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Sub-Saharan Africa

AIDS epidemic update Regional Summary



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SUB-SAHARAN AFRICA

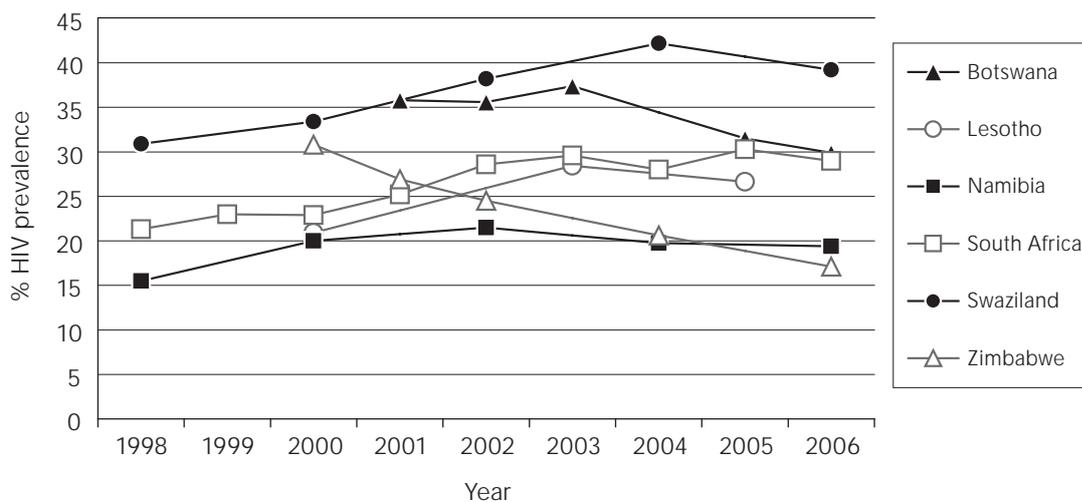
Southern Africa

The scale and trends of the epidemics in the region vary considerably, with southern Africa most affected.¹ In 2007, this subregion accounted for almost a third (32%) of all new HIV infections and AIDS-related deaths globally, with national adult HIV prevalence exceeding 15% in

eight countries in 2005 (**Botswana, Lesotho, Mozambique, Namibia, South Africa, Swaziland, Zambia and Zimbabwe**). Nowhere else has national adult HIV prevalence reached such levels. However, there is evidence of slight declines in the epidemics of some countries

Figure 1

Median HIV prevalence among women (15–49 years) attending antenatal clinics in consistent sites in southern African countries, 1998–2006



Sources: Various antenatal clinic surveys.

¹ Southern Africa includes the countries of Angola, Botswana, Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, South Africa, Swaziland, Zambia and Zimbabwe.

(notably Zimbabwe), while the epidemics in most of the rest of the subregion have either reached or are approaching a plateau (see Figure 1) Only in **Mozambique** have the latest HIV data (from 2005) shown an increase in prevalence over the previous surveillance data set.

In **Zimbabwe**, HIV prevalence in pregnant women attending antenatal clinics has declined significantly in recent years, from 26% in 2002 to 18% in 2006. Among young pregnant women (15–24 years), prevalence declined from 21% to 14% over the same period. Infection levels were highest among pregnant women attending antenatal clinics in areas of mining (26% prevalence) and commercial farming (22% prevalence) (Ministry of Health and Child Welfare Zimbabwe, 2007).

More than three quarters of all AIDS deaths globally in 2007 occurred in sub-Saharan Africa.

Latest HIV prevalence estimates obtained from antenatal clinic surveillance match those reported in the most recent population-based HIV survey, which estimated national adult (15–49 years) HIV prevalence at 18% in 2005–2006, and found that 11% of young women (15–24 years) and 4% of young men were infected with HIV (Central Statistical Office Zimbabwe & Macro International, 2007). However, the survey also found that a considerably larger proportion of adult women were living with HIV (21%) than men (15%). For both men and women, the risk of acquiring HIV increases considerably from their late teens to mid-30s. A total of 6% of women and 3% of men aged 15–19 years tested HIV-positive, compared with about 35% of women and 30–32% of men in their 30s. The data also show a marked increase in HIV prevalence for people with multiple sexual partners in their lifetime. For example, 7% of men with only one sexual partner in their lifetime were HIV-positive, compared with 31% of men with 10 or more lifetime partners (Central Statistical Office Zimbabwe & Macro International, 2007).

