mill workers in KZN reports an average prevalence rate of 27 per cent, with an average age of 40.5 years (Mbrris, Burdge and Cheevers 2000). Thus, given the reported high HIV susceptibility of these sectors, labour supply is likely to be more severely affected compared to

other sectors. These sectors are likely to experience increased morbidity levels as result of illness-related absenteeism, as infected workers develop secondary infections such as tuberculosis, thrush and pneumonia as their immune systems are depleted. Increased morbidity results in reduced labour productivity and an absolute loss of invested skills and experience as workers take early or medical retirement, or die as a result of Aids-related illnesses.

A cross-sectoral company study confirms the sector-based differentiation in that it reports the highest relative HIV prevalence rates in heavy industry (18.6%) followed closely by mining (17.8%) and the lowest rate (9.3%) in light manufacturing (Evian *et al* 2002). A study of paper and pulp manufacturers in KwaZulu-Natal and Mpumalanga reports a 20 per cent prevalence rate (Lifeworks as cited by the SABC news 2002). Another study shows that manufacturers and chemical firms report HIV prevalence rates at 16 per cent and 12 per cent respectively (Kew 2002).

In contrast, the financial and business sectors report the lowest aggregate HIV prevalence levels. Old Mutual (life insurance) for instance, reports a five per cent prevalence level among two-thirds of its staff (Kew 2002). Telecommunication and financial firms report the lowest rates at seven per cent and five per cent respectively (Kew 2002).

Reported HIV prevalence trends in the public sector

In the public health sector Henscher (2000), using the Doyle-Metropolitan model, predicts a mid-case scenario of HIV infection rates differentiated by occupational category. Thus, doctors, pharmacists and dentists have the lowest estimated prevalence rates. Most categories of nurses have infection levels of 10-12 per cent in 2001, rising to 21-25 per cent in 2010. However, student nurses have the highest prevalence rate at just above 25 per cent in 2001, rising to 40 per cent by 2010. The latter will seriously affect the future supply of nurses to the sector, and will also negatively affect the capacity of the health sector to replace and retrain other health professionals. All indications are that the demand for public health services will increase significantly as a result of Aids-related illnesses, thus increasing the demand for health professionals. A decline in the number of available nurses will have a negative effect in terms of the overall capacity of the health service to meet increased demands for service delivery. Furthermore, the existing migration losses of nurses to foreign countries may be further exacerbated by Aids-induced losses. Similarly, while the prevalence rate amongst doctors is low, HIV/Aids may now be an added reason for emigration of doctors to developed countries, thus further reducing their numbers and increasing replacement rates.

Most studies regard education as a very vulnerable sector given that educators, learners and students are highly susceptible to HIV infection (Fowler 2001). The highest incidence of new HIV infections occurs in the age range 15 -25 years, thus making young learners and students very susceptible (Fowler, 2001). Teaching is a very susceptible occupational category with a high-risk demographic profile (predominantly African and female), with an average age of 32 years. Over the period August 1999 – May 2001, the South African Democratic Teachers Union (SADTU) reported an increase in the number of funeral benefit claims among educators, with 'natural causes' being the single largest cause of death of those aged 30-40 years. SADTU attributes both these trends to HIV/Aids (Lorgat 2001). Similarly, a study of educator mortality in a sample of KwaZulu-Natal schools shows that 92 per cent of educators who died were younger than 50 years old, a proxy for Aids-related deaths (Badcock-Walters & HEARD, 2001). The World Bank (2002) reports a HIV prevalence rate of 12 per cent (44 000) among teachers, based on the average population prevalence rate. Cohen (2001) reports an estimated prevalence rate of 15 per cent in 2001, rising to 24 per cent in 2005 and to 30 per cent in 2010. Educators are often posted away from their families, and (compared to the communities they work in) are relatively better off in terms of income. Other African studies have shown that these conditions increase possibilities for risky sexual behaviour (ILO 2000). Over time, this will reduce the number of educators, thus constraining capacity within the education sector to provide basic and further education, the springboard for higher education and training of future labour supply to other sectors of the economy. For this reason, the reduction in qualified and experienced teacher supply may limit the flow as well as the quality of labour supply to the rest of the economy.

Projected HIV prevalence trends from macro-economic modelling

Projections derived from macro-economic modelling studies show that HIV prevalence rates are high and growing across sectors. They also indicate the existence of a HIV prevalence gradient by main economic sector, similar to that reported in company and sectoral studies. At this point, all the macro-economic studies assume that no significant 'behavioural or structural change' will take place over the 10-15 year projection time frame (BER 2001:1).

The ING Barings study (Quattek 2000), based on the ASSA600 demographic model, is the most prominent in that it is the only one that has conducted projections across economic sectors. Others, by Abt/Metropolitan, provide individual sector projections. Quattek (2000) argues that the study measures relative rather than absolute risk exposure of sectors. It further does not differentiate between sectors on the basis of any special assumptions about the specific risk exposure of any sector. The study acknowledges that as a result, it may indeed underestimate HIV/Aids prevalence levels for certain sectors (such as mining, for instance).

Criticisms of the study focus on the nature and quality of the underlying data, as well some of its assumptions. Acott (2000) argues that the ING Barings study assumes that HIV risk exposure is uniform across all sectors. He argues that the projections may indeed be too optimistic and that higher HIV/Aids prevalence rates may in fact be recorded at all sector levels. He also notes that certain sectors, such as forestry products, have no definable data origins as described by Quattek.

The ING Barings study does show that in line with company-based reports, HIV infection rates are high compared to adult prevalence rates, as shown in Table 4. It also confirms that there is a sector gradient in that HIV prevalence rates differ by main sector. The most susceptible sectors in terms of the proportion of HIV-positive workers include the mining sector, peaking at 29.3% in 2005, and the general government sector, peaking at 26.4%, albeit five years later. Other similarly high-risk sectors include transport & storage, construction and accommodation & catering. At the least susceptible end are financial and business services, at 8.9% and 11.9% respectively in 2000. However, by 2005, most sectors are close to, or in excess of 20 per cent prevalence, with the exception of finance, business and communication. Finally, most of the growth in the HIV infection rate occurs in the period 2000-2005, with marginal declines throughout the periods leading up to 2010 and 2015.

Table 4: HIV-positive per 100 workers by main economic sectors

SECTOR	2000	2005	2010	2015
Finance and insurance	8.9	12.4	12.5	11.7
Business service	11.9	15.6	15.1	14.3
Communication	12.1	16.5	16.3	15.3
Health	14.9	20.0	19.0	16.6
Metals	15.0	19.9	19.3	17.8
Forestry products	15.2	*20.2*	19.8	18.6
Machinery	15.9	21.2	20.8	19.5
Retail	16.2	21.3	20.7	19.3
Chemicals	16.6	21.6	20.7	19.3
General government	17.2	24.5	26.0	26.1
Consumer manufacturing	17.3	23.0	22.9	21.3

Agric, forestry & fishing	17.3	23.2	23.2	21.8
Accommodation & catering	17.9	23.0	22.2	20.8
Construction	18.2	23.9	23.4	22.1
Transport and storage	18.5	23.5	22.0	20.2
Mining	24.1	29.3	26.4	24.4

Source: WEFA as cited in Quattek, 2000: 49

The sector gradient, in HIV prevalence distribution and consequent Aids vulnerability, is important given the differing shares and contribution of sectors to growth in the economy and employment growth particularly. Thus, while the tertiary share of the economy has grown significantly in the 1990s, compared to 1976, the share of the secondary and primary sectors have declined (Standard Bank 2000). The financial intermediation, business services and communications sub-sectors have been the main contributors to this shift in the economy (Standard Bank 2000). This has partly contributed to the shifts in the distribution of employment and skills away from the primary sector (such as mining and agriculture) since the 1980s (Reserve Bank 2001; Standard Bank 2000).

Thus, the lower projected HIV prevalence levels in the financial intermediation, business services and communication sub-sectors point towards lower levels of labour losses, less volatile labour supply and thus relatively stable labour turnover and lower productivity impacts. This trend is particularly significant, given relatively larger growth in employment and labour demand in these tertiary sub-sectors.

However, the range of HIV prevalence levels across all tertiary sub-sectors suggest high levels of heterogeneity. Thus, there are projected high HIV prevalence levels in the general government sector, accommodation & catering, transport & storage, with mid-level prevalence levels for the retail sub-sector. This suggests that the tertiary sub-sectors have varying levels of HIV susceptibility and thus different risk profiles. The literature does not explore how the differing prevalence levels within the tertiary sector will influence overall productivity levels, employment growth and the demand for and supply of labour, given the prominence of the tertiary sector in the economy.

All of the above also suggest that the tertiary sector in itself will be differentially affected in that certain high-level sub-sectors will experience relative stability in terms of labour turnover and fewer deaths, whereas sub-sectors at the 'lower' end will experience increased labour turnover and instability due to illness-related absenteeism, as well as loss of workers due to Aids deaths (Abt Associates 2000). The secondary sector is also differentially affected, as manufacturing experiences mid-level prevalence levels, whereas construction has very high prevalence levels , with differing labour losses as a result.

In contrast, the primary sector, including mining and agriculture, reports among the highest HIV prevalence levels. Increased labour losses and turnover will further exacerbate existing employment losses and negative employment growth in the sector. A gap in current research includes an analysis of how sectoral HIV/Aids susceptibility dynamics will affect future employment growth in the broader economy, in the context of the projected differential impact of HIV/Aids across and within sectors. The basis of this differential HIV impact may be explained by the differing demographic and skills profile of these sectors, as will be explored later on in this paper.

