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# Health and Health Care in the Workplace

## Abstract

*This chapter provides a description of the socio-demographic changes in the labour force with particular reference to the increased feminisation of the labour force and the changing industrial landscape. Limited data on the general health status of the adult population and the workforce is presented with a particular emphasis on chronic diseases and their risk factors.*

*The HIV and AIDS epidemic continues to have a profound impact on workers' health with some mining companies reporting prevalence as high as 30% among their workforce. Although a legislative framework exists for ensuring workers' health and safety, an integrated and unified approach is lacking in this area. There is consequently a paucity of occupational health service provision in both the public and private sectors. With respect to employer-subsidised health care, there appears to be little coverage of low income earners who experience significant barriers to affordable and accessible health care. Employer-funded workplace-based clinic services, service a fraction of workplaces and are limited in the services they offer. It is recommended that the World Health Organization's Global Plan for Action on Workers' Health be utilised as a framework for improving the health of workers.*

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## Introduction

This chapter focuses on the health status of the South African workforce and health care provision in the workplace. A snapshot is provided of the demographic profile of the workforce. In describing the health status of the workforce, data are presented on the prevalence and risk factors for chronic diseases in general and occupational injury and disease in particular. Health care provision and financing aimed at the workforce is described in terms of the relevant legislative framework; models of employer-subsidisation and workplace-based models of health care service provision; and provision for social security and disability care. Finally, priorities and challenges facing health care provision for the workforce are outlined.

No primary research was conducted to obtain data and secondary sources provided all the information required for this review. Despite the active role of the private sector in health care provision in the workplace, sourcing of data proved problematic as it was neither available nor accessible. Consequently, most of the data were sourced from government departments, policy documents, company reports or through personal communication.

## Socio-demographic profile of the South African workforce

Health care provision in the workplace is influenced by legislative requirements, employment patterns, the nature of industrial activity and the hazards associated with such industrial activity.<sup>1</sup> The availability of and access to health care outside of the workplace may also have an impact on the provision of health care. With the advent of a democratic government in South Africa post 1994, the economy has been characterised by strong growth that has influenced employment patterns, uneven growth of certain industrial sectors and the growth of the informal sector. Recent figures from the 2006 Labour Force Survey (LFS) indicate that the economically active population<sup>a</sup> (EAP) increased steadily between 2001 and 2006, and now numbers 17 million.<sup>2</sup> This translates into a cumulative employment gain of 1.6 million in the South African labour market during this period. As illustrated in Table 1, the provinces that employ a large proportion of the EAP are Gauteng (27%); KwaZulu-Natal (19%) and the Western Cape (13%).

<sup>a</sup> Definition of economically active population comprise those who are employed and those who are available to work and have taken active steps to find employment.

**Table 1: Demographic profile of economically active population in South Africa, 2006**

| Province | Male No. (Thousands) | Female No. (Thousands) | Total EAP | EAP as a % of total EAP |
|----------|----------------------|------------------------|-----------|-------------------------|
| EC       | 981                  | 1 015                  | 1 996     | 12                      |
| FS       | 573                  | 490                    | 1 063     | 6                       |
| GP       | 2 691                | 1 981                  | 4 672     | 27                      |
| KZN      | 1 740                | 1 579                  | 3 319     | 19                      |
| LP       | 576                  | 567                    | 1 143     | 7                       |
| MP       | 682                  | 576                    | 1 258     | 7                       |
| NW       | 651                  | 490                    | 1 140     | 7                       |
| NC       | 244                  | 183                    | 427       | 2                       |
| WC       | 1 149                | 1 025                  | 2 174     | 13                      |
| SA       | 9 287                | 7 904                  | 17 191    | 100                     |

Note: Economically active population (EAP): persons >15 years old who are employed (formal and informal sector) or unemployed (persons willing to work and seeking work).

Source: StatsSA, 2006.<sup>2</sup>

The trade industry (which includes the wholesale and retail sectors) employs 3 million people and continues to make the single largest contribution to total employment (23.9%). This is followed by the community and social services industry (18.1%) and the manufacturing sector, which accounted for 13.6% of total employment (see Table 2). Employment trends over a 5-year period (2001-2006) revealed a decline in employment within the agricultural sector and mining industry whilst the transport, construction and trading sectors expanded their share of the labour force (see Table 2). Notably, about 40% of the workforce is employed in potentially hazardous sectors such as manufacturing, transport, agriculture, construction and mining.

**Table 2: Trends in the distribution of employment by the industrial sector in South Africa for 2002 and 2006**

| Industry                      | September 2002<br>No. (%)<br>(x 10 <sup>3</sup> ) | September 2006<br>No. (%)<br>(x 10 <sup>3</sup> ) |
|-------------------------------|---|---|
| Trade                         | 2 194 (19.4)                                      | 3 055 (23.9)                                      |
| Community and social services | 2 043 (18.1)                                      | 2 319 (18.1)                                      |
| Manufacturing                 | 1 633 (14.5)                                      | 1 737 (13.6)                                      |
| Transport                     | 574 (5.1)   | 1 309 (10.2)                                      |
| Private households            | 1 029 (9.1)                                       | 1 108 (8.7)                                       |
| Agriculture                   | 1 420 (12.6)                                      | 1 088 (8.5)                                       |
| Construction                  | 605 (5.4)   | 1 024 (8.0)                                       |
| Finance                       | 1 084 (9.6)                                       | 611 (4.8)   |
| Mining                        | 559 (5.0)   | 398 (3.1)   |
| Utilities                     | 84 (0.7)  | 119 (0.9)   |
| Unspecified                   | 72 (0.6)  | 33 (0.3)  |
| Total                         | 11 296 (100)                                      | 12 800 (100)                                      |

Source: StatsSA, 2006.<sup>2</sup>

Gender differences are apparent in the South African labour market with males at a relative economic advantage compared to females, as reflected in lower unemployment rates (21% vs 31%), greater absorption into the labour market (50% vs 35%) and labour force participation rates (64% vs 51%).<sup>2</sup> There is however, general agreement that feminisation of the South African labour force has taken place at an increased rate in the past decade with women accounting for six in ten of all new labour force entrants. During 1995 to 2005 females accounted for 55% of the increase in employment, the bulk of which accrued to African females.<sup>3</sup> However, gender discrimination remains a problem and is reflected in the quality of employment and lower remuneration paid to female workers in the labour force.<sup>2</sup>

In terms of the four major population groups the unemployment rate was highest among African people (30.5%) than among Coloured (19.4%), Indian / Asian (9.6%) and White people (4.5%). The unemployment rate was substantially higher in women compared to men except for Whites where the difference was not as marked. Females also outnumber males in the category of discouraged work seekers (13.2% vs 8.1%) suggesting that they still face significant barriers to employment.<sup>2</sup> Whilst labour force participation rates have been driven by increased female participation, the participation rate remains higher for males in all race groups with African and Indian / Asian females showing the lowest participation rates.<sup>3</sup>

An assessment of occupational groups across both genders reveals that the three highest paid occupational categories (i.e. managers, professionals and technicians) together accounted for 21% of total employment. The lower end of the occupational hierarchy comprises jobs that require fewer skills and lower education levels such as domestic work and elementary labour accounting for 30% of the workforce. The greatest proportion of the workforce is employed in the formal sector (66%) with 19% employed in the informal sector (excluding the agricultural sector).<sup>b</sup> In the informal sector 45% of the workforce is active in trade, 18% in construction and 18% in service industry.

The gendered distribution of work requires a stronger focus on the health issues of women and the differential impact of high risk work on women. Furthermore, the expansion of certain sectors such as the transport and construction industries require greater awareness of the health risks and hazards associated with exposures in these sectors. The growth of the informal sector and the large number of workers employed in elementary occupations may compromise health and safety standards due to poor regulation and a lack of awareness of human and labour rights.