Infection levels in pregnant women vary considerably, ranging from 11% in Mashonaland Central to more than 20% in Matabeleland South and

Mashonaland West. In 2006, at least 25% of antenatal clinic attendees tested HIV-positive at Banket (a town in the north of Mashonaland West), Victoria Falls (on the western border with **Zambia**, in Matabeleland North) and Beitbridge (on the southern border with **South Africa**, in Matabeleland South) (Ministry of Health and Child Welfare Zimbabwe, 2007).

The downward trend observed in **Zimbabwe's** surveillance data is supported by several studies (Mugurungi et al., 2005; UNAIDS, 2005; Mahomva et al., 2006; Ministry of Health and Child Welfare Zimbabwe, 2007), while declining prevalence among both men and women has also been observed in rural parts of Manicaland (Gregson et al., 2006). The trend reflects a combination of high mortality and declining HIV incidence, related, in part, to behaviour change (UNAIDS, 2005). There is evidence from eastern **Zimbabwe** that more women and men have been avoiding sex with a non-regular partner, and that consistent condom use with non-regular partners increased for women (from 26% in 1998–2000 to 37% in 2001–2003), though not for men (Gregson et al., 2006).² Mathematical modeling also suggests that the declines in HIV prevalence cannot be attributed solely to the natural evolution of **Zimbabwe's** AIDS epidemic (Hallet et al., 2006).

A comparison of data in 1999 and 2005 (Central Statistical Office Zimbabwe & Macro International, 2000 & 2007) shows only minor changes in condom use during sex with a non-regular partner. In 1999, 42% of women said they used condoms the last time they had sex with a non-regular partner, compared with 47% in 2005; whereas for adult men, condom use during sex with a non-regular partner remained about the same (70% versus 71%). However, paid sex appears to have decreased: 7% of adult men in 1999 said they had paid for sex in the previous year, whereas this figure decreased to 3.8% in 2005. On the other hand, condom use declined slightly among those men who said they had paid for sex—from 82% in 1999 to 73% in 2005 (Central Statistical Office Zimbabwe & Macro International, 2000 & 2007).

Against the background of economic deterioration, the impact of AIDS-related illness and, in particular, aids-related death is threatening

² See *AIDS epidemic update: December 2006* for more detailed discussion.

household viability. According to one recent study in the east of the country, almost 4 in 10 (39%) households dissolved or relocated after an AIDS-related death, compared with 1 in 4 (27%) households that had experienced a non-AIDS-related death. AIDS-related deaths were more likely to result in the loss of the head of the household, and households with AIDS-related deaths spent significantly more on health care than did households with a non-AIDS-related death. Median expenditure on health care, funeral and memorial services equalled a quarter of the average annual per capita income (Gregson et al., 2006).

Zimbabwe's recent decline in HIV prevalence reflects a combination of high mortality and declining HIV incidence, the latter partly due to behaviour change.

With an estimated 5.5 million [4.9 million–6.1 million] people living with HIV (UNAIDS, 2006),³ **South Africa** is the country with the largest number of infections in the world. The country's Department of Health estimates

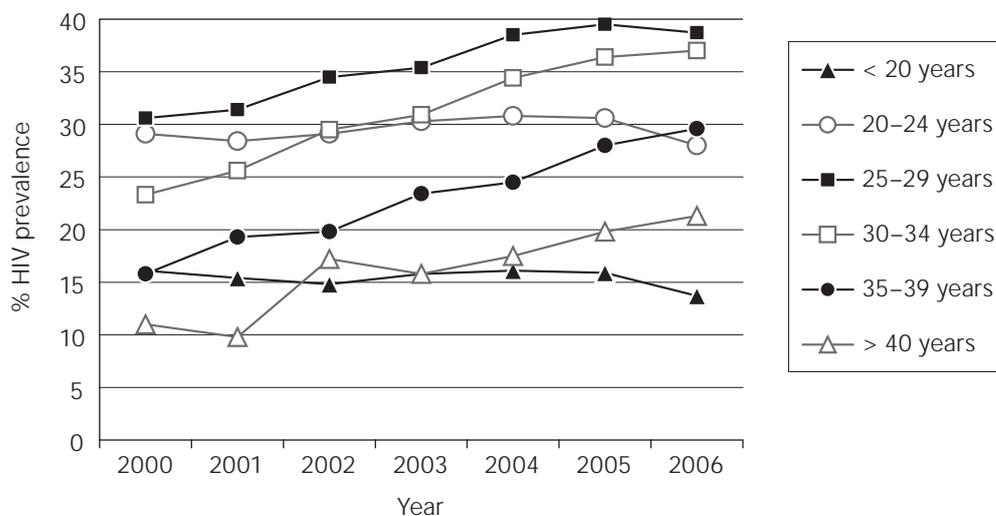
that 18.3% of adults (15–49 years) were living with HIV in 2006 (Department of Health South Africa, 2007). More than half (55%) of all South Africans infected with HIV reside in the KwaZulu-Natal and Gauteng provinces (Dorrington et al., 2006).