Aids vulnerability

Aids vulnerability refers to the relative level of risk faced by an individual, company to be negatively affected by the impact of Aids-related illnesses, deaths and increased costs. The sectoral gradient is evident in the number of Aids deaths per 100 workers, as shown in Table 5.

Thus, high prevalence sectors will tend to experience increased numbers of deaths per 100 workers. This increases Aids vulnerability as their exposure to direct and indirect costs increases. However, Table 5 has some anomalies, in that some of the sectors with the highest HIV prevalence rates also have some of the lowest Aids death rates, such as the general government services sector. The other glaring anomaly involves the business service sector, which has an Aids death ratio second only to mining, yet has the second lowest HIV prevalence rate. These anom alies are not explained, nor explored in the report.

Table 5: Aids deaths per 100 workers in main economic sectors

SECTOR	2000	2005	2010	2015
Finance and insurance	0.4	1.1	1.5	1.4
Business service	0.6	1.9	2.5	1.2
Communication	0.3	0.9	1.2	1.2
Health	0.4	1.3	1.7	1.6
Metals	0.5	1.6	2.1	2.0
Forestry products	0.5	1.6	2.1	2.0
Machinery	0.5	1.6	2.1	1.9
Retail	0.6	1.8	2.3	2.1
Chemicals	0.6	1.8	2.4	2.2
General government	0.4	1.0	1.4	1.4
Consumer manufacturing	0.6	1.8	2.5	2.4
Agri, forestry & fishing	0.6	1.7	2.4	2.2
Accommodation & catering	0.6	2.0	2.5	2.3
Construction	0.5	1.7	2.2	2.1
Transport and storage	0.4	1.3	1.7	1.7
Mining	0.8	2.5	3.0	2.7

Source: WEFA as cited in Quattek, 2000: 49

The table shows that there is a substantial increase in Aids death ratio in the period 2000-2005, peaking by 2010, five years later than the peak in HIV prevalence. Initially, in the years 0-7 post-infection, HIV infection contributes to increased absenteeism related to Aids-related illnesses or morbidity, as well as sick and/or compassionate leave for funeral attendance as employees and colleagues start to die. On the basis of a study of sugar mill workers, Morris *et al*. (2000) estimate that half of illness-related absenteeism is concentrated in the 6th year post-infection.

This period also results in increased costs to both the infected individual and company in terms of medical benefits to pay for the treatment of opportunistic Aids-related infections and general care (Rosen *et al.* 2002). Productivity levels begin to decline and anecdotal evidence suggests that once workers start experiencing the onset of secondary infections, some tend to 'go home and die' among family. This pattern would probably consolidate labour turnover patterns even earlier than predicted. Finally, from year 7 onwards, employees start to leave permanently as a result of early retirement or death caused by Aids. Companies incur termination-related costs related to retirement and death benefits and indirect costs related to absolute losses in skills and experience, workforce morale and cohesion (Rosen *et al*. 2001). When combined with the findings in Tables 3 and 4, the largest cumulative reduction to the labour force occurs over the period 2000-2005, peaking by 2010. This initial huge impact will be followed by similar, but relatively smaller waves of contraction in the workforce as the number of Aids deaths grows at a slower rate.

However, the epidemic progression in the labour force at both company and sector level may not proceed as neatly as hypothesised here. Thus, given the projected increases in HIV prevalence over time, and especially in the next few years, and the fact that infections occur at different times, sectors and companies may be faced with a series of successive waves of Aids illnesses and deaths. In addition, the presence or absence of medical treatment and care(including anti-retrovirals), aimed at dealing with morbidity levels, may increase or decrease the incubation period.

Thus, the contraction of the workforce, the consequent reduction of and loss of skills and experience, as well as increased costs may be spread over time and differentially across all sector workforces. From this, one may infer that in high prevalence sectors especially, the reduction in the workforce will be cumulatively larger, as will be the loss of skills, experience and productivity compared to low prevalence companies and sectors. The relative direct costs involved will differ by company and sector depending on the level of medical and retirement benefits provided. Furthermore, the susceptibility of skill categories will also determine relative cost vulnerability. Thus, even low prevalence sectors will be vulnerable given the substantial medical, retirement and replacement costs associated with high-skilled workers in the context of the skill shortage (Quattek 2000).

The positive side of this argument is that given the cumulative effect of HIV/Aids, it is possible to plan and intervene at the point of HIV infection in order to delay the onset of Aids related illness and death (Whiteside and Sunter 2000). This will reduce the absolute loss of qualified and experienced workers and the related turnover costs, but also allow for more informed succession planning for vulnerable occupational categories. Furthermore, in order to prevent new infections in the future, companies incur costs in Year 0 by running preventative education and awareness programmes, thus reversing the zero cost pattern as shown in Table 2. This type of anticipatory planning and intervention will effectively limit the scale of this most vulnerable period and increase the capacity to meet labour supply replacement needs of the economy at a time when most sectors experience labour losses.

DEMOGRAPHIC IMPACT OF HIV/AIDS ON THE LABOUR MARKET

The previous section provides an overview of the general HIV susceptibility profile of companies and sectors in the labour market, by way of HIV and Aids prevalence and mortality trends. The current data and projections on the impact of HIV/Aids indicate that the specific demographic, skills and income profiles, as well as structural factors specific to an industry or company, may increase susceptibility and the exposure risk profile of the labour force (BER 2001; Abt Associates 2000). This section considers the demographic impact of HIV/Aids on the labour market, and assesses the extent and nature of the empirical information available in order to validate modelling assumptions about which sub-groups are at risk.

Background

The two main demographic models are the Doyle-Metropolitan model, which is a proprietary product, and the Actuarial Society of South Africa (ASSA) model, which includes versions ASSA600 and ASSA2000. Both models assume heterosexual transmission, which is the main mode of HIV transmission in South Africa. They also assume that the epidemic moves across and within the following four risk groups, each of which illustrates the relative risk of exposure of individuals in the labour market to HIV infection:

- Commercial sex workers and their clients;
- Those who have a high incidence of sexually transmitted diseases (STDs), which is a major contributory factor in transmission of HIV;
- Those with a normal risk of HIV infection; and
- Those with no risk of being infected (e.g. children and the elderly) (BER 2001:4).

Both models now also include 'change' and 'no change' scenarios, to factor in the impact of significant interventions such as increased condom usage and mother-to-child-interventions.

In order to arrive at macro-economic, labour market, company and sector level impact of HIV/Aids, the demographic models are overlaid with complementary data, including macro-economic and workforce data. Thus the demographic profile forms the basis of allocation into the above risk groups.

The demographic impact

Most studies indicate that the main drivers of sectorally differentiated impact of HIV/Aids on labour supply locate themselves partly in the age, race and sex distribution of HIV/Aids prevalence and mortality patterns (BER 2001, Abt Associates 2000). This section assesses the reliability of these categories, especially race and gender, as indicators for HIV/Aids susceptibility.

Extrapolations of the ANC data to the national population show that adults (15-49 years), Africans and women are overwhelmingly affected by HIV/Aids as opposed to other age groups, population groups and men. Similarly, macro-economic studies confirm these differentiated demographic trends in the labour force (Quattek 2000; BER 2001).

The age factor is relatively non-controversial as an indicator of HIV susceptibility. The age distribution of HIV/Aids prevalence contributes to restructuring in the composition and quality of the labour force, given the disproportionate impact on the economically active population. The Medical Research Council (Dorrington *et al* 2001:5-6) reports a general increase in adult mortality (15-49 years) between 1985 and 1999/2000, doubling in the 30-35 year age range, which it attributes to HIV/Aids. Abt Associates (2000), using the Metropolitan model, predicts that compared to a no-Aids scenario, the largest reductions in the population by 2015 will be concentrated in the combined age category 35 –44 years, followed by those in the age categories, 30-34 years and 45-49 years. Thus the age structure of the labour force will change with a decline among those in their mid-thirties, and a relative concentration at the upper end up to 65 years, resulting in a hollowing out (the so-called 'chimney' effect) in the labour force, similar to that in the population (Lisk 2002:4).

A further dislocating effect on age distribution relates to the projected increase in Aids orphanhood and school dropouts. These may contribute to increased child labour as children enter the workforce at ever younger ages in search of financial support (Lisk 2002). ASSA2000 predicts the number of maternal Aids orphans to increase from 190 000 in 2001 to just over 1.8 million in 2015 (BER 2001).

The combined effect of the above trends on human capital amounts to a 'generational gap' in the overall skills, knowledge and experience invested in the labour force. Thus, there is an overall reduction in skills and experience as adults leave or die at the height of their productive capacity. Simultaneously, the entry of young inexperienced workers into the labour force reduces overall skills capacity (Lisk 2002), coupled with lowered educational qualifications, making them more difficult candidates for workplace-based skills training or higher education. Moreover, whilest older workers may be retained in the labour force beyond retirement age, thus adding to the skills base, this can at most be a temporary measure.

Finally, the disproportionate age distribution of HIV/Aids contributes to an increase in the dependency ratio, as fewer numbers of working age people now take responsibility for an increasing number of those who are not economically active (Lisk 2002). The high unemployment rate in South African gives rise to a high dependency ratio, which may now be further exacerbated by the effects of HIV/Aids on the economically active population. It is an area that merits further research, especially in so far as it relates to the interrelationship between poverty and the HIV/Aids impact on the labour market.