## Health status of the South African workforce

Data available on the disease profiles of the South African workforce is scant. The 1998 South African Demographic Health Survey (SADHS) served as the primary data source for this section and provided mainly burden of disease and mortality estimates for the South African adult population.<sup>4</sup> For comparison, data for the corporate sector was obtained from a survey undertaken by a large health care insurer among 18 companies representing eight corporate sectors.<sup>8</sup> Since this study provided only data related to non-communicable disease burden and risk factors, little is known about the impact of communicable diseases (excluding HIV and AIDS) and acute conditions on the health of the workforce.

The SADHS found that non-communicable diseases (NCDs) as a group, accounted for 36% and 40% of deaths among men and women, respectively.<sup>6</sup> The other main causes of death were HIV and AIDS, other communicable diseases excluding HIV and AIDS and injuries (see Table 3). The common NCDs include stroke, ischaemic heart disease (IHD),

b Formal sector employment occurs where the employer (institution, business or private individual) is registered to perform the activity, whereas informal sector employment does not require the employer to be registered

diabetes mellitus (DM), hypertensive heart disease (HHD) and chronic obstructive pulmonary disease (COPD).

**Table 3: Main causes of death for South African adult men and women, 2003**

| Cause                        | Men (n=303 081) (%) | Women (n=253 504) (%) | Total (n=556 585) (%) |
|------------------------------|---------------------|-----------------------|-----------------------|
| Non-communicable disease*    | 36                  | 40                    | 37                    |
| HIV and AIDS                 | 26                  | 34                    | 30                    |
| Other communicable disease** | 21                  | 20                    | 21                    |
| Injuries                     | 17                  | 6                     | 12                    |

\* Non-communicable disease: includes ischaemic heart disease, stroke, COPD, hypertensive heart disease and diabetes mellitus

\*\* Other communicable disease: includes maternal, perinatal and nutritional related diseases

Source: Bradshaw et al., 2003.<sup>5</sup>

The percentage of deaths and rank for cause of death is illustrated in Table 4. The burden of disease due to NCDs, as a group, was similar for men and women and across the nine provinces. However, when looking at the various diseases and illnesses that form part of the NCD group, for men and women, some differences emerge (see Table 4). The risk factors related to NCD deaths in the poorer provinces include indoor exposure to smoke, poor access to clean running water, and poor access to health care services.<sup>7</sup> Obesity, physical inactivity, hypertension and elevated cholesterol are identified as contributing risk factors in the more urbanised provinces.

**Table 4: Specific causes of death for adult South African men and women due to non-communicable diseases [(rank), % of total], 2003**

| Men               |             | Women             |             | Total             |             |
|-------------------|-------------|-------------------|-------------|-------------------|-------------|
| IHD               | (8)<br>2.7  | Stroke            | (6)<br>3.1  | Stroke            | (8)<br>2.7  |
| Stroke            | (9)<br>2.3  | IHD               | (9)<br>2.0  | IHD               | (9)<br>2.4  |
| COPD              | (12)<br>1.1 | Diabetes Mellitus | (10)<br>1.6 | Diabetes Mellitus | (12)<br>1.2 |
| Diabetes Mellitus | (15)<br>0.9 | HHD               | (11)<br>1.5 | HHD               | (13)<br>1.1 |
|                   |             | COPD              | (20)<br>0.7 | COPD              | (16)<br>0.9 |

IHD: Ischaemic heart disease

COPD: Chronic obstructive pulmonary disease

HHD: Hypertensive heart disease

Source: Bradshaw et al., 2003.<sup>5</sup>

A recent study, under the auspices of a major private health insurer was conducted among 18 companies representing eight corporate sectors.<sup>8</sup> A comparison of the risk factors for NCDs from this study and the SADHS is shown in Table 5, in an attempt to address the limitations of the SADHS in terms of the representativity of the employed population. The differences between employed adults in the corporate sector and those in the general population study may be due to differences in educational and socio-economic status. The SADHS reported that the prevalence of overweight was highest among men in urban settings and those who were educated, which is confirmed in the corporate study.<sup>6</sup> In addition, the SADHS showed that women with the lowest levels of education were the most obese.<sup>6,9</sup>

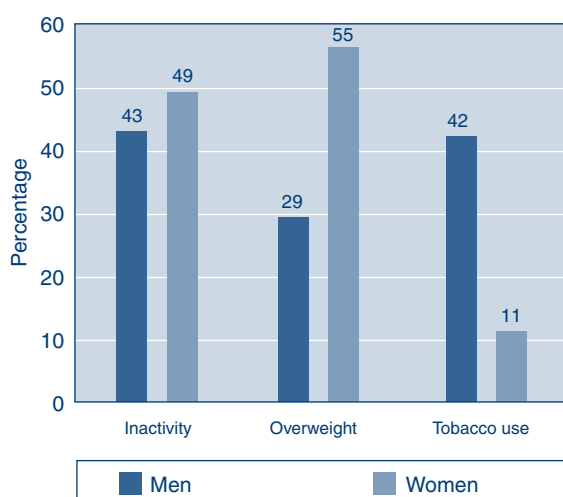
**Table 5: Prevalence of lifestyle risk factors for non-communicable diseases from a corporate survey versus the SADHS**

|                       | Corporate survey (%) |     |       | SADHS (%) |     |       |
|-----------------------|----------------------|-----|-------|-----------|-----|-------|
|                       | Total                | Men | Women |           | Men | Women |
| Overweight (BMI>24.9) | 32                   | 37  | 26    | -         | 29  | 55    |
| Obese (BMI>29.9)      | 16                   | 13  | 17    | -         | 9   | 29    |
| Physical inactivity   | 69                   | 62  | 75    | -         | 43  | 49    |
| Smoking               | 20                   | 26  | 17    | 24        | 42  | 11    |

Source: SADHS,1998;<sup>4</sup> Steyn et al., 2002;<sup>9</sup> Kolbe-Alexander et al., in review.<sup>8</sup>

Previous studies have shown that 42% of men and half of all South African women are currently inactive while only 36% of men and 24% of women participate in sufficient physical activity to derive health benefits (Figure 1).<sup>10</sup> These results are supported by Steyn et al. who found that women were less physically active than men from the age of 15 years.<sup>11</sup> Conversely, individuals in the corporate sector are far less physically active, with more than two thirds (69%) reporting no habitual physical activity. This has important implications for working adults since physical activity is associated with decreased risk of disease, but also with greater levels of productivity and lower rates of absenteeism.<sup>12</sup>

**Figure I: Prevalence of inactivity, overweight, and tobacco use in South African adults, 2003**



Source: SADHS, 1998.<sup>4</sup>

Notably, a lower percentage of men and women in the corporate sector smoked, compared to the general South African population. The findings from Steyn et al. further showed that more males than females smoked (44% versus 11%) and Coloured women had higher rates than African women (39% versus 5%).<sup>13</sup> In addition to the high rates of smoking, nearly a third of non-smoking men and 12.4% of women employed were exposed to environmental tobacco smoke in their workplace. The workplace is therefore an opportune setting for implementing interventions that could reduce smoking rates and secondary exposure to environmental tobacco smoke. These findings underscore the importance of initiating future research studies to obtain accurate and representative health and risk profile data for the corporate sector. Workplace-based health care services aimed at promoting employee wellness need to consider the difference in the disease and risk factor profile between men and women and those who are employed versus the general population and tailor their interventions accordingly to reduce the burden of disease.<sup>5</sup>

Data from research carried out by the Risk Equalization Technical Advisory Panel for the Council for Medical Schemes (CMS) showed that among patients on treatment for chronic diseases, hypertension (50 per 1 000 population), hyperlipidaemia (30 per 1 000 population), asthma (16 per 1 000 population), type 2 diabetes mellitus (15 per 1 000 population) and ischaemic heart disease (8 per 1 000 population) rank as the chronic conditions with the highest prevalent rates in this population.<sup>14</sup> Whilst these data are limited to those who are insured and treated for particular chronic conditions, it does partially mirror the cause of death data

due to non-communicable disease of the general population, as illustrated in Table 4.

