People infected with HIV are asymptomatic for a variable number of years during which time they are HIV antibody positive and infectious. Many people will be able to work normally during this period, especially if they are not aware of their HIV infection. An early occupational health concern that otherwise perfectly well people may suddenly develop AIDS dementia and pose a risk to themselves and others at work does not seem to have been borne out, as AIDS dementia is nearly always accompanied by other features of AIDS. Nevertheless, AIDS is a cause of dementia occurring in relatively young people, and this may be a limiting factor for work fitness in some cases.

In rich nations there has been very substantial modification of the natural history of HIV infection. Highly active antiretroviral therapy (HAART) is usually a cocktail of three types of drugs. With good compliance to HAART, people with HIV or AIDS can remain well for many years. However, these effective drugs are very expensive. Even with recent price reductions for developing countries, they cannot be afforded and the infrastructure needed for their use and monitoring is lacking. The prognosis of AIDS in developing countries remains extremely poor, with death within two years being usual.

THE AIDS EPIDEMIC WORLDWIDE

Estimates on the worldwide AIDS epidemic are available from, for example, the UNAIDS website. At the end of 2000, the number of adults and children estimated to be living either with HIV or AIDS worldwide was estimated to be 36.1 million (fig 1). Of these, 25.3 million are in sub-Saharan Africa, and 5.8 million are in South and South East Asia. The situation in some countries of South and South East Asia has the potential to become very much worse, given the huge population in this area. From the 1970s through to 2000, some 21.8 million people have died from HIV/AIDS. Some 3.0 million people died of HIV/AIDS in 2000 alone (fig 2), and 2.4 million of these deaths were in sub-Saharan Africa.

There is little sign of the epidemic slowing. In 2000 there were 5.3 million new infections, 3.8 million of them in sub-Saharan Africa, and 780 000 of them in South and South East Asia. It is estimated that there were about 15 000 new HIV infections every day in 2000, more than 95% of them in developing countries. About 13 000 of them were in people aged 15–49 years, the main employed age group.

Estimates of the proportion of the adult population aged 15–49 years living with HIV/AIDS in 2000 are shown in box 1. In developed countries progression from HIV to AIDS has been at least delayed thanks to effective antiretroviral treatment. At the same time fewer people with AIDS have died because they are kept alive and relatively well on these effective treatments. Overall, the effect has generally been to increase the number of people with AIDS who are alive; this has been shown, for example, in California and in the UK. With the improved prognosis of HIV infection, people may be more likely to take risks. Prevention campaigns targeted at gay communities were associated with substantial reduction in risk behaviours and a fall in the rate of new HIV infection. Recent information, however, suggests that the frequency of risk behaviour may be increasing again in some communities.

In sub-Saharan Africa nearly 9% of the population have HIV or AIDS (box 1). This is more than an order of magnitude greater than the highest proportion in developed countries. In South and South East Asia the proportion of the population with HIV or AIDS in 2000 is 0.56%, but there is concern that there could be a huge growth in this figure yet to come.

In some countries in sub-Saharan Africa the situation is especially bad. In Botswana, over a third of the adult population are now infected with HIV and it is predicted that in 20 years time there will be more people in their 60s and 70s than in their 40s and 50s, because of the lower age group dying from AIDS. The death toll predictions are appalling: in countries where 15% or more of young adults are currently infected with HIV, at least 35% of boys now aged 15 will die of AIDS, even if the rate of new infections is halved in the next 15 years.
HIV/AIDS AND THE WORKPLACE

The health care setting

Developed countries

There is a documented, small occupational risk of HIV infection in the health care setting in developed countries. The risk of infection from a single percutaneous exposure to HIV infected blood is around 0.3%. Cumulatively, some 55 documented HIV seroconversions have been reported from the USA, 35 from Europe (of which five are from the UK), and just 12 from the rest of the world. Other cases are possibly occupationally acquired HIV infection but without documented seroconversion: 136 from the USA, 68 from Europe, and just 13 from the rest of the world. It is notable that seven of the eight UK cases of possible occupational transmission (there were no other risk factors) were people who had worked in high seroprevalence areas in Africa. There is also a small risk of transmission to patients from health care workers. Documented transmissions to patients have occurred from a Florida dentist who transmitted HIV to six patients and a French orthopaedic surgeon who transmitted the virus to one...
patient.\textsuperscript{7} In western Europe (including the UK) and North America health care workers with known HIV infection are not allowed to undertake invasive procedures where injury to them could expose patients to their blood (exposure prone procedures), in order to remove even the smallest risk of them transmitting infection to patients.\textsuperscript{8,9}