In analysing the overall racial and gendered impact of HIV/Aids on the labour force, it is important to note that given the nature of current ANC data, very little is known about the impact on population groups and men among others, especially given the absence of reliable national household level data (Abt Associates 2000). The ANC data shows that HIV/Aids has a differential

impact on racial groups with the highest peak prevalence for Africans at 19.5% compared to 3.24% for Whites, 4.8% for Asians and six per cent for Coloureds (BER 2001:7).[1]While publicly available company data generally does not comment on actual racial distribution, most indicate that all population groups are affected.

Some company data describes HIV/Aids as constituting a crisis for gender advancement, as women are particularly susceptible to infection relative to men (ILO 2002; Lisk 2002). The reasons are manifold, including physiological, socio-cultural and economic reasons. The most recent ANC sero-prevalence survey shows that women aged 15-49 years, constitute 56 per cent of the 4.74 million currently infected (Department of Health, 2001). Women also tend to be younger at age of infection (15-35 years), compared to men (20-45 years) (BER 2001). The combination of higher infection rates among women, and their current economic and social vulnerabilities (resulting in a lack of income for medical care and treatment), may translate in women dying sooner than men. The Medical Research Council report on mortality shows that while the mortality rates for men and women aged 30-35 years doubled between 1985 and 1999/2000, the rate was 3.5 times higher for younger women aged 25-29 years (Dorrington *et al* 2001:6).

The increase in the Aids-related mortality of those in their mid-thirties will have a depressing effect on the labour participation rate, as this also peaks in the mid-thirties for both men and women. However, the effect on the labour participation rate may be particularly dire for women, especially in causing them to shift out of the labour force to the not economically active population. African women constitute a significant proportion of discouraged unemployed, and the HIV/Aids impact may now exacerbate low levels of employment. The fact that women tend to care for sick relatives will further exacerbate this, especially for low-skilled women. This disparity may translate into a gender imbalance in favour of men in both the population and labour force structures.

Increased absenteeism levels as a result of Aids-related illness or tending to sick relatives, imply that the odds will be further stacked against women accumulating sufficient skills and experience. At skilled and high-skilled levels, this may prevent women from breaking through the so-called 'glass ceiling', especially in traditionally male-dominated occupations. Overall though, losses among Africans and women undermine the achieving of equity targets in terms of both skills retention and skills development among those from the historically disadvantaged.

There are not many firm or sector studies that compare the gender distribution of HIV prevalence, without reverting to the projections extrapolated from the ANC data. For instance, a company study by Evian *et al* (2001) claims that HIV prevalence rates among men (15 per cent) are generally lower compared to women. However, the study was conducted amongst a mostly male workforce (Evian *et al* 2001), and the results were compared to the antenatal HIV prevalence levels among pregnant women (24.5%). The study also asserts that while the HIV prevalence among men is highest in the 20-39 year age range, it is generally much lower compared to that recorded in the ANC survey.[1] Besides research design weaknesses specific to the study, these comparisons are not that valid as they do not take into account the bias towards high prevalence levels among pregnant women.

The literature to some extent suggests that the racial and gendered pattern of prevalence and morbidity has its roots in the structural susceptibility of those from historically disadvantaged groups, including Africans and women. Local studies do not explore the racial nexus to a great extent, other than attributing it to poverty and generally reduced socio-economic circumstances. There is slightly more emphasis placed on the gendered nature of the HIV/Aids epidemic, especially given the high rate of violence against women. Thus, increased high-risk sexual behaviour and increased HIV risk exposure are generally ascribed to continued high levels of poverty, lack of economic power, lack of access to education and information, lack of social cohesion of families (as a result of the apartheid and the migrant system), and the relatively low socio-economic status of women *vis a vis* men.

These aggregate HIV susceptibility patterns derive from an underlying, unacknowledged assumption that all Africans and all women are the same and display uniform risk behaviours in

terms of HIV susceptibility. However, as most socio-economic analysis shows, while it is true that Africans and women are generally the most disadvantaged groups in South African society, there is a complex interplay of demographic characteristics, including race, gender, province, age, education and other socio-economic characteristics such as income, skills and occupation, that produce a differentiated picture. Thus, labour statistics report a consistent increase in the level of household income inequality among African households in the post-1995 period, whereas White households have low levels of income inequality (Statistics South Africa 2001). The emergence of a small group of well-educated, well-paid Africans holding high ranking occupations, while the majority of African households have remained poor, is generally cited as a contributory factor. Similarly, while all women are disadvantaged relative to men, most White women are less disadvantaged than women of other population groups, as well as African males.

Finally, provincial differentiation in HIV estimates shows that aggregate estimates hide the wide variations at lower levels, for in different cities, towns, villages, firms, sectors etc. Thus, the tendency to adopt a 'one size fits all' approach may miss important nuances. There is a complex combination of social and economic circumstances impacting on risk aversive behaviour and exposure risk, which will be explored in the following section.

LABOUR MARKET DYNAMICS AND HIV SUSCEPTIBILITY

This section seeks to assess the role of skills, occupational and income groupings as contributing to HIV susceptibility and their interaction with the underlying demographic profiles in terms of age, sex, and race. This is done within the understanding that modelling is only a simulation of a reality, in this case the labour market, that which is much more multi-faceted and complex. The current labour market has a highly stratified skills base, differentiated by race, gender, education, income and occupation, an endemic shortage of skilled and especially highly skilled labour, and a large pool of unskilled, poorly educated and unemployed people. The interplay of race, gender, education and skill contributes to occupational segmentation.

Thus, women are economically more vulnerable as they tend to be concentrated on the periphery of the labour market in low skilled, low paid and informal sector positions. Furthermore, men dominate the formal labour market, with more women in the informal and marginalized sectors, including subsistence agriculture and domestic work. Unemployment levels are generally higher for women, especially so-called 'discouraged' women who are African, live in non-urban areas, and have with relatively low levels of formal education and skills (Statistics South Africa, 2001).

Current HIV studies, however, tend to conclude that the relationship between demographics and labour market factors is fairly straightforward and predictable. For instance, the data suggests that all unskilled, semi-skilled and low paid workers have high aggregate HIV prevalence rates and susceptibility across all economic sectors (Quattek 2000; BER 2001). However, due to efforts to improve wages at lower levels and to address the apartheid wage gap in the post-apartheid era, an unskilled worker in the public service now earns a higher wage than one in the private sector. Similar scenarios apply to unionised municipal workers (low skilled) and low skilled cleaners who are outsourced. In such cases, it is not clear to what extent higher relative incomes and unionisation will outweigh low skill status in terms of HIV susceptibility.

The skills impact and occupational segmentation

Research in South Africa on the skills and occupational distribution of HIV/Aids incidence, prevalence and mortality is very uneven and tentative. Extrapolation from the demographic models (based on the ANC survey data) is contentious given the inherent biases of the ANC data towards women and the unskilled, as well as the weaknesses of complementary data, including the Census 1996 and the October Household Survey (OHS). As noted earlier on, this is further exacerbated by the absence of sufficient household and firm-based data (in the public domain) on the skills and occupational distribution of HIV/Aids prevalence.

The two main macro-modelling studies that have focused on the interplay between skills and HIV/Aids impact include the ING Barings projections reported on by Quattek (2000) using the

ASSA600, and Abt/Metropolitan projections. Both are reliant on the ANC data as primary source data and complementary data from the Census 1996 and the October Household survey to extrapolate to the labour market.

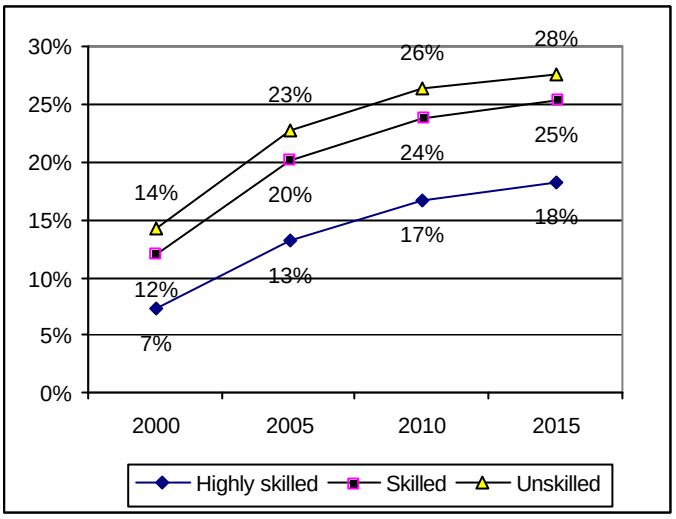
Both models adopt different base definitions to determine skills levels. Thus, whereas the Abt/Metropolitan skills categories are based on Census 1996 occupational categories, ING Barings uses average wage as a proxy (BER 2001; Quattek 2000:36). Neither of these definitions are necessarily invalid, but used separately, they provide only a partial view of skills categorisation. At the same time, differences in the findings from these models may perhaps be attributed to definitional differences. Furthermore, given the South African context, these skill definitions may be insufficient, as they ignore relative education endowments and their interaction with occupational categorisation and skill levels. Also, given historical labour market discrimination, many so-called unskilled or semi-skilled Black workers possess skills acquired through years of on-the-job experience, but hold no formally recognised qualifications. On the whole, the inconsistency in skills definitions reflects the general failure among labour statisticians to adopt a common formulation and definitions so that measurement problems are reduced.