## Occupational disease and injury

Global estimates focusing on the contribution of occupational exposures to ill health, indicates that selected risks at work resulted in the loss of 24 million years of healthy life and caused 850 000 deaths worldwide in 2000.<sup>15</sup> Similarly, occupational injury and disease pose an enormous cost to the South African economy. A study commissioned by the Department of Labour in 1997 estimated the cost (in 1996 terms) to equate to R17 billion which translated to 3.5% of the national Gross Domestic Product (GDP).<sup>16</sup>

The pattern of occupational diseases reported under the compensation dispensation is documented in the 2006 Compensation Commissioner's annual report [as required by the Compensation for Occupational Injuries and Diseases Act, 1993 (COIDA)]. The Compensation Fund currently (2006) covers 5 254 429 workers since individuals employed in state departments, provincial administrations and local authorities (exempted employers) do not receive benefits from the COIDA fund.<sup>17</sup> Similarly, workers from the mining and construction sector are registered with mutual associations and their role is to provide compensation in the event of an occupational injury or disease. Occupational diseases reported to the Compensation Commissioner's office have indicated a downward trend over the past 3 years (2004-2006).<sup>17</sup> These trends need to be interpreted with caution in a setting of poor diagnostic capacity for occupational diseases and a paucity of occupational health services in both the private and public sector.<sup>1</sup>

In the non-mining sector noise-induced hearing loss, post-traumatic stress syndrome and TB (among health care workers) together accounted for 78% of all occupational disease claims submitted in 2006 (see Table 6). Data from the mining sector which employs 466 301 employees,<sup>c</sup> indicate that the five most frequently reported occupational diseases are pulmonary TB, silico-TB, silicosis, chronic obstructive airways disease (COAD) and noise-induced hearing loss (see Table 7). Among these diseases, TB comprised 50% of the occupational disease burden. This is also reflected in autopsy findings of miners conducted for compensation purposes where the rate of TB had increased consistently from the early 1990's to 239 per 1 000 population in

c Personal communication, D Adams, Mine Health and Safety Council, 24 May 2007.

2004.<sup>18</sup> Silicosis rates based on autopsy results have also shown an increase particularly in the gold-mining industry which accounts for 91% of cases (250 per 1 000 population in 2003 to 277 per 1 000 population in 2004). In recognition of the detrimental role that silica exposure plays in fuelling the high rates of occupational lung disease in the mining sector, the Department of Labour has embarked on a

national programme for the elimination of silicosis in line with the International Labour Organisation (ILO) / World Health Organization (WHO) Global programme for the elimination of silicosis.<sup>19</sup> The greatest proportion of occupational lung disease claims currently emanate from the gold and platinum mines with diamond, coal and other types of mines contributing to a lesser extent.

**Table 6: Occupational diseases reported to the Compensation Fund for the non-mining sector in South Africa, 2001-2006**

| Occupational disease reported                      | 2001  | 2002  | 2003  | 2004  | 2005  | 2006  |
|--|-------|-------|-------|-------|-------|-------|
| Noise-induced hearing loss (NIHL)                  | 1 465 | 1 952 | 2 549 | 2 724 | 1 823 | 1 276 |
| Post traumatic stress syndrome (PTSD)              | 970   | 1 624 | 1 325 | 1 297 | 839   | 816   |
| Tuberculosis of the lungs (in health care workers) | 211   | 500   | 384   | 384   | 323   | 293   |
| Dermatitis   | 217   | 203   | 203   | 227   | 203   | 156   |
| Pneumoconiosis                                     | 193   | 182   | 302   | 189   | 109   | 134   |
| Occupational asthma                                | 104   | 168   | 214   | 165   | 103   | 74    |
| Repetitive strain injuries                         |       | 40    | 24    | 82    | 71    | 71    |
| Mesothelioma                                       | 201   | 20    | 17    | 28    | 16    | 12    |
| Irritant induced asthma                            |       |       |       | 7     | 16    | 2     |
| Lung cancers                                       |       |       |       | 4     | 1     | 1     |
| Chronic obstructive airways disease (COAD)         |       |       |       | 17    | 13    | 25    |
| Disease caused by chemical agents                  |       |       |       | 69    | 15    | 19    |
| Disease caused by physical agents, excluding noise |       |       |       | 5     | 13    |       |
| Disease caused by biological agents, excluding TB  |       |       |       | 75    | 228   | 185   |
| Others   |       |       |       | 85    | 49    | 44    |
| Total  | 3 361 | 4 689 | 5 018 | 5 358 | 3 822 | 3 108 |

Source: Department of Labour, 2006.<sup>17</sup>

**Table 7: Occupational diseases reported and certified for the mining sector of South Africa, 2005-2006**

| Occupational disease       | Claims reported |       | Claims certified |       |
|----------------------------|-----------------|-------|------------------|-------|
|                            | 2005            | 2006  | 2005             | 2006  |
| Pulmonary TB               | 4 015           | 3 648 | 3 039            | 2 204 |
| Silico-TB                  | 132             | 320   | 272              | 363   |
| Silicosis                  | 1 031           | 1 536 | 207              | 452   |
| COPD                       | 208             | 186   | 225              | 52    |
| Noise-induced hearing loss | 238             | 1 875 | 1 763            | 1 681 |

Source: Department of Minerals and Energy, unpublished.<sup>d</sup>

d Department of Minerals and Energy, South Africa (unpublished). South African Mines Reportable Accidents Statistics System (SAMRASS) data base.

In the non-mining sector occupational injuries account for close to 99% of all claims submitted under COIDA with a total of 219 399 in 2006 (excludes injuries reported by exempted employers).<sup>17</sup> This represents a reported injury rate of 42 per 1 000 workers for 2006, which is 27% higher than the rate of 33 per 1 000 workers in 1994. This suggests a worsening of occupational health and safety standards from data reported previously by Jeebhay et al.<sup>1</sup> This is corroborated by reports of an increase in the awards for occupational injuries in 2006 which amounted to R1.311 billion representing an increase of close to 30% on the previous year's expenditure.

In the mining sector there were 4 158 occupational injuries reported in 2006, which represents an injury rate of 4.13 per million hours worked. Gold mines accounted for 56% of all reported injuries. During the same period 199 fatalities were reported which translates to a fatality rate of 0.20 per million hours worked. The gold mining sector appeared to be the most hazardous contributing 57% of all fatalities.<sup>e</sup> Both injury and fatality rates in mines have indicated a downward trend from 1984 to the present (see Figure 2). This is probably related to the contraction of the mining industry as well as improved safety measures in mines due to improved regulation of mine health and safety since the early 1990's.<sup>20</sup> In recognition that the safety standards in South African mines are still not in line with international standards, the Mine Health and Safety Council (MHSC) in South Africa has set itself the goal of achieving safety levels equivalent to international benchmarks by 2013 in all underground metalliferous mines.<sup>21</sup>