The latest HIV data collected at antenatal clinics suggest that HIV infection levels might be levelling off, with HIV prevalence in pregnant women at 30% in 2005 and 29% in 2006 (Department of Health South Africa, 2007). The decrease in the percentage of young pregnant women (15–24 years) found to be infected with HIV also suggests a possible decline in the annual number of new infections. The consistently high and rising prevalence among older antenatal clinic attendees is a concern that needs further investigation (see Figure 2).

The epidemic varies considerably between provinces. HIV prevalence among pregnant women is highest in the populous KwaZulu-Natal province (39%), and lowest in the Northern Cape (15%), Western Cape (16%) and Limpopo (19%) provinces. In the five other provinces (Eastern Cape, Free State, Gauteng, Mpumalanga and North West) at least 25% of

Figure 2

HIV prevalence by age group among antenatal clinic attendees in South Africa, 2000–2006



Source: Department of Health, South Africa, 2000–2006.

³ All estimates of the total number of people living with HIV in a given country are for 2005.

women attending antenatal clinics in 2006 tested HIV-positive (Department of Health South Africa, 2007). There is also variation within provinces and populations. For example, in the Northern Cape, average prevalence among pregnant women ranged from 5% at clinics in one district to almost 23% in another, while in the province of Limpopo it varied from 14% to 28%, depending on the district. Similarly, although only 9% of **South Africa's** population aged 2 years and over live in urban informal settlements, 29% of people living with HIV are found in these areas (Rehle et al., 2007).

In South Africa, which has the largest number of HIV infections in the world (5.5 million), an estimated 1.8 million people have died of AIDS-related disease since the epidemic began.

Very high prevalence has been found in parts of KwaZulu-Natal. For example, in Amajuba district, 47% of women attending antenatal clinics tested positive in 2006 (Department of Health South Africa, 2007), as did 51% of women aged 25–29 years who participated in an earlier household-based HIV survey in the rural district of Umkhanyakude (Welz et al., 2007). In another study, in a rural district in the north of the same province, HIV incidence of 8% was found in men and women aged 25–29 years. On current trends, and in the absence of effective programmes, it is estimated that two thirds of the 15-year-olds in that district could be infected with HIV by the time they reach their 35th birthday (Barnighausen et al., 2007).

Young women in **South Africa** face greater risks of becoming infected than men. Indeed, among 15–24-year-olds, women account for about 90% of new HIV infections (Rehle et al., 2007). HIV incidence among 20–29-year-old women in 2005 was approximately 5.6%, more than six times higher than for men of the same ages (0.9%) (Rehle et al., 2007). However, high HIV incidence is being found also in men towards the upper end of this age group: in a northern KwaZulu-Natal study, an estimated 8.8% of men aged 24–29 years had been infected in the previous year (Barnighausen et al., 2007).

An estimated 1.8 million South Africans have died from AIDS-related disease since the

epidemic began (Dorrington et al., 2006). Total annual deaths (from all causes) increased by 87% from 1997 to 2005 (from 316 505 to 591 213) (Statistics South Africa, 2005 & 2006), with at least 40% of those deaths estimated to have been AIDS-related (Bradshaw et al., 2004; Actuarial Society of South Africa, 2005; Medical Research Council, 2005; Anderson & Phillips, 2006). Rising death rates lowered life expectancy at birth to 49 years for males and 52.5 years for females in 2006, and have probably contributed to the decline in the country's population growth rate from 1.25% in 2001–2002 to slightly more than 1% in 2005–2006 (Statistics South Africa, 2007).