As noted previously, a critique of the ING Baring skills projections notes its assumption that risk behaviours do not vary within and across skills categories (Acott 2000). The risk distribution at skill levels and occupational groupings is a function of various demographic and socio-economic factors coming into play as well. As stated before, in the absence of company, sector-based or even household sero-prevalence data, these projections need to be supplemented by more in-depth, primary research.

The absence of sufficient company or sector-based primary data on prevalence levels by skill categories has implications for effective succession planning and training. The experience of SASOL (Dickinson 2002), shows that at lower levels of analysis (for example, divisions and occupational categories), in the absence of actual skills-or occupation–based prevalence data, managers make 'intelligent' guestimates, which do not lend themselves to efficient succession planning. This tends to complicate impact analysis of the size and nature of future labour supply needs.

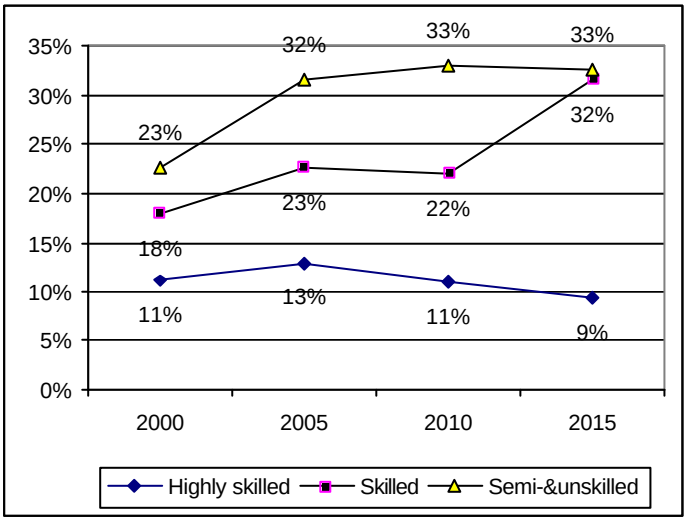
The projections by Abt/Metropolitan and ING Barings in Figures 1 and 2 show that **all** skill categories are significantly affected and have unacceptably high infection levels, even at high skill levels (BER 2001; Quattek 2000). The implication is that all skill levels will experience losses in labour and increased turnover as workers fall ill and die of Aids-induced illnesses.

Figure 1: HIV prevalence rate by skill levels[2] (2000-2015) Abt/ Metropolitan



Source: Bureau for Economic Research 2001

Figure 2: HIV prevalence rate by skill levels[3] (2000-2015)



Source: Quattek 2000 (ASSA600)

At the same time, the existing projections, together with anecdotal evidence, indicate that there is an inverse relationship between skill level and HIV/Aids prevalence levels. Thus, projections show higher prevalence levels for lower-skilled and poorer paid workers compared to higher skilled and better-paid workers, as shown in Figures 1 and 2 (BER 2001; Quattek 2000).

A study of predominantly male, sugar mill workers in KwaZulu-Natal confirms the occurrence of the highest HIV prevalence rates, 27.9% to 31.6%, among the lowest payroll bands, including semi-and unskilled workers (Morris *et al* 2000). At the end of the study period, 1991-1998, 45 per cent of those infected had left the workforce, through ill-health, retirement or death (Morris *et al* 2000).

A study conducted by Evian *et al* (2001), which tested prevalence levels in 43 companies in South Africa, Zambia and Botswana, confirms a skills gradient in HIV prevalence levels. The survey included South African companies in mining, heavy industry (manufacturing), light manufacturing and unspecified sectors, such as transport, railways, water and administration. It shows that in South African companies, managerial level staff has the lowest infection rate (4 per cent), followed by skilled staff (6.5% per cent), compared to higher infection rates among lower skill levels, which range from 15 per cent to 21 per cent. However, among lower-skilled workers, the unskilled report lower rates (14.8%) compared to the semi-skilled at 17.9%. When compared to skilled employees in Zambia (26.4%) and Botswana (16 per cent), South African skilled employees have a much lower rate (6.5%). At managerial level, the country differential is much smaller, and starts off a low base.

Most studies conclude that the skills gradient is an outcome of race and gender-based distribution across skills levels (BER 2001). Given the different base definitions of the two models, both occupational categories and average income groups will manifest a similar gradient, decreasing at higher levels of occupation or income. Thus, the dominance of Africans and women, all high-risk groups, in semi-and unskilled occupations may account for high HIV prevalence levels, whereas the dominance of Whites accounts for lower HIV prevalence levels in predominantly highly skilled occupations. The implication is that existing skill segmentation by race and gender is further exacerbated by HIV/Aids, as Africans and women will lack the mobility (through education and training) to move up the skills ladder. This impacts negatively on labour market capacity to redress the skills shortage by increasing the small existing pool of skilled and highly skilled labour, and to make it more demographically representative, in both the private and public sector.

However, Abt Associates (2000) points toward the effect of changes in the demographic profile on the composition of skill and occupational categories. Specifically, the impact of affirmative action and the general drive towards equity are labour market dynamics that need to be factored in.

Thus, as Acott (2000) argues, skills categories are not homogenous units. For instance, there have been demographic profile changes at both the highly skilled levels and skilled levels, to varying degrees. Africans and other Blacks have made inroads into senior management, especially in the public sector and to a smaller extent in the private sector. Furthermore, teachers and nurses, who are both regarded as high-risk groups, given their demographic profiles, are also included in the highly skilled categories, all factors that are supposed to increase infection rates. Thus, Dorrington (as cited in BER 2001) argues that the existence of a skills gradient shows that the relatively lower prevalence level at senior management or highly skilled levels is predominantly determined by skills rather than race. The implication is that those who are highly skilled, irrespective of demographic profile, are more likely to engage in risk–aversive behaviour as a result of increased access to information and education, as well as increased income, which may contribute to a healthier lifestyle.

The Abt-Metropolitan projections show that at skilled level, the HIV prevalence levels are as high as those among the semi- and unskilled, with a projected difference of 2-3 per cent over the entire period. In contrast, the ING Barings study shows a much larger differential for 2000-2010, and similar prevalence rates by 2015(Quattek 2000). In the skilled occupations, however, the demographic profile is more balanced compared to other skills categories as it contains large numbers of White workers, a factor that is supposed to lower prevalence levels. At the same time, skilled artisanal occupations are among the few occupations where Blacks have made successful inroads compared to the highly skilled (Department of Labour 2001). It is thus not immediately clear whether race or skill is the predominant influence on HIV susceptibility. What it does point towards is that, as Acott (2000) argues in a critique of the ING Barings model, the assumption of homogeneity within and across different skill levels and, by implication uniform risk behaviour, is erroneous. HIV transmission is essentially socially determined and it cannot be assumed that conditions that underlie social behaviour are the same within and across economic sectors and skill categories.

The projections of aggregate HIV infection rate by skill levels may not be a true reflection of specific workforce risk. These could either over- or underestimate risk because of demographic profile or other factors that may increase risk beyond the average (Abt Associates 2000). Another area that merits further research is the extent to which there is a private/public sector differential by skill levels in measuring HIV susceptibility (Abt Associates 2000). This builds on the uneven implementation of affirmative action as well income differentials in these sectors as well.

The current data do illustrate that all skill levels are vulnerable to losses and thus to replacement and training. In addition, the upgrading of unskilled and semi-skilled labour may be jeopardised given the relatively severe impact of HIV/Aids, thus slowing down the achievement of equity.

There is a high rate of increase in the growth of HIV/Aids prevalence across all skill levels (as shown in Table 6). The Abt/Metropolitan projection shows that most of the growth in HIV prevalence occurs between 2000 and 2005, with declines in growth up to 2015. At highly skilled levels, the virtual doubling in growth (7.2% to 13.3%) in 2000-2005 points to increased vulnerability regarding the supply of highly skilled workers.

Furthermore, the Aids prevalence rates in Table 6 show that at all skill levels, the proportion of workers sick with Aids increases at a faster rate over both 2000 - 2005, and 2005 - 2010, declining afterwards. Given the progression of the epidemic, the period between contracting Aids-related illnesses and death is approximately 1-2 years. This compounds the possibility of a skill *cum* replacement deficit in the period 2000 to 2010, as the overall size and quality of the skills pool may be reduced at a rate higher than the capacity to replace lost skills from the existing pool. .

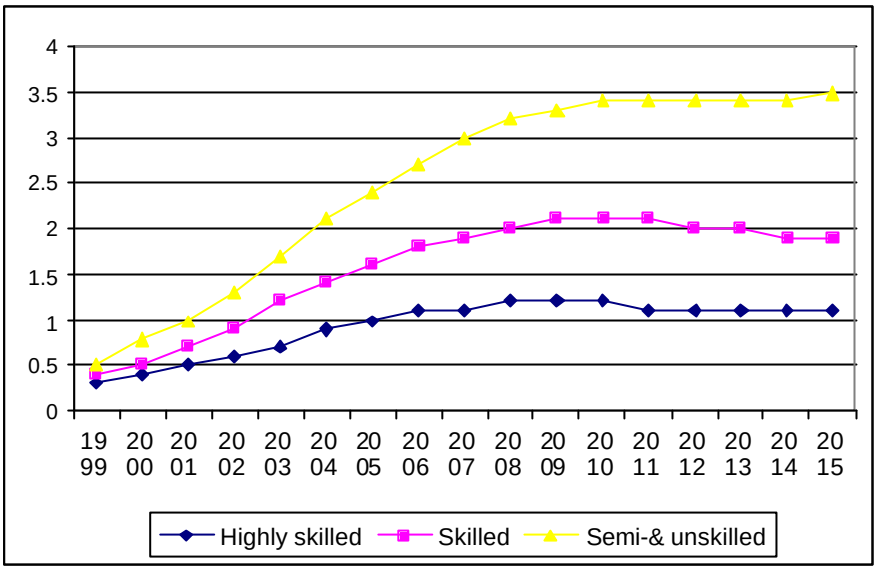
Table 6: Aids prevalence by skills levels: 2000-2015 Abt/Metropolitan

Skill levels	2000	2005	2010	2015
Highly skilled	0.3%	1.4%	2.7%	3.5%
Skilled	0.5%	1.9%	3.5%	4.2%
Semi-Unskilled	0.6%	2.2%	3.9%	4.7%

Source: Bureau for Economic Research 2001

Quattek (2000) shows that while the projected number of Aids deaths per 100 workers is fairly similar across all skills classes in 1999 (as shown in Figure 3), by 2003 the mortality ratio diverges substantially, peaking at 1.2, 2.1 and 3.4 per 100 workers for highly skilled, skilled and semi-skilled and unskilled categories respectively. The peak mortality ratio for the highly skilled is reached sooner than that of the other skill classes.