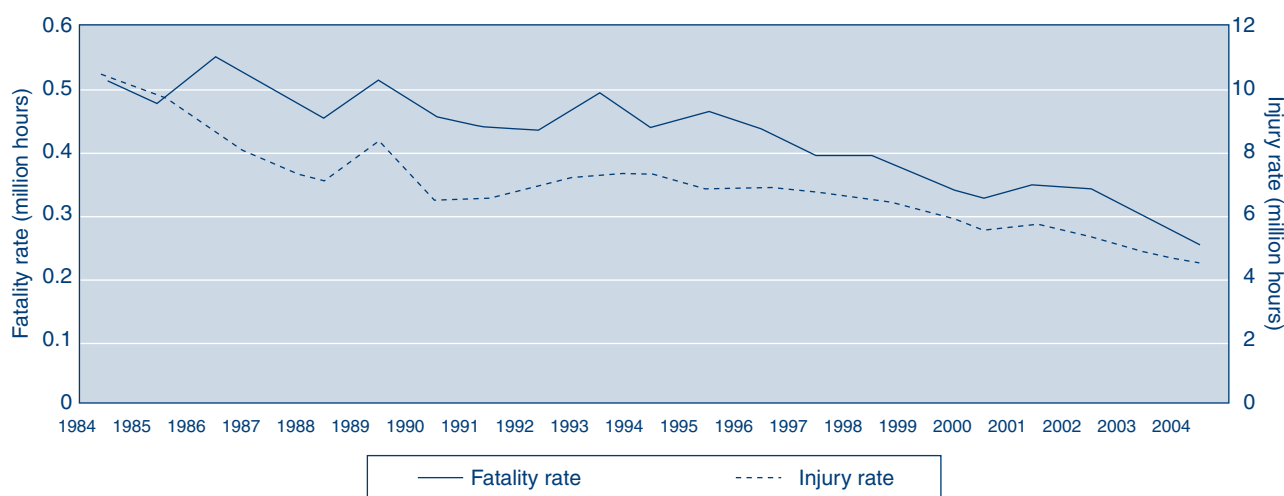
## HIV and AIDS

Although no reliable data of HIV infection per sector or per skills category is available, it is generally believed that the HIV prevalence is significantly higher among semi- and unskilled workers than among highly skilled and white-collar workers. The mining, transport, building and construction and manufacturing sectors are particularly vulnerable to the AIDS epidemic, as a large proportion of their workforce falls within the semi- and unskilled categories with two large mining companies reporting an HIV prevalence of 30% among their workforce.<sup>22</sup>

With over 5 million of the population estimated to be infected with HIV, South African workplaces have had to develop an organised and formalised response in dealing with the HIV epidemic. A recent survey by the South African Business Coalition on HIV/AIDS (SABCOHA) evaluated the HIV workplace strategies of 1 032 companies and found that 81% of the financial services companies, 60% of the mines and around 50% of the companies in the manufacturing and transport sectors had an HIV and AIDS policy.<sup>22</sup> However, less than a third of the retailers, wholesalers, vehicle dealers and building and construction companies implemented an HIV and AIDS policy.

There appears to be a relationship between size and skill level in the company and the implementation of HIV programmes. The financial, mining, transport and manufacturing sectors appear to be the most advanced in the provision

**Figure 2: Annual fatality and injury rates for South African mines, 1984-2004**

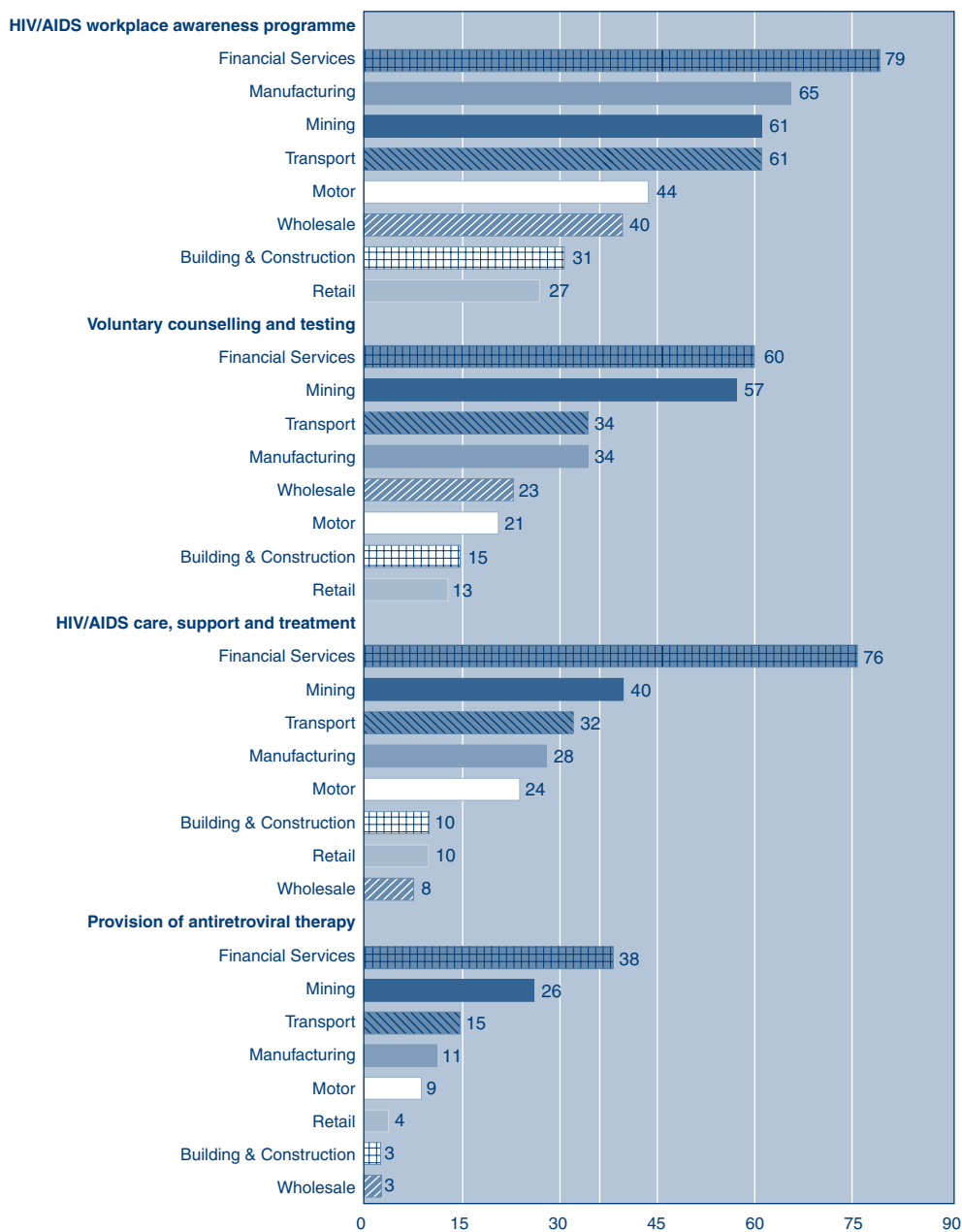


Source: Department of Minerals and Energy, 2005.<sup>21</sup>

e Department of Minerals and Energy, South Africa. Fatality and injury rates per commodity (rates per million hours worked) – SAMRASS. Data base (provisional figures).

of HIV awareness programmes, voluntary counselling and testing (VCT) programmes, HIV and AIDS care, support and treatment programmes and the provision of antiretrovirals (Figure 3). In contrast, smaller companies (employing less than 100 employees) lag behind in the provision of HIV programmes due to financial constraints and lack of perceived long-term risk to business operations.<sup>22</sup>

**Figure 3: Percentage of companies that have implemented HIV/AIDS programmes – sectoral breakdown, 2005**



Source: SABCOHA survey, 2005.<sup>22</sup>

## Occupational health services and health care in the South African workplace

### Legislative framework for the provision and funding of occupational health services and health care in the workplace

Multiple statutes govern the provision of occupational health and general health services for the workforce and these are outlined in Table 8.

#### Occupational health and safety

Although there is no obligation on employers to provide occupational health services for workers, the Occupational Health and Safety Act (Act 85 of 1993) and its various Regulations on hazardous chemical substances (i.e. lead, asbestos and biological hazards) mandate the provision of occupational health services through the requirement for medical surveillance of workers exposed to these agents in high-risk industries.

The Mine Health and Safety Act (Act 29 of 1996) allows for the establishment of a medical inspectorate to enforce occupational health standards.<sup>1</sup> *“The inspectorate’s responsibilities also include protecting communities against the environmental, public health and safety consequences of mining activity.”*<sup>16</sup> The fragmented approach to occupational health and safety has resulted in the drafting of the National Occupational Health and Safety Bill (2005) that provides for the establishment of a National Health and Safety Authority whose primary aim will be to reduce work-related accidents and diseases through effective integration between prevention and compensation functions.<sup>16,23</sup> If promulgated the Bill should have a positive impact on occupational health and safety service provision through improved enforcement capacity, uniform standard setting, improved information systems and research capacity, an enhanced unified compensation system and the promotion of a culture of health and safety in the workplace.