In **Swaziland**, according to preliminary data from a new population-based survey, one in four (26%) adults (15–49 years) is HIV-positive. This is the highest prevalence ever found in a national population-based survey anywhere. Both antenatal and population-based survey data show little difference in HIV prevalence between regions. In contrast, there is a significant difference in infection levels between men and women: 20% of adult men tested HIV-positive, compared with 31% of women (Central Statistical Office Swaziland & Macro International, 2007).

HIV prevalence among antenatal clinic attendees remains among the highest in the world. There is some evidence that many young women (more than 60%, according to one study) abstain from sex until their late teens (Buseh, 2004), but HIV infection levels rise rapidly once women become sexually active. One in two (49%) women aged 20–34 years attending antenatal clinics and women aged 25–29 years who participated in the 2006 population-based HIV survey were found to be HIV-positive; among pregnant teenagers (15–19 years), one in four (26%) were HIV-positive (Ministry of Health and Social Welfare Swaziland, 2006; Central Statistical Office Swaziland & Macro International, 2007). HIV infection levels in men reach similar heights, but in older age groups 44% of men aged 30–34 years and 45% of those aged 35–39 years were HIV-positive. Unusually high HIV prevalence is found also among older age groups, with about a quarter (28% of men and 24% of women) aged 50–54 years found to be HIV-positive (Central Statistical Office Swaziland & Macro International, 2007).

AIDS awareness and knowledge appears not to be associated with safer behaviour to the extent

anticipated. HIV knowledge is high, with more than 85% of women and 80% of men saying that HIV transmission can be prevented by using condoms and restricting sexual intercourse to a single, uninfected partner. Yet only slightly more than half of adult men (56%) and women (57%) who reported more than two sexual partners in the previous year said they had used a condom the last time they had sex (Central Statistical Office Swaziland & Macro International, 2007).

HIV prevalence in most southern African countries is either approaching or has reached a plateau.

Lesotho's HIV prevalence levels remain high. Almost one in four (23% [21.9%–24.7%]) adults (15–49 years) were living with HIV in 2005 (UNAIDS, 2006), with infection levels highest in urban areas. Women account for about 57% of people living with HIV, with prevalence among antenatal clinic attendees reaching 38% in the 25–29-year age group in 2005 (Ministry of Health and Social Welfare Lesotho, 2005). The most recent HIV data show a decline in infection levels among young pregnant women (15–24 years), from about 25% in 2003 to 21% in 2005, but the apparent decrease might be due to the addition of new sentinel surveillance sites in the most recent survey (Ministry of Health and Social Welfare Lesotho, 2005).

Prevention efforts in **Lesotho** lack the quality and scale needed to reverse the epidemic. HIV knowledge is poor. Fewer than one in five (17.9%) married (and fewer than one in three (26.3%) unmarried) young people (15–24 years) could demonstrate comprehensive knowledge of HIV when surveyed in 2004. In addition, a large proportion of young people are sexually active at very young ages—more than a quarter of young men (27%) were having sex before they turned 15, as were 15% of young women. Very few (7% of the young men and 4% of the young women) used a condom the first time they had sex. Among young men having extramarital sex, condom use in 2004 was almost non-existent: only 5% of married or cohabiting young men said they used a condom during sex with their other partner(s) in the previous 12 months (Ministry of Health and Social Welfare Lesotho & ORC Macro, 2004). Reluctance to use condoms

has been found in other studies, including one among inmates at Quthing prison. Despite relatively high knowledge of HIV (approximately 70% of the men knew at least one way of preventing HIV infection), 42% said that they would not use a condom (Akeke, Mokgatle & Oguntibeju, 2007).

As in other countries in the region, there is a huge need and opportunity to improve HIV prevention within marriages and other long-term relationships in **Lesotho**. It is estimated that approximately 40% of HIV-positive couples are “discordant”, that is, only one partner of the couple is HIV-positive (Corno & De Walque, 2007).

Overall, the epidemic in **Namibia** appears to have stabilized, with one in five women (20%) seeking antenatal care testing HIV-positive in 2006 (Ministry of Health and Social Services Namibia & ORC Macro 2007). But the risk of HIV varies considerably across this large, sparsely populated country. HIV prevalence below 10% was found among pregnant women in Gobabis (in the east) and Windhoek (the capital), but exceeded 25% in Engela and Oshakati (in the far north) and reached 39% in Katima Mulilo, at the country's eastern tip (Ministry of Health and Social Services Namibia & ORC Macro, 2007). The relatively steady trend since the mid-1990s in HIV prevalence among young pregnant women (15–24 years), and the rising trend among those in their 30s suggests that prevention efforts need to be improved (Ministry of Health and Social Services Namibia and ORC Macro, 2007).