Figure 3: Projected number of Aids deaths per 100 workers by skills levels 1999-2015



(Quattek 2000)

Abt Associates (2000) project that by 2010 the labour force will, in the absence of substitution, decline by 8 per cent for the highly skilled, 10 per cent for the skilled and 11-13 per cent for the semi-and unskilled. Quattek (2000) predicts an average decline of ten per cent over the period 2000-2015, across all skills levels. With the exception of the highly skilled(8% decline), the ING Barings projections for declines in the labour force, are higher for the skilled(13%) and the semi-and unskilled(18%) by 2010 when compared to a non-Aids scenario. Thus, even at the upper end of the skills spectrum, one should anticipate a higher attrition rate in the relatively small pool of highly skilled and skilled people.

This may exacerbate the existing structural inability to match and increase the pool of sufficiently skilled people in order to match the skills demand as well as economic growth. This situation may not ease, as HIV/Aids is likely to exacerbate the current short supply of skilled labour in the absence of sufficient replacements and retraining.

Impact on income distribution

Currently there is no comprehensive analysis available on the relationship between HIV/Aids and current income levels and distribution. Studies in other parts of Africa have shown that in the initial stage of the epidemic, HIV prevalence levels increased in line with income (World Bank 2002). This was ascribed to a combination of disposable income for commercial sex and high levels of mobility in these groups.

The only available projection on income by Abt Associates (2000), based on the Metropolitan model and Census 1996 data, shows that there is an inverse relationship between HIV prevalence rate and personal income group[4]. The projection is based on the assumption that the distribution or level of income remains constant across all income groups, and no special assumptions about the demographic risk profile are taken into consideration (Abt Associates 2000). Thus, those with no income have a prevalence rate of 16 per cent, whereas those with an estimated annual income of R560 000 have an estimated HIV prevalence rate of 1.8% (Abt Associates 2000). By extension, an unemployed person with no personal income has the highest HIV infection level.

The prevalence distribution echoes existing unequal income distribution in that the highest HIV prevalence levels are concentrated among those to whom the smallest proportion of total

income accrues. Abt Associates (2000) argue that high HIV risk tends to accrue to those income groups that have been dislocated and marginalised historically under apartheid. These include Blacks (especially Africans and Coloureds), women and younger people. The only low-income group with a relatively low HIV risk includes those receiving old-age pensions.

In the best-case scenario for Aids cases, the prevalence gradient from lowest to highest personal income is influenced by age profile and geographical factors (Abt Associates 2000). Thus, instead of the highest risk occurring among those with no income, it occurs among those earning between R18 501 and R46 500 per annum. Beyond 2010, these groups and those earning less will have an Aids prevalence of three per cent, whereas prevalence for the highest income group is predicted to be at one per cent. Aids mortality rates are predicted to follow a similar pattern, but from a lower base. Thus, by 2010, the lower income bands will have an Aids mortality rate of 2.1%, whereas mortality for the highest income bands is predicted to be between 0.6 – 0.8% (Abt Associates 2000). Finally, these estimates also show that compared to a no-Aids scenario and given no substitution, there will be absolute HIV/Aids-induced declines in the size of the population across all income bands by 2015 (Abt Associates 2000). However, the largest reduction will be in the lowest income bands.

The income gradient implies that companies and sectors will have differing cost vulnerability given the availability of medical and retirement benefits to their workers. Thus, Rosen and Simon (2002) calculate that companies with low-paid workers have the lowest HIV/Aids related expenditure levels.

Medical care costs associated with Aids-related illnesses will increase expenditure for infected individuals and their families. Medical benefits are very expensive and mostly concentrated among so-called white-collar workers in skilled and highly skilled occupations. Thus, skilled and highly skilled workers will have relatively enhanced access to medical treatment and care, in order to prolong their productive lives. However, given either the absence of medical benefits, or unaffordable medical benefits, those in lower skilled positions are more likely to carry the cost themselves (financed by their own savings), or else use the overburdened public health system. The estimated cost of treatment per person per year ranges from R13 000 and R25 000, out of reach for most of the labour force (*Business Day* 12 September 2002). The overall impact may increase levels of debt among the labour force, as well as deepening poverty levels within the workforce. South Africa has one of the highest levels of income inequality globally, and the differentiated HIV/Aids burden on wages may worsen this trend.

Overall, it is expected that given the decline in labour supply, wages will rise (BER 2001). However, given the direct and indirect costs of HIV/Aids, labour demand may fall, which will have a dampening effect on wages, especially at low and unskilled levels. Collective bargaining processes are likely to be strained as unionised workers attempt to factor these increased demands into negotiations, and employers try to reduce them. However, unorganised workers may have to rely entirely on government intervention or their own resources.

Aids-induced deaths among the employed and the subsequent loss of income have a direct impact on the distribution of household income. Given the high rates of unemployment in the labour market, many 'very poor' households (earning less than R1000 a month) rely predominantly on remittances from working household members living in or outside the household (Torres, Drury, Eldring, Lewis and Vass 2001). Given the increased dependency ratio, these households face increasing income vulnerability. Furthermore, these households may have to carry the financial burden when those employed, but infected, retire from work and come home to be cared for. Existing studies predict a deepening of household income vulnerability and depletion of household savings, as existing household expenditure is shifted away from basic necessities such as food and education towards medical treatment and care (BER 2001).

Education and HIV/Aids impact

Currently there is no comprehensive analysis regarding the relationship between levels of education and HIV/Aids prevalence. However, given the linear relationship between personal income and education levels, an extrapolation of the income gradient of HIV prevalence to

education should show a similar pattern. The returns to education are highest at tertiary levels, decreasing at secondary, primary and no education levels (*Statistics South Africa* 2001). Given the patterns regarding skills and income discussed previously, it is fair to assume that well-educated (see tertiary) individuals are likely to have lower HIV infection levels, with the opposite applying to those with less or no education.

However, studies have also shown that education is not regarded as a homogenous entity in the labour market. Thus, the Mesebetsi Labour Force survey (Torres *et al* 2001) shows that among professionals with tertiary education, Whites earn twice as much as Africans, and more than both Coloureds and Indians. While racial discrimination is a contributory factor, the perception by business, of the comparative quality of formerly White and historically disadvantaged higher education institutions, plays a role. Thus, given the increased popularity of formerly White institutions, the relationship between education, demographics and HIV susceptibility may be more nuanced. Furthermore, given the increased private investment in education among Africans, risk-aversive behaviour to secure future income may be more prevalent than current studies suggest.

HIV prevalence and the unemployed

The projections indicate a general decline in labour supply to the labour market, as a result of the loss of workers as a result of Aids and Aids-related illnesses. However, one would assume that the unemployed would be an alternative source of labour supply. There is also an assumption among many companies that given the pool of unemployed, replacement of unskilled workers may be fairly easy. However, drawing upon the unemployed may be more complicated than is often assumed (Cohen 2002). Given the particular demographic character of the South African unemployed, being predominantly African, female, young and rural-based, the unemployed have a high-risk profile for HIV susceptibility. High prevalence rates of 30 per cent and more are projected for the unemployed, higher than for the rest of the labour force (Abt Associates 2000).

The unemployed include a range of people with differing levels of education, skills and work experience. Thus, in the light of general restructuring in the economy through right-sizing and rationalisation, there may be a relative small pool of skilled unemployed and older people who might become an alternative source of labour supply. However, given the general lack of skilled people in terms of economy-wide human resource requirements, this is not necessarily going to sufficiently fulfil labour needs.

Arndt and Lewis (2001) examined the interrelationship between Aids and unemployment, using a computable general equilibrium (CGE) approach. They conclude that, relative to a no-Aids scenario, Aids will not have a significant effect on unemployment among the unskilled and semi-skilled, leaving it virtually unchanged. While Aids leads to declines in the growth rate of semi-skilled and unskilled labour supply, it also results in a decline in labour demand. This decline also occurs due to a decline in economic growth rate and output declines in the construction and equipment sectors, both of which employ unskilled and semi-skilled workers. Other studies (BER 2001; Bollinger and Stover 1999) have come to similar conclusions.