#### Health care provision and funding

The Nursing Bill (Bill 26 of 2005) defines the scope and practice of nurses in all health service organisations whilst the Medicines and Related Substances Act (Act 101 of 1965) provides for nurses to be authorised to dispense scheduled medicines through workplace health services. This is an important function as workplace-based health services are

primarily nurse-staffed and both primary health care and occupational health services are delivered to the workforce. For non-workplace-based health care, the Labour Relations Act (Act 66 of 1995) allows for the establishment of bargaining councils and the administration of medical schemes for the benefit of members, whilst the Medical Schemes Act (Act 131 of 1998) allows for the establishment of a regulatory body to oversee the activities of medical schemes and to protect the interests of those insured with such schemes. The National Health Act (Act 61 of 2003) outlines the duties and responsibilities of all stakeholders in the health system and makes provision for the delivery of occupational health services as a provincial health departmental function. However, occupational health service provision by provincial departments of health is uneven and in some cases absent due to a lack of capacity and financial support.<sup>1</sup> The lack of a health information system to provide data generated by occupational health service programmes at provincial levels renders it impossible to evaluate the scope and effective functioning of these programmes.

#### Compensation for occupational injury and disease

The two laws regulating the compensation of workers for occupational injuries and diseases are the Compensation for Occupational Injuries and Diseases Act (Act 138 of 1993) and the Occupational Diseases in Mines and Works Act (Act 78 of 1973).<sup>16</sup> Compensation benefits may include loss of salary, payment of medical expenses, lump sum payments and monthly pension payments to disabled workers or his / her dependants.

There are major disparities between these two statutes regulating compensation. Whilst the COIDA provides a statutory no-fault compensation benefit for employees with occupational injuries or diseases, the Occupational Diseases in Mines and Works Act (ODMWA) provides compensation for miners with occupational lung diseases only. COIDA provides for pension payouts in the event of permanent disability whilst compensation under ODMWA is limited to lump-sum payments. However, the ODMWA incorporates a surveillance function as it allows for free biennial medical examinations of mineworkers at accredited health care institutions. COIDA does not provide any equivalent surveillance function. However, in an effort to facilitate the proper diagnosis of occupational diseases, promote efficiency of the compensation system and enhance access to the compensation system for claimants with occupational disease, the Compensation Fund has, since 2003, embarked on the establishment of

Provincial Medical Advisory Panels.<sup>24</sup> These panels, which are comprised of experts in occupational medicine provide technical support to the Department of Labour in policy and medical expertise related to occupational disease claims. Currently panels have been established in three provinces namely, the Western Cape, KwaZulu-Natal and Gauteng.

In general, compensation benefits under the COIDA are better than those paid out in terms of the ODMWA as it

allows for a guaranteed minimum benefit which the ODMWA does not. The Occupational Health and Safety Policy of 2005 has called for the creation of a single compensation system which will result in equalising of benefits and effective access to compensation benefits for all workers.<sup>16</sup>

**Table 8: South African legislation pertaining to occupational health and safety, health service provision and compensation**

|   | Act  | Function  | Enforcement agency                |
|---|--|---|-----------------------------------|
| Occupational health and safety                  | Occupational Health and Safety Act (Act 85 of 1993). <sup>25</sup>                   | Ensures that employers provide workers with a healthy and safe work environment   | Department of Labour              |
|   | Mine Health and Safety Act (Act 29 of 1996). <sup>26</sup>                           | Ensues a healthy and safe working environment for workers in the mining sector  | Department of Minerals and Energy |
|   | National Occupational Health and Safety Bill, 2005. <sup>23</sup>                    | Allows for the establishment of a National Health and Safety Authority which will act as a forum for policy-making and standard setting in occupational health and safety with overall regulatory responsibility for occupational health and safety in South Africa               | Department of Labour              |
| Health care provision and funding               | Medicines and Related Substances Act (Act 101 of 1965). <sup>27</sup>                | Provides for an authorisation permit to be issued to a nurse to dispense schedule 1-4 substances at workplace health services   | Department of Health              |
|   | Labour Relations Act (Act 66 of 1995). <sup>28</sup>                                 | Allows for the establishment of bargaining councils that have the right to establish and administer pension, provident funds, sick pay and medical aids for the benefit of the members<br><br>Outlines procedures for dealing with ill-health causing incapacity in the workplace | Department of Labour              |
|   | Medical Schemes Act (Act 131 of 1998). <sup>29</sup>                                 | Allowed the establishment of a Council for Medical schemes to regulate the activities of medical schemes and protect the interests of members of medical aid schemes  | Department of Health              |
|   | National Health Act (Act 61 of 2003). <sup>30</sup>                                  | Sets out rights and duties of health care providers, health workers, health establishments and users<br><br>Provides for the provision of occupational health services by provincial departments of health  | Department of Health              |
|   | Nursing Bill (Bill 26 of 2005). <sup>31</sup>  | Outlines the scope of practice, duties and responsibility and level of accountability of nurses within government and other health service organisations  | Department of Health              |
| Compensation of occupational injury and disease | Occupational Diseases in Mines and Works Act (Act 78 of 1973). <sup>32</sup>         | Provides mainly for the compensation of occupational lung diseases in mines and quarries  | Department of Health              |
|   | Compensation for Occupational Injuries and Diseases Act (Act of 1993). <sup>33</sup> | Provides for medical cover and compensation of occupational injuries or diseases arising from workplace exposures   | Department of Labour              |

### Models of employer-subsidised health care

Doherty et al. identify four main sources of finance for health care: government; households; employers and donors; and non-governmental organisations.<sup>34</sup> While government is identified as the largest source of health care finance (44%), households and employers represent the second and third largest sources of finance (39% and 16.6% respectively). Households either make contributions to medical schemes and various other forms of private insurance or pay out-of-pocket directly for health care services. Employers fund health care for their employees either directly through workplace-based health services or indirectly through contributions made on behalf of employees to private health insurance companies.

#### Medical scheme subsidies

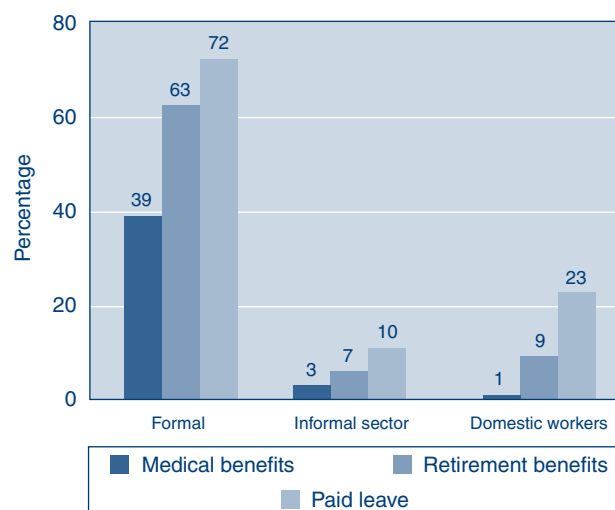
Private health insurance (PHI) comprises three major components namely, community health insurance, not-for-profit health insurance and for-profit commercial health insurance.<sup>35</sup> *“At present, the PHI market in South Africa provides duplicate cover affordable only to the higher income groups. Such cover enables enrollees to access health care delivered through privately financed providers that are separate from the public health delivery system.”*<sup>36</sup>

The not-for-profit PHI system in South Africa is largely represented by the medical schemes industry. During 2005, medical schemes in South Africa covered 14.6% of the population. The gross contribution income of medical schemes for 2005 amounted to R54.2 billion (or R670 per beneficiary per month). One of the challenges facing South Africa within the not-for-profit PHI system is that in the low income groups, while employees contribute towards public and private health services, they do so without access to a subsidy (from either the tax system or their employer) nor do they have access to risk-pooling that occurs within the medical scheme system. If the South African public health system with universal coverage or a Social Health Insurance (SHI) system for the employed populace provided adequate services and met consumer demands, *“there appears to be no need for government to prioritise improving access of low income consumers to PHI.”*<sup>36</sup>

The 2005 Old Mutual Survey on employer health care financing and subsidy policies demonstrated that the majority (65%) of employers continued to subsidise their workforce by paying a percentage of the medical scheme contribution with no financial limits attached.<sup>37</sup> Only 5% of

the companies surveyed indicated that they contributed to medical schemes on a total cost to company basis for all or some employees (capping or limiting the employer subsidy). This is despite the fact that the 2003 survey reported that 21% of employers had moved to contract with employees on a ‘cost to company’ basis. Key factors identified by the 2004 LFS that drive employer-based medical scheme membership included the nature of employment contracts, wage levels, sector and industry.<sup>36</sup> The LFS demonstrated that medical benefits provision was lower than other benefit provisions such as paid leave and retirement or pension funds.<sup>38</sup> Not surprisingly, the survey also found very low levels of benefit provision within the informal sector (see Figure 4).