Related to the HIV epidemic, there has been an increasing problem of multidrug resistant tuberculosis in recent years, especially in the USA. Both patients and staff are at risk, particularly those with HIV or who are immunosuppressed for other reasons.\textsuperscript{10} Detailed guidelines have been produced for reducing the risk of spread of tuberculosis in health care facilities, especially in relation to HIV and multidrug resistant strains.\textsuperscript{10,12}

Perhaps the biggest impact of the HIV epidemic in the health care setting has been an increased awareness of the risks associated with blood contact, leading to adoption of procedures to reduce such contact and the development of new equipment. This may also reduce the risk of transmission of other blood borne viruses, such as hepatitis C.

Developing countries
Relatively little is known about transmission to workers or patients in the health care setting in developing countries. In many developing countries, especially in sub-Saharan Africa, the HIV seroprevalence is high in both patients and health care workers. Infection control procedures are usually very poor and systems for monitoring and reporting exposures are equally poor or non-existent. Thus the number of reported cases of documented occupational transmission or probable occupational transmission is likely to be a gross underestimate because incidents are not reported or followed up. Clearly there must be an important cumulative risk of transmission in the health care setting, particularly in sub-Saharan Africa, but it is very difficult to make an accurate assessment of this risk. The guidance in the UK is that health care workers who undertake invasive procedures and who think they have been at risk of HIV infection are supposed to have a test for HIV antibodies and seek advice about any necessary limitations of practice.\textsuperscript{13} It has been suggested that the occupational risk in sub-Saharan Africa is probably great enough that someone whose work there has involved undertaking invasive procedures should have an HIV antibody test on return to the UK before continuing to undertake such procedures. This is also a consideration for medical students undertaking electives in countries with high HIV prevalence, and this could be an issue when employing staff who have trained and undertaken invasive procedures in these countries.

The financial impact of providing treatment for AIDS may be enormous. In seven of 16 African countries sampled in 1997 health spending for AIDS was more than 2% of gross domestic product (GDP), whereas the total health expenditure was 3–5% of GDP.\textsuperscript{14} The situation is worse still because of the increase in tuberculosis accompanying the AIDS epidemic. The situation is exacerbated by the loss of health care workers themselves due to HIV and AIDS. For example, in Zambia there was a 13-fold increase in health worker deaths between 1980 and 1990, most of which was attributable to HIV.\textsuperscript{14}

The general workplace
Developed countries
Most people with HIV or AIDS pose no risk to their colleagues or other people they come into contact with in their work. AIDS is a chronic illness and will lead to spells of sickness absence from time to time, and ill health retirement if available. Some companies have undertaken pre-employment screening for HIV on the grounds that people with HIV will place an undue burden on the company pension scheme. In practice, it is hard to show an adverse impact of the HIV epidemic on the workforce in developed countries. In the UK, it is considered unethical for occupational physicians to be involved in pre-employment screening for HIV without proper counselling and consent.\textsuperscript{15} Being HIV positive is not in itself a disability under the UK Disability Discrimination Act because it does not interfere with activities of daily living.

Education of the workforce and policies to avoid discrimination against employees with HIV or AIDS are important. Most large companies in developed countries now have policies about preserving confidentiality and avoiding discrimination against employees with HIV.

Developing countries
In developing countries with high population prevalences of HIV and AIDS and little prospect of effective treatment, the present and predicted population and workforce consequences are extremely serious. Information for the workforce in South Africa in 1999 and predictions for 2005 and 2010 are shown in box 2.\textsuperscript{16}

The agricultural sector
The impact on agriculture is important because the economy of many countries bearing the brunt of the AIDS epidemic depends on agriculture, and most of the population in these countries is occupied in agriculture, either self employed in