HIV prevalence and the informal sector

Generally, labour market statistics in South Africa have focused on the size of the formal sector rather than on the informal sector. The current official statistics have only very recently begun to collect more coherent information on the informal sector, and significant variations are still being found in these initial stages of data collection. This historical weakness is exacerbated when trying to figure out the living conditions and circumstances of those in the informal sector. Given that these employers and employees are among the most marginalized, many of whom are engaged in so-called survivalist economic activity, they are probably also among the most susceptible to infection with the HI virus. Their demographic profile (largely African, female and young) also indicates high risk of exposure to HIV infection in the informal sector. Furthermore, the informal sector labour force does not have the cushioning effect of medical benefits or large companies that are able to absorb the overall risk. Thus, HIV/Aids is likely to increase their marginalisation in terms of employment and income. The only exception are the highly skilled in

the informal sector who generally have a relatively lower risk of exposure due to their age, gender and racial characteristics (Abt Associates 2000)

Cohen (2002) argues that the re-allocation of household savings towards increased health spending will reduce capital available for investment in informal sector activities. This may increase the vulnerability of women in particular, as a large proportion of informal sector participants are women.

In South Africa, informal sector activities are largely concentrated in the main economic sectors of trade, food processing etc (*Statistics South Africa* 2001). Thus, the ability to buy stock to trade, for instance, may be severely compromised. Furthermore, Aids-induced declines in productivity as a result of increased costs, will, according to Bollinger and Stover (1999), result in a decline in labour demand and thus fewer formal sector jobs. This, they argue may result in the marginalisation of workers from the formal sector, who now have to opt for low paid jobs in the informal sector.

Finally, very little is known about the rural-urban differential in terms of HIV prevalence and susceptibility. Given the high levels of mobility within the country and the labour market, it is expected that the differential will be fairly small. Furthermore, given increased levels of poverty, access to information and education, the rural labour market will be heavily hit in terms of labour losses.

VULNERABILITY AND THE HIV/AIDS IMPACT

The previous section highlighted those factors in the labour market that influence relative HIV susceptibility. In this section, an assessment is done of the factors that contribute to increased vulnerability of both the companies and labour force in terms of increased Aids-related costs, as well as evidence of 'burden shifting'.

Increased cost of HIV/Aids

Table 7 summarises the main channels of direct, indirect and systemic costs placed on companies as a result of Aids. It shows that while direct costs are quantifiable and thus controllable, indirect and systemic costs are less so.

Table 7: Distribution of Aids-related company costs

Direct Costs	Indirect costs	Systemic costs
Benefit payments	Reduced productivity	Loss of workplace cohesion
Recruitment and training	Increased absenteeism	Loss of workforce experience, skills and knowledge
Overtime and casual wages	Management burden	Market impacts
HIV/Aids programs		Institutional

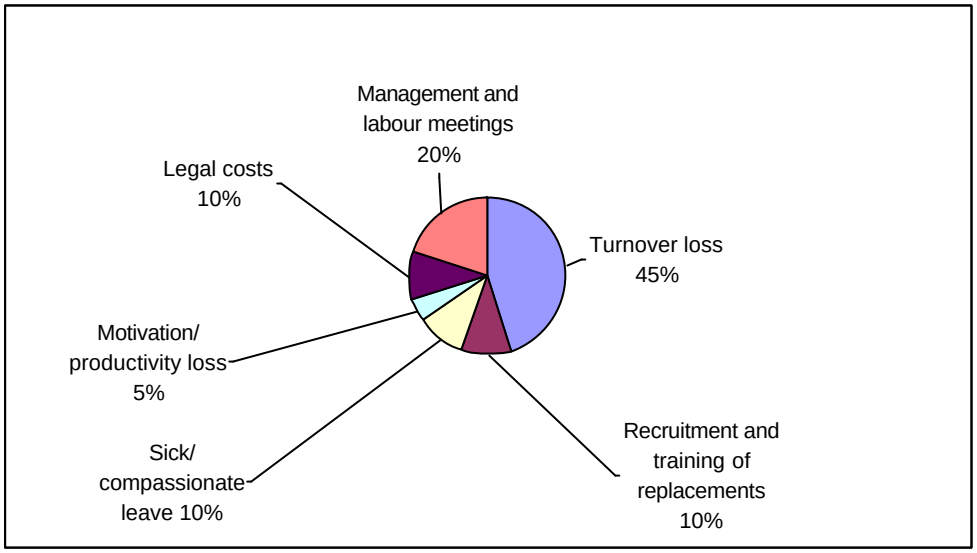
Source: Adapted from Rosen et al 2001

Moore (1999) projects that direct costs (such as employee benefits) would double by 2005 and triple by 2010, based on the Metropolitan Life model. This could increase the salary bill by 15 per cent in 2005 (manufacturing company); alternatively, benefits could be reduced by 50 per cent. Furthermore, the projections show that indirect costs (for an average manufacturing concern) could add as much as an extra ten per cent to the salary budget by 2005 and 15 per cent by 2010.

Figure 4 summarises the distribution of indirect costs due to HIV/Aids in the average manufacturing firm. Most of the costs are associated with turnover losses when employees are absent, leave the workforce when they become too ill to work, or die of Aids-related illnesses. Given the sensitivity of the HIV/Aids issue, and its related impact on costs, collective bargaining

between labour and management constitutes a sizable proportion of overall costs (Bollinger and Stover 1999).

Figure 4: Sources of additional indirect costs (Metropolitan Life Insurance)



Source: Moore, D 1999

It is in this context that contractual arrangements, employment benefits and enterprise size are fundamental to determining the relative exposure of both companies and their employees to increased Aids-related costs.

Atypical forms of employment

Atypical forms of employment are part of the general re-organisation of work to reduce labour costs in the drive for increased competitiveness. A study by Evian *et al* (2001) shows that contract workers had the highest overall rate of HIV infection at 20.9%. These workers are likely to be employed at lower skilled levels, and Evian *et al* (2001) ascribe the high prevalence rate to the age, gender profile and seasonal or 'unstable' nature of contract employment. The general profile of non-permanent workers, being predominantly African, poorly educated, low-skilled and low-paid indicates a propensity for higher levels of HIV susceptibility.

The current shift towards employing casual, temporary or contract workers through casualisation and outsourcing may be intensified by the added cost burden imposed by HIV/Aids. There is evidence to suggest that under these circumstances, companies will increasingly resort to employing non-permanent workers with reduced or no benefits. Thus, Rosen and Simon (2002) argue that in the light of Aids, companies tend to outsource less skilled jobs, to selectively retrench, restructure employment contracts, and conduct pre-employment screening as well as capital substitution. Another example includes cited trends in the mining and agribusiness sectors to subcontract so-called 'independent workers' or independent contractors, who work on a virtually full-time basis, but have very few benefits (Rosen and Simon 2002:3). They conclude that this is further evidence of the practice of 'burden shifting' in the private sector to shift Aids-related costs away from themselves towards the public sector, non-governmental organisations (NGOs) and households. The overall effect is to shift the burden to those that are already among the most vulnerable and marginalised in the labour force.

Atypical forms of employment are generally also accompanied by increased skill and task flexibility in the workplace. This becomes a likely option to ensure that there is sufficient skilled labour in the light of anticipated losses. The SABCOHA study (Deloitte and Touche 2002) shows

that just over a third of the surveyed companies have considered multi-skilling as an option to ensure trained staff given staff losses. Medium-to-large companies (>100 workers) are more likely to have done so than smaller companies. It does indicate that retraining of staff for replacement of lost skills is not a widely considered option.

Conditions of employment

In line with the previous section, Labour Force Survey findings confirm that atypical workers, such as casual, temporary, fixed term or contract workers generally receive lesser conditions of employment (Torres *et al*, 2001). Thus, permanent workers are more likely to receive paid sick and annual leave than non-permanent or atypical workers. Aids-induced sick leave is therefore likely to be more costly for those companies employing predominantly permanent workers.

Retirement and medical aid benefits are very expensive, especially given the general lack of social security. The Mesebetsi Labour Force survey (Torres *et al*, 2001:47) reports that in the private sector, 42 per cent of respondents indicated that they received a retirement benefit, with about 88 per cent reporting the same in the public sector. Seventy-three per cent in the public sector had access to a subsidised medical care benefit and 25 per cent in the private sector (Torres *et al* 2001: 47) This implies that fewer private sector workers will have recourse to funding for Aids-related medical care (if their benefits indeed include an Aids coverage) or a death or retirement benefit. They will have to carry the cost themselves or attempt to access an overburdened state health sector.

Evidence from the mining industry in Botswana shows that death and disability cover is not sufficient and below insurance-recommended levels; there are low levels of coverage, as the employee take-up is low; and that company funds are becoming 'undercapitalised' because of the demands of HIV/Aids leading to increased premiums, but with reduced benefits (Elias *et al* 2001:41). Provision of medical aid for lower skilled workers is normally very low, as premiums are unaffordable. Thus, given the overwhelming absence of medical benefit or insurance, most private sector HIV-infected employees may have to carry the cost of medical treatment themselves or turn to the overburdened state health sector.

Current macro-modelling projections make the assumption that enterprises will shift some of the cost burden towards their employees (BER 2001; Quattek 2000). Studies confirm this trend towards 'burden shifting', especially with regard to medical and retirement benefits (BER 2001; Whiteside 2002). Other studies cite the reduction of medical benefits and the replacement of defined retirement benefit schemes with defined contribution schemes as further evidence (Connelly 2002; Rosen and Simon 2002).