**Figure 4: Percentage of employees with benefits by sector (excluding self-employed), 2004**



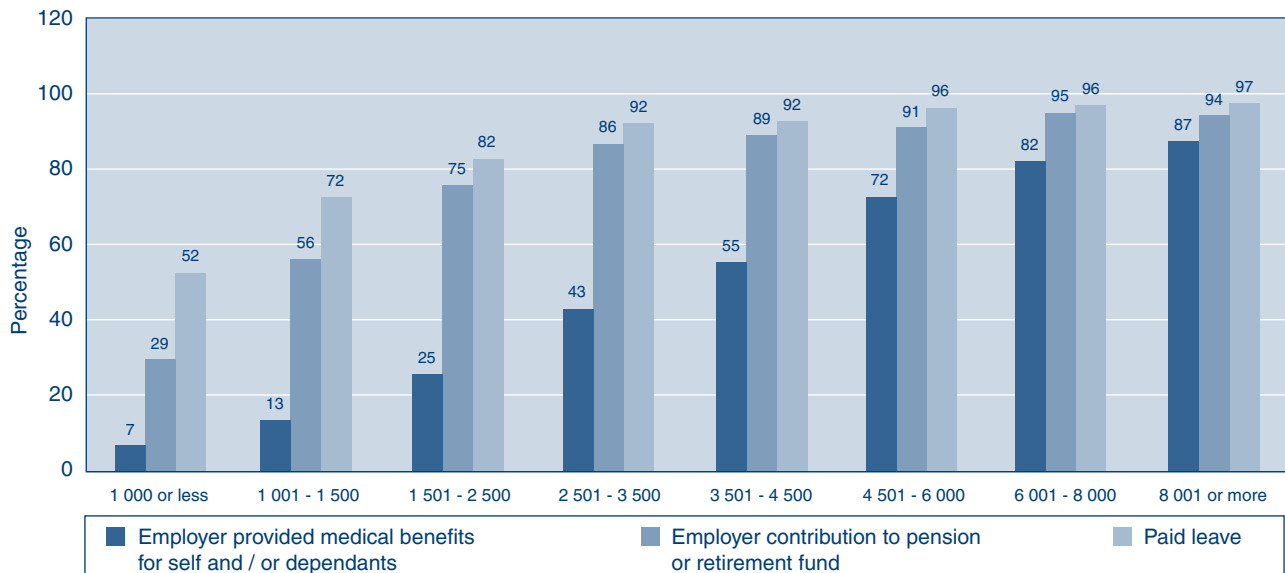
Source: Broomberg, 2005;<sup>36</sup> StatsSA, 2004.<sup>38</sup>

Within the formal sector, significant variation exists in employer provided benefits across industries and by wage category. The proportion of employees in formal employment with employer provided benefits is significantly less (39%) in income categories below R2 500 per month with only 7% of employees earning R1 000 or less and 13% of those between R1 001-R1 500 having employer provided benefits (see Figure 5). The nature of industry and employment relationship also determines the proportion of employees receiving employer-provided benefits. The more temporary the employment relationship, the less likely employees are to receive medical benefits as is evident in the construction and agricultural industries (see Figure 6). In general, the more labour intensive industries also appear to receive medical benefits.

Government and parastatal employers, who employ approximately 20% of the formally employed, have the highest level of medical scheme provision. This is despite the fact that in the lower income categories of the formally employed government sector, coverage is relatively low. Data from the

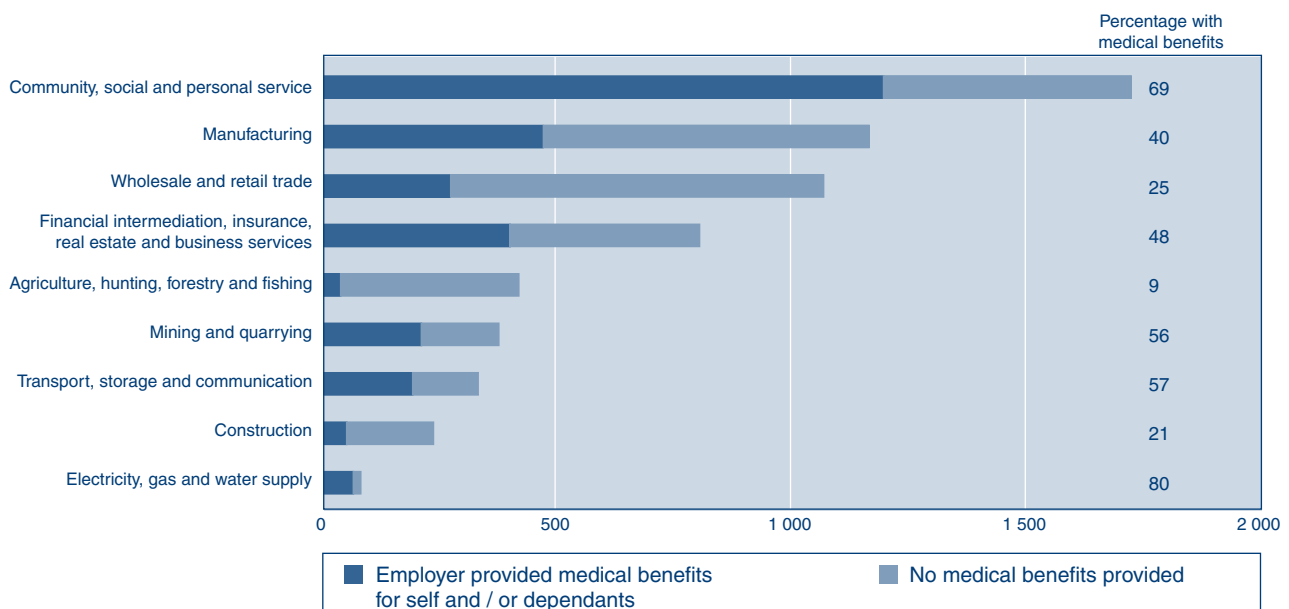
LFS further illustrated that the provision of medical scheme benefits is positively related to the size of the company and the extent of unionisation. The larger and more formal the companies and the higher the union membership, the more likely it is that medical scheme benefits are provided.<sup>36</sup>

**Figure 5: Percentage of formal, permanent employees with employer-provided benefits by gross monthly personal wage (Rands per month), 2004**



Source: Broomberg, 2005;<sup>36</sup> StatsSA, 2004.<sup>38</sup>

**Figure 6: Percentage of formal sector, permanent employees with medical benefits by industry, 2004**



Source: Broomberg, 2005;<sup>36</sup> StatsSA, 2004.<sup>38</sup>

### Bargaining council subsidies

In the current environment, Bargaining Council Medical (BCM) schemes provide the only real opportunity to extend health insurance cover to low income earners as is evident by the large proportion of workers with income categories below R2 500 (see Figure 5).<sup>39</sup> BCM schemes display characteristics that significantly distinguish them from mainstream medical schemes. These schemes are unique in that they are the simplest and cheapest type of medical scheme. They were established in the industrial sector to cater for low income earners most of whom are either unskilled or semi-skilled. There were 34 BCM schemes in 1994 and most of them covered only employees, excluding dependants and pensioners. These schemes provide significantly limited medical benefits, usually restricted to primary health care benefits with very few BCM schemes offering hospital cover in the private sector. Surprisingly, very little is reported in the literature about BCM schemes.