<table>
<thead>
<tr>
<th>Box 2 Predictions for the workforce in South Africa related to HIV/AIDS</th>
<th>1999</th>
<th>2005</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proportion HIV positive</td>
<td>11%</td>
<td>18%</td>
<td>21%</td>
</tr>
<tr>
<td>Proportion sick with AIDS</td>
<td>0.6%</td>
<td>1.8%</td>
<td>2.9%</td>
</tr>
<tr>
<td>Life expectancy of population: female (years)</td>
<td>54</td>
<td>43</td>
<td>37</td>
</tr>
<tr>
<td>Life expectancy of population: male (years)</td>
<td>50</td>
<td>43</td>
<td>38</td>
</tr>
</tbody>
</table>
The impact of HIV on work: key points

- Most of the impact will be felt in sub-Saharan Africa and other developing countries
- Steep falls in agricultural production are already documented in some countries
- Direct and indirect costs to businesses are already high and rising, including loss of workforce, costs of benefits and costs of insurance
- Predictions for the future are alarming, even if the rate of new infections is greatly reduced

The business sector

The impact on businesses operating in countries with a serious AIDS epidemic is already being felt but much worse is yet to come, as the people who are now infected with HIV develop AIDS and become ill and die. The costs to businesses are both direct and indirect. Direct costs include increased employee benefits and medical scheme costs. Funeral costs and death benefits are also significant as the disease kills many members of the workforce. Indirect costs include those of recruiting and training new staff. Many of the people who develop AIDS are in the supervisory cadres; that whole level of the workforce is just disappearing. There are costs of additional sick and compassionate leave, and there is reduction in productivity because even if people are at work they are not working at full capacity. There is a negative impact on staff morale, and there is organisational disruption. How do you say to somebody with AIDS that you are going to discipline him or her for poor performance, when that person may be going to die soon? Furthermore, how can a supervisor discipline somebody for poor performance if the supervisor himself is also HIV positive and fearing that he is going to develop AIDS and die?

A transport company in Zimbabwe with 11 500 workers had more than 3400 HIV infected workers and 64 deaths from AIDS in 1996. The total costs of AIDS in 1996 were around ZS39 million, or 20% of their profit. The costs are predicted to be ZS108 million by 2005. The insurance industry in South Africa has calculated the cost of pensions and disability benefits as 7% of the payroll in 1999, and estimated that this figure will rise to 19% if the current benefits are maintained.

RESPONSE OF EMPLOYERS AND GOVERNMENTS

Some businesses have been slow to respond, either unwilling to accept that the workplace situation will really get worse, or believing that nothing can be done to prevent it. However, many large national and multinational companies are now trying to take action in order to reduce problems in the future. Some governments are supporting these actions by giving tax breaks for companies that do something about HIV prevention in their workplaces, and some are requiring that HIV prevention programmes should be part of the tender for government business opportunities. Workplace interventions include education about preventing transmission, provision of condoms, and treatment of sexually transmitted infections (which increase the risk of transmission of HIV). Some employers also provide similar services to the wider community on the grounds that reducing the overall population prevalence of HIV infection in the area changes the risks to the workers. Simple interventions may have useful effects. In 40 factories in Zimbabwe workers were given information about HIV and offered counselling and testing, and in half the factories they were also offered confidential interviews with peer educators who gave them condoms and told them more about their situation. The HIV prevalence among workers rose in all the factories over the two years of the study, but it rose 34% less in the factories with peer educators and the programme cost just ZS6 per employee.

The recently announced Global Health Fund, which is funded by contributions from the governments of wealthy countries, has AIDS as a major focus. However, there are already doubts about how effective it will be.

SUMMARY

AIDS is not likely to have a major impact on work in western Europe and North America, but it is already having a huge impact in sub-Saharan Africa and this is going to get much worse. This reflects the fact that the brunt of the AIDS epidemic is being experienced in sub-Saharan Africa, and AIDS will kill a sizeable section of the working population in this region in the next 20 years. The agricultural sector will suffer badly, as will businesses in general, and this will have devastating effects on the economy of countries that are already among the poorest in the world. Workplace based interventions could have some impact on reducing the rate of increase of HIV infection among employees. More general actions to reduce HIV transmission, to reduce poverty, and to improve health care systems in affected countries are urgently needed to tackle the unfolding tragedy of the AIDS epidemic.

REFERENCES

2 UNAIDS. Accessed 1 August 2001. URL: http://www.unaids.com