A study of 15 large defined contribution retirement funds shows that 50 per cent have intervened to reduce the cost burden of participating companies. This involved reducing death and disability benefits (40 per cent), 'capping' contributions (48 per cent) or employees increasing their contributions without increasing benefits (48 per cent) (Old Mutual cited in Rosen and Simon 2002). A study of medical benefits provided by 56 large companies showed that 78 per cent have restructured their medical benefits by shifting more of the costs on to the employees, putting a ceiling on company contributions and/or reducing overall benefit levels (Old Mutual cited in Rosen and Simon 2002). Given the rise in medical premiums, more than a third of employees chose to leave the medical aid scheme.

A study by the Johannesburg Chamber of Commerce confirms similar cost-cutting measures with concomitant reductions in the provision of medical care. A survey of 67 South African firms conducted by Deloitte & Touche Human Capital Corporation confirms a trend among employers to respond to increased medical scheme costs by shifting the burden back to employees (*Business Day* website 2002). Premiums paid for medical schemes constitute about 13 per cent of payroll for these companies. Forty per cent reported a change in choice of medical schemes in the period 1999-2001, due to increased premiums. The latter generally increased as a result of the increased risk burden of HIV/Aids.

In general, this trend will impact negatively on lower skilled workers, who have reduced or no access to medical care and death and retirement benefits compared to higher skilled workers.

Impact of enterprise size

There are no current studies to indicate that enterprise size is a factor in HIV susceptibility. A study by Rosen *et al* (2002) indicate a wide variation in projected HIV prevalence levels between four companies, which showed very little relationship to enterprise size. Projected HIV prevalence levels remained below ten per cent for the period 1990 to 2010. The largest enterprise, company A (>25 000 workers) had a slightly lower projected HIV prevalence level than company E (<1000 workers). The study further showed that relative to their enterprise size, large companies had the highest projected rate of new infections. Thus the incidence rate ranged from two to four per cent for the largest companies and 0.8% and 1.7% for the smaller ones. The one drawback of this study is that it is not representative of small companies, as the upper range of the smaller ones is very high (generally less than 1000 employees). Thus, evidence on companies that employ less than 100 or 50 employees will be more representative of enterprise size categories in the South African labour market.

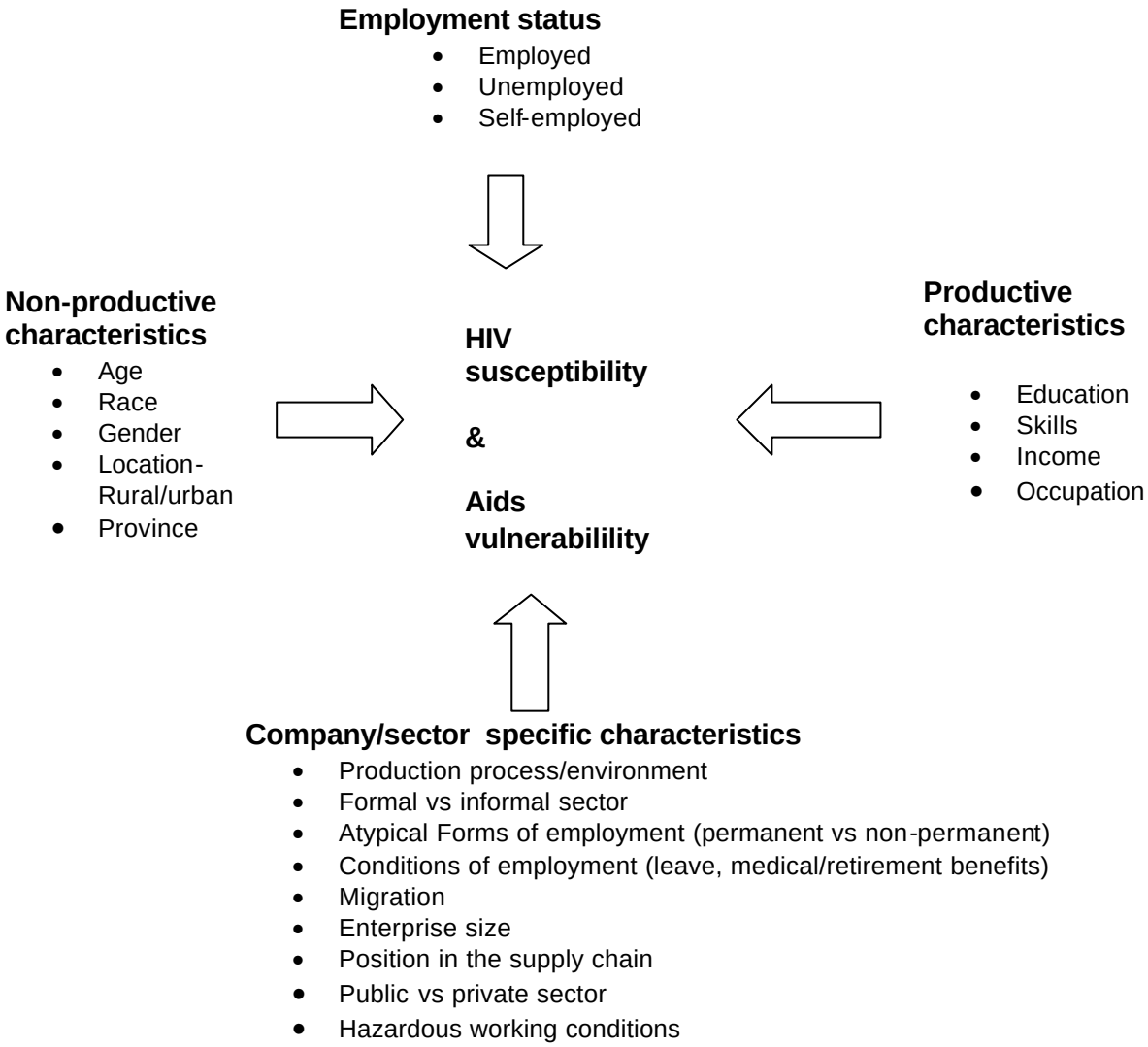
However, existing information shows that the demographic profile of these companies will be overwhelming African, in low skilled and low paid jobs. This suggests potentially high levels of HIV susceptibility, but any further conclusions are hard to reach in the absence of more concrete evidence.

However, there is evidence to suggest that the practice of outsourcing of non-core service activities or even production activities by larger companies to smaller ones or 'independent contractors' may contribute to increased vulnerability among smaller companies. For instance, mining companies outsource the employment of contract workers to labour brokers (Rosen and Simon 2002) to reduce labour costs. Given that contract workers have reduced or no benefits, outsourcing effectively shifts the burden of Aids cost from larger to smaller companies or so-called 'independent contractors'. Medium and smaller companies may not be able to absorb the risk related to increased costs, especially when faced with declines in labour supply, skills levels and profit levels.

Support networks among large and smaller enterprises along the supply chain thus become essential in order to draw upon more resources to spread the risk. The SABCOHA study (Deloitte and Touche 2002) identifies the need for 'external' support from larger companies and industry associations, as well as financing, in order to implement effective HIV management strategies.

The identification in the literature of those factors and conditions that are driving HIV susceptibility and Aids vulnerability suggest that there is a more complex picture than is suggested by aggregate statistics. By way of a summary, the following conceptual framework seeks to show the relationship between labour market dynamics and HIV susceptibility and Aids vulnerability. It is untested, and the relationships are not immediately clear. However, in the context of labour market segmentation as well as structural changes (such as affirmative action and increased access to education), these different elements work with and against one another. Thus, while non-productive characteristics may be a first indicator of HIV susceptibility, given historical inequities, productive characteristics specific to the labour market may reduce or increase HIV susceptibility and Aids vulnerability.

INTERRELATIONSHIP BETWEEN LABOUR MARKET DYNAMICS AND HIV/AIDS SUSCEPTIBILITY AND VULNERABILITY



Current labour market interventions

The previous sections illustrate the complexities related to identifying those companies and sectors that are most at risk of HIV/Aids, in order to target intervention and resource allocation. Rosen and Simon (2002) argue that there has been 'under-investment' in HIV/Aids by the private sector. At the same time, they also argue that Aids costs constitute an Aids 'tax', best avoided by rational businesses. Their estimations show that the overall cost per new infections across four companies differed considerably. This was attributed to the differing levels of death and disability benefits provided, medical care provision, the status of unskilled workers (permanent or non-permanent) and overall labour productivity across different companies. They conclude that the return in investment in the prevention of new infections will be sustainable and exceed the future costs of full-blown Aids. Furthermore, investment in treatment and care of those already infected, will delay future incurred costs and extend the lives of skilled and experienced workers.

Projections by Moore (1999) show that a large company (1000 employees) through a lump sum investment of R100 000 and an additional R25 000 annual investment on Aids education can save about R10 million in indirect costs over 10 years; a return on investment of over 50 per cent

annually. She argues that an investment in Aids education and awareness can thus represent a substantial saving on indirect costs.

The recent media announcements by large multinationals such as Anglo American, De Beers and Old Mutual that they intend complementing existing preventative programmes with the provision of anti-retrovirals have been welcome (*Business Day* 12 September 2002). Given their individual risk assessments, it is becoming increasingly clear that investment in the prevention of new infections, as well as prolonging the lives of infected workers through treatment, is more cost effective (Anglo American 2002). However, this is not a widespread response and is confined to large companies which have the benefits of economies of scale, considerable health infrastructure, the pressures of social responsibility and public image. The result may be to widen the gap between those workers in relatively well-paid jobs in large multinationals as opposed to those who are not.