While there has been little reported in the literature about the effectiveness and long-term viability of BCM schemes, government is acutely aware of the need to establish an appropriate legislative and operational framework to meet the needs of low income employees. This priority to initiate measures to encourage low income participation in medical schemes led to the consultative investigation into Low Income Medical Scheme (LIMS) coverage. One of the conclusions emanating from the LIMS process is that *“despite the low coverage statistics, a significant majority of low income households appear to want access to medical scheme cover. This adds weight to the observation that financial constraints, and lack of affordability, are the key obstacles to extending coverage at present, at least for those households with access to formal sector employment”*.<sup>53</sup>

### Workplace-based clinical services: Staff-based models and directly-contracted models

Workplace-based health services are modelled on either a staff-based model or a directly-contracted model. Employers may choose to provide clinical services by hosting in-house clinics employing permanent staff, with the vast majority being occupational health nursing staff. Employers may also choose to contract with independent private practitioners who do sessional work at the workplace (directly contracted model). Occupational medical practitioners in contracted models are usually employed on a part-time consultancy basis although some large companies employ the services of full-time medical advisors.

Alternatively, employers may also choose to outsource the provision of occupational health services to specialised companies who provide the systems and human resources to manage the occupational health programme. This is increasingly favoured as a more efficient and effective method of occupational health service delivery but may not be accessible to small and medium enterprises due to budget constraints. Workplace-based occupational health services may be engaged in the promotion and maintenance of employee health, maintenance of workforce efficiency, the fulfilment of legal compliance with regulations and obligations to the workforce and enhancement of company performance through professional health management.<sup>40</sup> In addition, many provide primary health care services as well as consultative, rehabilitation and administrative services.<sup>1</sup> It is difficult to ascertain the extent of coverage of the workforce due to a lack of data on occupational health service provision in the private sector. However, one of the largest service providers currently only services 120 000 workers in 186 clinics and 17 mines countrywide, suggesting that whilst coverage of workers is higher in the private sector, it still covers only a fraction of the workforce in the formal sector.<sup>40</sup> This is particularly true of workers in the non-mining sector as the Mine Health and Safety Act of 1996 compels mines to employ occupational medical practitioners to carry out medical surveillance of miners.

### Models of social security and disability care for workers

#### State-funded or administered – Workers Compensation Fund / South African Social Security Agency

Government administered social security is dispensed in two ways. For workers with certified occupational diseases and / or injury with significant permanent disablement (>30%), a pension is payable under COIDA. Employers registered with the Compensation Fund pay mandatory annual premiums to insure their workforce against occupational injury and disease. Such premiums are based on industrial risk-ratings and the size of the workforce. There are 295 651 employers registered with the Compensation Fund which resulted in a cumulative contribution of R3 billion in premiums for the 2005/06 financial year. Under COIDA a pension may be payable to a worker even if the person continues to be productive and is employed. Ongoing medical care and treatment for chronic disease may also be covered in terms of COIDA if this is aimed at limiting future and ongoing disability and complications. Currently the fund pays pension

benefits to 23 608 claimants with the capitalised values of new pension benefits awarded in the 2005/06 financial year amounting to R403 million (R392 million in 2004/05) representing an increase of 2.8% on the previous year. Pensions are revised annually and increases are awarded within the budget constraints of the Compensation Fund.

A disability grant may be payable for other non-occupational health problems manifesting as physical or mental disability. The disability grant is means-tested and awarded to a person who is unfit to enter employment in terms of the Social Assistance Act (Act 13 of 2004).<sup>41</sup> The eligible age for women is 18-60 and for men 18-65 years after which they become eligible for an older person's grant. The disability grant is administered by the South African Social Security Agency (SASSA) under the auspices of the Department of Social Development with funding provided by the National Treasury. Currently there are 1 505 068 recipients who benefit from disability grants of which 59% are women. For 96% of disability grant recipients this represents their only source of income with only 4% reporting still being employed. Currently disability grant recipients comprise 12% of those in receipt of social security grants from the SASSA.<sup>42</sup> The disability grant profile reveals that over 36% of beneficiaries with disabilities have physical disabilities, 29% have a specific illness and 16% suffer from emotional impairment.<sup>43</sup> The disability grant appears to have an important impact on the health of recipients as 93% of recipients in a survey indicated that the grant had improved the general health of the household or had been used in caring for an ill household member (75%).<sup>44</sup>

A major flaw in the public social security system has been the lack of a rehabilitative focus and the absence of programmes to integrate persons with disabilities back into the workplace.<sup>43</sup> This is true for both recipients of disability grants from SASSA and those who receive pensions from COIDA. Over 90% of persons in receipt of the SASSA disability grant have low levels of education and are unemployed. No public-private projects of scale exist which is geared at the meaningful integration of people with disabilities into the EAP. Whilst workers with occupational injury and disease enjoy protection of their employment status in terms of existing labour legislation, poor enforcement results in the loss of employment for a considerable number of workers affected.<sup>45</sup>

## **Priorities and challenges for workplace-based health care services**

The WHO in its recently adopted Global Plan for Action on Workers' Health responds to the need to move from strategy to practical action in the area of occupational health.<sup>46</sup> The Global Plan for Action outlines five broad principles that Member States need to pursue in order to proactively address the health needs of workers and limit the negative economic and social impact on the health of workers. These five principles pertinent to the South African context are discussed below.

### **Develop and implement national policies, action plans and programmes on occupational health**

The WHO advocates that *"occupational health policies and action plans should be linked to national strategies on health and labour and be developed and implemented in coordination with other relevant public health programmes"*.<sup>46</sup> Examples of such programmes are those pertaining to the environment and health, control of communicable diseases, prevention of injuries and promotion of mental health. Examples of such initiatives in South Africa include the drafting of the Occupational Health and Safety Bill (2005), which addresses the fragmented regulation of occupational health and safety in the country and calls for the establishment of a single regulatory authority for workers' health and safety. There is an urgent need for the occupational health and safety agency to be established to set processes in motion. This should go a long way to promoting a culture of health and safety, adherence to uniform standards and eliminating the inequity reflected in the provision of occupational health services and compensation between the mining and non-mining sectors.

### **Protect and promote health at the workplace**

The Global Plan of Action also calls for the protection and promotion of health in the workplace. This may require specific interventions in high risk industries such as mining, transport and construction. A multi-stakeholder approach is important in determining industry-specific health and safety standards. One of the most important factors contributing to

the absence of a preventative focus in occupational health and safety is the lack of qualified personnel within government occupational health and safety agencies tasked with the enforcement and implementation of policy. In 2000, the Department of Labour registered 82 inspectors with occupational health and safety qualifications with a vacancy rate of 47% for these positions. This translates into one occupational health and safety inspector for every 90 000 workers in the formal sector representing an annual expenditure of 0.02 cents per worker covered by the Occupational Health and Safety Act.<sup>16</sup>

With such limited financial and human resources devoted to this important function, little capacity exists for effective accident investigation, workplace risk assessments and evaluation of occupational health services. This is further compounded by the lack of a national and uniform reporting system for reporting accidents and incidents of ill-health caused by exposure to occupational hazards. Such a system would allow for awareness of emerging occupational hazards, flagging of high risk industries and effective allocation of resources aimed at the prevention of workplace accidents and diseases where it is most needed. Workplace-based health-initiatives should also create and utilise opportunities to promote healthy choices and prevent disease. There has been an increasing trend towards the incorporation of 'worker wellness' programmes into health care packages offered by occupational health service providers, in recognition of the demand for such services and the opportunity for health promotion.<sup>40,47</sup> However, there are insufficient data available on the degree of uptake of such services by workers and their impact on workers' health.