Preliminary data from a 2006 population-based survey show that, among young people (15–24 years), 9 in 10 (90%) sexually active men and three quarters (75%) of women reported having had “higher-risk” sex (that is, sex with a non-marital, non-cohabiting partner) in the previous 12 months. Half of the women (48%) and a third of the men (33%) surveyed did not use a condom consistently with those partners (Ministry of Health and Social Services Namibia & ORC Macro, 2007). In another survey (carried out in the towns of Keetmanshoop, Oshakati, Rundu and Walvis Bay), around 1 in 10 (11%) sexually active young men (15–24 years) and almost 1 in 3 (29%) of their female counterparts said their most recent sexual partnership had been with a person at least 10 years older than them. Because HIV prevalence tends to be highest among women in their 30s and men in their mid-30s to mid-40s,

these young people face a high risk of acquiring HIV (Parker & Connolly, 2007).

The decrease in HIV infection levels among pregnant women attending antenatal clinics in **Botswana** in recent years (from 36% in 2001 to 32% in 2006) suggests that the epidemic there has also reached its peak and could be on the decline. Based on these and other HIV data (including data from a recent population-based HIV survey), it is estimated that one in four (24% [23.0%–32.0%]) adults (15–49 years) in **Botswana** were living with HIV in 2005 (UNAIDS, 2006). **Botswana's** epidemic therefore remains severe.

Half (49.2%) the pregnant women aged 30–34 years tested for HIV at antenatal clinics in 2005 were found to be infected with HIV, as were 45% of those aged 25–29 years (Seipone, 2006). Infection levels in pregnant women varied across the country—from a low of 21% in the village of Good Hope in the south to more than 40% in the city of Francistown and the village of Tutume (in the north east), and 47% in Selebi-Phikwe (a densely populated mining town in the east). Prevalence was unusually high among pregnant teenagers, 18% of whom tested HIV-positive in 2005. However, this was the lowest infection level seen among pregnant women in that age group since the early 1990s, suggesting a possible decrease in new infections (Ministry of Health Botswana, 2006). Such an interpretation is supported by the continuing decline in HIV prevalence observed among young pregnant women. Among 15–19-year-old women attending antenatal clinics, prevalence decreased from 25% to 18% between 2001 and 2006, whereas among their 20–24-year-old counterparts it declined from 39% to 29% over the same period (Ministry of Health Botswana, 2006).

There is evidence that condom use among teenagers has increased. In 2001, 81% of unmarried men in their late teens (15–19 years) said they had used a condom the last time they had sex, compared with 95% in a 2004 survey (Central Statistical Office Botswana, 2001 & 2005). Among their unmarried female counterparts, the corresponding figures were 71% in 2001 and 82% in 2004. However, misconceptions about HIV persist, with almost a third (30%) of survey respondents in 2004 claiming that HIV can be acquired by supernatural means and more than half (50.5%) believing the virus can be transmitted by mosquitoes. Only one in five

(21%) people knew that having multiple sexual partnerships increases the risk of HIV infection, but three in four knew that condoms can prevent HIV transmission (National AIDS Coordinating Agency & Central Statistical Office Botswana, 2005). The latter finding is consistent with evidence that significant levels of sex with a non-regular partner have persisted: one in four (23%) sexually active participants in a population-based survey said that they had had concurrent sexual relationships with two or more partners in the previous 12 months (Carter et al., 2007).

At 26%, national adult HIV prevalence in Swaziland is the highest ever found in a countrywide population-based survey anywhere in the world.

At least a third of adults are believed to know their HIV status (Weiser et al., 2006). After **Botswana** implemented a massive opt-out voluntary counselling and testing system in 2003, the uptake of HIV testing more than doubled, from about 61 000 in 2004 to almost 158 000 in 2005, when about 89% of those offered an HIV test agreed to be tested. More than two thirds (69%) of the people who were tested for HIV in 2005 were women (Steen et al., 2007). The percentage of pregnant women who know their HIV status has grown considerably—for example, from 47% in 2003 to 78% in 2004 among women giving birth at the regional referral hospital in Francistown (which performs deliveries for most of Francistown's pregnant women, as well as for many women from outlying areas). The proportion of pregnant women receiving treatment to prevent the transmission of HIV to their infants also increased (from 29% to 56%) in the same study. After the introduction of routine, on-site rapid tests in antenatal clinics in 2005, nearly all tested women received their results and intervention uptake increased even further, to 75% (Creek et al., 2007).