Rosen and Simon (2002) also argue that the private sector response has been insufficient and question the extent to which it is possible to rely entirely on the private sector, but to consider a complementary role by government.

FUTURE RESEARCH NEEDS

A recurring theme throughout this review has been the need for more comprehensive and reliable primary data among more representative populations at household, workplace and sector level to inform current projections and research and address some of the weaknesses of the ANC data.

More research on the dynamics of HIV risk group formation, including the interplay of socio-economic characteristics such as demographic factors, skills, education and income profiles will provide a clearer idea of which sectors and occupational groups are vulnerable to HIV prevalence. There are other sources of labour market vulnerabilities, which are not sufficiently explored in current research, such as the impact of atypical employment as a result of outsourcing and increased casualisation. Furthermore, other differentials such as the urban-rural dimension, the public-private sector differential, enterprise size and the formal-informal sector impacts are not sufficiently explored.

An understanding of these dimensions will enhance clearer identification of susceptible and vulnerable companies and sectors in the labour market, in order to facilitate more effective and targeted financial and human resource allocation. Research on the cost impact of alternative preventative and treatment options will contribute to more informed intervention within the labour market.

CONCLUSIONS

This literature review starts off arguing that information on HIV/Aids prevalence trends is necessary, but not sufficient to identify the labour market risk generators in terms of HIV susceptibility and Aids vulnerability. This is particularly important within the context of highly differentiated labour markets, the cleavages of which both facilitate and are exacerbated by the HIV/Aids impact.

In general the literature points towards a rather static picture that fails to sufficiently explore the complex interplay between socio-economic risk factors including income, education and skill level and demographic factors, particular to the labour market and HIV/Aids. This is especiallly exacerbated by the dearth of empirical information forthcoming from within both the public and private sector. Developing trends including internal restructuring of the labour market now also need to be factored in, in order to measure the impact of Aids vulnerability on the labour market.

GLOSSARY

HIV - Human Immunodeficiency Virus

Aids - Acquired Immunodeficiency Syndrome

Prevalence - the absolute number of people infected.

Incidence - the number of new infections over a period.

Morbidity - number of illnesses associated with Aids.

Mortality - number of deaths associated with Aids.

BIBLIOGRAPHY

Abt Associates Inc. 2000. *Demographic Impacts of HIV/AIDS in South Africa*. Sandton: Abt Associates Inc.

Acott, D. 2000. *The impact of Aids in SA: a critique of demographic methods used in the ING Barings report of April 2000, and their implications*. Unpublished Honours thesis: University of Cape Town.

Actuarial Society of Southern Africa. *ASSA 2000.* Accessed on 15 August 2002.

<http://www.assa.org.za/downloads/aids/summarystats.htm>

Anglo American.2002.*News Release.*Accessed on 06 August 2002.<http://www.tac.org.za>

AngloGold. 2002. *Facing the challenge of HIV/Aids 2001/2002*. Accessed on 17 September 2002. <www.anglogold.co.za>

Arndt, C. & Lewis, J. 2001. *The HIV/Aids Pandemic in South Africa: Sectoral impact and Unemployment.* Mimeo.

Badcock-Walters, P. & HEARD. 2001. *The impact of HIV/AIDS on Education in KwaZulu-Natal.* Mimeo., Health Economics and Aids Research Division, University of Natal.

Bain, J. Big business takes HIV into own hands. Business Day. 12/08/2002.

Bloom, D., Mahal, A. & River Path Associates. 2002. *HIV/Aids and the private sector- a literature review.* Accessed on17 September 2002.<http://www.iaen/papers/>

Bollinger, L. & Stover, J. 1999. *The economic impact of AIDS.* The Futures Group International: Glastonbury.

Bureau for Economic Research. 2001. The Macro-economic impact of HIV/AIDS in South Africa. *Economic Research Note* No.10. University of Stellenbosch.

Cohen, D. 2002. *Human capital and the HIV epidemic in sub-Saharan Africa.* Working paper 2. Geneva: International Labour Organisation.

Cohen, N .2001. *Economic Impact of HIV/Aids in South Africa*. Presentation. USAID/South Africa.

Connelly, P. 2002. *The cost of treating HIV/Aids with ARVs in South Africa: Who knows? Who cares?* Mimeo. Johannesburg.

Deloitte & Touche. 2002. *Evaluation of Workplace responses to HIV/Aids in South Africa- A rapid situation analysis*. Johannesburg: Deloitte and Touche Human Capital Corporation.

Department of Health.2001. *Summary report-national HIV and syphilis sero-prevalence survey of women attending antenatal clinics in South Africa – 2001.* Pretoria.

Department of Labour.2001.Commission for Employment Equity Report 1999-2001.Pretoria :Department of Labour.

Dickinson, D.2002. *Sasol's response to HIV/Aids*. Johannesburg: Wits Business School.

Dorrington, R., Bourne, D., Bradshaw, D., Laubscher, R. & Timaus, I. 2001. *The impact of HIV/Aids on adult mortality in South Africa.* Technical Report. Burden of Disease Research Unit & South African Medical Research Council.

Dorrington, R. & Johnson,L. 2002. 'Epidemiological and demographic'. In Gow, J. & Desmond, C. (eds.). *Impacts and Interventions*.*The HIV/Aids epidemic and children of South Africa*. Pietermaritzburg: University of Natal Press.

Elias, R. and Taylor. I. 2001. *HIV/AIDS, the mining and minerals sector and sustainable development in Southern Africa*. Mining and Minerals and Sustainable Development (Southern Africa) Project.

Evian, C., Slotow, S., Rosen, S., Thea D., Fox, M., Macleod, B. & Simon, J. 2001. *Anonymous unlinked HIV prevalence surveys in 43 workplaces in South Africa, Botswana and Zambia 2000-2001.* Provisional results. Presentation.

Fowler, M.2001. *HIV/Aids interventions: uniqueness of the higher education sector*. Mimeo.

Henscher, M. 2000. *Health sector impacts of HIV/Aids : key issues for planning*. Presentation to SANAC technical task team. Accessed on 15 September 2002.

< http://www.tac.org.za/Documents/ResearchPapers/hensher.ppt>

Heywood, M.2000. *HIV/Aids and the World of Work.* Report for the International Labour Office: Aids Law Project.

International Labour Organisation. 2000*. HIV/Aids in Africa: the impact on the world of work.* ILO: Geneva.

Kew, J. 2002. *Old Mutual launches staff Aids plan*. Business Day. 12 September 2002.

Lisk, D. 2002. *Labour market implications of HIV/Aids in sub-Saharan Africa*. Working Paper 1. ILO: Geneva.

Lorgat, H.2001. Testing times*. Educator's Voice.* October 2001.Accessed on 12 August 2002. <http://www.sadtu.org.za/ev/Oct_2001/frontdoor.htm>

Moore, D.1999. The Aids threat and the private sector. *Aids Analysis Africa,* **9(**6).

Morris, C., Burdge, D. & Cheevers, E. 2000. Economic impact of HIV infection in a cohort of sugar mill workers in South Africa, *SA Journal Of Economics* **68(**5).

Parker, W., Kistner, U., Gelb, S., Kelly, K., O'Donovan,M. 2000. *The economic impact of HIV/Aids on South Africa and its implications for governance*. Compiled by the Centre for Development, Research and Evaluation(Cadre) on behalf of the Joint Center for Political and Economic Studies. USAID.

Quattek, K.2000. *The economic impact of Aids on South Africa: a dark cloud on the horizon*. Johannesburg: ING Barings.

Reserve Bank.2001. *Annual Report.* Pretoria: Government Printer.

Rosen, S., Simon, J., Thea, D., MacLeod, W. & Vincent, J .2001. *The impact of HIV/Aids on businesses in Southern Africa .* Center for International Health: Boston University School of Public Health. Presentation.

Rosen, S. & Simon, J. 2002. *Shifting the burden of HIV/Aids*. Discussion Paper No1. Center for International Health: Boston University School of Public Health.

SABC. *Aids biggest risk to business.* Accessed on July 03 2002. <http://www.sabcnews.com/Article/print_whole_story/0,1093,37703,00.html>

Standard Bank. 2000. The impact of the structural change of the South African economy on labour. *Editors Brief*. Economics division: Standard Bank.

Statistics South Africa. 2001. *Labour Force Survey* . Pretoria: Government Printer.

Temkin, A. *JSE –listed groups to report on Aids.* 16 September 2002. Business Day.

Torres, L., Drury, D., Eldring, L., Lewis, P. & Vass, J. 2001. *Mesebetsi Labour Force Survey: Topline report.* Cape Town.

Whiteside, A. 2002. *The economics of HIV/Aids*. Presentation at the Barcelona conference.

Whiteside, A. & Sunter, C. 2000. *Aids: the challenge for South Africa*. Cape Town: Human & Rousseau and Tafelberg Publishers.

World Bank. 2002. *Education and HIV/Aids - A Window of Hope* .Washington: World Bank.

ENDNOTES

1This survey has a number of weaknesses. It is not based on a representative sample and bias may have crept in due to voluntary participation, the exclusion of workers absent due to illness, and the non-verification of age categories.

[2] Highly skilled category includes managers and professionals; skilled includes technicians and associated professionals and artisans; semi-and unskilled include sales and service workers, clerical and elementary occupations.

[3] Highly skilled category includes managers and professionals; skilled includes technicians and associated professionals and artisans; semi-and unskilled include sales and service workers, clerical and elementary occupations.

[4] Income groups are based on those 20 years and over; as well as the mid-point estimates of each income category.