### Improve the performance of and access to occupational health services

Improving the performance and access to occupational health services is seen as integral to improving workers' health. There has been good progress in this area in the mining sector but very little in the non-mining sector.

Globally it is estimated that less than 15% of workers have access to occupational health services.<sup>46</sup> In South Africa employer-provided and funded workplace-based health services (excluding the mines) range between 11-18%, depending on the size of the workforce, with some sectors such as the agricultural sector having little or no provision or access to occupational health services.<sup>1,48,49</sup> The WHO argues for the provision of basic occupational health serv-

ices in countries with low coverage.<sup>46</sup> Such services should be guaranteed by the public sector and mechanisms for delivery and financing should be put in place through integrating the development of occupational health services into national strategies for reforming the health system and improving its performance. In South Africa this strategy was embraced in the White Paper on the Transformation of the health system, with the Department of Health (DoH) focusing specifically on the provision of occupational health services to historically neglected sectors such as small and medium enterprises, the public sector, workers in the informal sector and the unemployed.<sup>1</sup> Whilst the National Health Act refers to the delivery of occupational health services as a function of provincial departments of health, there is currently no delivery of basic occupational health services within the primary or secondary tiers of the health system.

### Provide and communicate evidence for action

According to the WHO, "Workers, employers, service providers and all other stakeholders need access to relevant, reliable and sufficient information on workplace hazards and solutions."<sup>46</sup> This requires national programmes for research in occupational health which needs to be reviewed regularly as priorities change. It also requires the setting up of good information systems to provide high quality data that will inform strategies and policy in occupational health and safety. The Safety in Mines Research Advisory Committee (SIMRAC), established under the MHSC is one such organisation which sets and implements the research agenda for occupational health and safety in the mining sector. The current per capita research expenditure (per mine employee) is R86.20 There is no similar body in the non-mining sector although the National Institute of Occupational Health, an institute within the National Health Laboratory Services, is involved in the training of occupational health professionals, research and surveillance in occupational health.<sup>50</sup>

## Address workers health through non-health policies for sustainable human and economic development

This principle recognises that “workers health is both a prerequisite for and a consequence of sustainable human and economic development”.<sup>46</sup> The Global Plan of Action calls for intersectoral collaboration to avoid the international transfer of occupational risks as exemplified in the asbestos-mining industry in South Africa, where local communities are still struggling with a huge burden of asbestos-related disease and the environmental impact of pollution arising from mining activities. A positive impact of globalisation may be the adoption of unified occupational health and safety standards by multinational companies operating in both developed and less-developed countries.<sup>51</sup> The emergence of ethical trade initiatives is one such example and may result in the formulation and adoption of a code of good practice governing employment standards for those involved in certain sectors.<sup>52</sup>

## Conclusion and Recommendations

Whilst many factors impact on the health of the workforce, this review highlights the following key areas that need to be addressed to promote a proactive approach to the prevention of ill health, limit disability and mortality, and enhance access to health care services among the South African workforce.

### Effective prevention of occupational injury and disease

For occupational health legislation to impact positively on workers' health, greater resources need to be devoted to the development of an effective and appropriately trained enforcement agency to ensure implementation of health and safety statutes. A uniform health information system that could provide meaningful data on the state of health and safety in the workplace is also required. Consideration should be given to providing incentives to those companies who have good occupational health programmes in place, institute proactive measures to promote workers' health and safety, and conform to occupational health and safety legislation. Such initiatives should span both the public and private sector given the presence of well-developed networks for occupational health service provision in the private sector.

### Expansion of workplace-based health services

Most of the access to occupational health services exists in the private and formal sector through the establishment of workplace-based health care services. Given that a large proportion of the workforce does not have access to such services, this is an issue that needs to be urgently addressed through the creation of public-private partnerships to achieve economies of scale.<sup>49</sup>

### Special focus on hazardous (high risk) employment sectors

Consideration should be given to the mandatory provision of employer-funded occupational health services in all high-risk employment sectors known to be associated with exposures hazardous to health as is currently required of the mining sector. Such services should establish surveillance programmes, environmental risk control and health and safety training that complies with a set of standards determined by a national regulatory body.

### Expansion of HIV and AIDS management and prevention programmes

Whilst companies recognise the adverse impact of HIV and AIDS on their profitability, it is disconcerting that many lag behind in the provision of workplace-based HIV awareness and prevention programmes. This is particularly prevalent among smaller companies.<sup>22</sup> Whilst programmes have been developed to assist small business and very small companies (<10 workers) with the establishment of HIV-workplace programme in the private sector, these programmes need to be actively marketed and incentives provided to improve uptake by small- and medium-sized enterprises. Many HIV-workplace programmes that are functional and well-run have broadened their focus to include other aspects of employee wellness thereby fulfilling an important health promotive function. In large companies with mature HIV-workplace programmes, support and care have been extended to include the families of workers and surrounding communities.

### Extension of Private Health Insurance to low income earners

Affordability of health care, in the midst of escalating health care costs, is an important issue for employers with only a quarter regarding the prescribed minimum benefit package as affordable for the lower income market and almost half providing no post-retirement funding for health care.<sup>37</sup> Surveys among low income families confirm that current expenditure on private health care poses a significant affordability burden to such households.<sup>53</sup> This is manifested as high out of pocket expenditure on health care and a relatively high level of unmet medical needs. Whilst efforts are under way to extend PHI in the form of Low Income Medical Schemes to such families, this initiative needs to be fast-tracked and made affordable through some form of government subsidisation.

### Achieving equity in the Worker's Compensation dispensation

A significant problem relating to the provision of compensation benefits for occupational injuries and diseases identified by the Taylor Commission into a Comprehensive System of Social Security is the exclusion of large labour sectors such as domestic workers, informal sector employees and self-employed persons from the compensation net.<sup>16</sup> This is potentially discriminatory and inequitable. Any new compensation dispensation should broaden the scope of coverage to include workers from these sectors. Consideration should also be given to compensation coverage of persons with environmentally-acquired diseases such as asbestos-related diseases.<sup>54</sup>

Rationalisation of the compensation legislation to establish a uniform and equitable compensation system should also be considered as a matter of urgency, in line with proposed changes to the health and safety statutes.

### Efficient rehabilitation and reintegration of injured / diseased workers into the workforce

The lack of compulsory rehabilitation or vocational training programmes to assist injured / diseased workers and to reintegrate them back into the workforce results in a huge loss to the economy as skilled workers who become injured / diseased at work invariably leave employment. The no-fault principle on which the compensation system is based, effectively shields employers from bearing the full cost of injuries and diseases arising out of hazardous working conditions and also blocks claimants' recourse to litigation. An actuarial

assessment of the entire compensation system is required to assess the feasibility of increasing employer premiums and abolition of the rebate system in order to improve benefits awarded to employees and allow for the funding of compulsory occupational rehabilitation programmes.<sup>54</sup>

### Prioritising research and surveillance system

South Africa currently does not have a nationally coordinated occupational health and safety research strategy nor an effective reporting system for occupational accidents and ill-health.<sup>16</sup> It is therefore impossible to assess the full extent and impact of occupational injury and disease, and the impact of policy intervention. The development of a national reporting system that builds on existing data bases is therefore imperative and is envisaged as a function of the occupational health and safety regulatory authority, referred to in the Occupational Health and Safety Bill, 2005. Mechanisms need to be put in place for enhancing the research enterprise in the non-mining industry as is the case for the mining industry.

In conclusion, improving the health of workers can be achieved through sustained coordinated efforts of society as a whole, under government leadership and with substantial participation of workers and employers.<sup>46</sup> Intersectoral collaboration is therefore a prerequisite for the meaningful implementation of the challenges and recommendations outlined in this review.

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