The latest HIV data collected at antenatal clinics in **Angola** indicate that HIV prevalence among pregnant women was similar in 2004 and 2005. Median national HIV prevalence was estimated at 2.4% in both 2004 and 2005 (Ministério da Saúde & CDC USA, 2006). Because only 40% of pregnant women access antenatal services (which are located mainly in urban or periurban

areas), these data provide an incomplete picture of Angola's HIV epidemic. Nevertheless, HIV infection levels among antenatal clinic attendees in 2004–2005 varied from less than 1% in Bié province (in the centre of the country) to 2.7% in the capital, Luanda, 4.2% in Huila province (in the south) and 11% in the neighbouring Cunene province (which borders **Namibia**) (Ministério da Saúde & CDC USA, 2006). Earlier surveys have revealed a high HIV prevalence of 33% among female sex workers in Luanda (Grupo Temático VIH & SIDA Angola, 2002) and 9% among male and female independent miners in Lunda Norte province (which borders the **Congo**) (Ministério da Saúde & CDC USA, 2006).

After appearing to stabilize in the early 2000s, Mozambique's epidemic has again grown, with HIV prevalence rising in all parts of the country.

In the other Portuguese-speaking country of this subregion, **Mozambique**, it is estimated that 16.1% [12.5%–20.0%] of adults (15–49 years) were living with HIV in 2005 (UNAIDS, 2006). After appearing to stabilize in the early 2000s, **Mozambique's** epidemic has again grown, with HIV prevalence rising in all parts of the country. HIV infection levels found in women attending antenatal clinics are lowest in the north (average of 9% in 2004), but prevalence of 20% or more has been found in the central and southern zones, including in the capital, Maputo, and in Gaza, Inhambane, Manica and Sofala provinces (where it reached almost 27% in 2004) (Conselho Nacional de Combate ao HIV & SIDA, 2006). The reasons for the lower prevalence in the north are not well understood, but could include the fact that male circumcision is widespread in that part of the country (see box "Male Circumcision and HIV Prevention").

Rising infection levels among young people (15–24 years) suggest that new HIV infections in **Mozambique** are still increasing (Conselho Nacional de Combate ao HIV & SIDA, 2006). Among young adults in the northern zone, HIV prevalence doubled (to 10%) between 2000 and 2004, and rose from about 12% to 18% in the south (Ministry of Health Mozambique, 2005). However, there are some signs that prevention activities among school-attending adolescents

are prompting more young people to protect themselves against possible HIV infection. In one such programme, introduced in five provinces, the percentage of teenagers who said they used a condom the first time they had sex almost doubled, from 36% in 2003 to 60% in 2005 (Tivane et al., 2006).

The lower levels of infection observed in Cabo Delgado, Nampula and Niassa (all in the north) and Inhambane, (in the south), compared with other regions, could be maintained if successful prevention efforts are expanded. Prevention efforts should also be scaled up among people enrolled in the country's expanding antiretroviral therapy programme. A study among people starting antiretroviral treatment has found that 70% of the sexually active patients had had unprotected sex in the three months before starting treatment, and only a quarter (26%) of the patients had disclosed their HIV status to their partners whose HIV status was unknown or negative (Pearson et al., 2007).

Malawi's epidemic appears to have stabilized, amid some evidence of behaviour changes that can reduce the risk of HIV infection (Heaton, Fowler & Palamuleni, 2006). Median HIV prevalence among pregnant women at sentinel surveillance sites has remained between 15% and 17% since the turn of the century (National AIDS Commission Malawi, 2005).

Adult (15–49 years) HIV prevalence was estimated at 14% [6.9%–21.4%] in 2005 (UNAIDS, 2006). Results from a triangulation study suggest that prevalence could be declining in parts of the country, with evidence of decreasing HIV prevalence among women attending antenatal clinics in some urban areas (where there is an average HIV prevalence of 18%, compared with 11% in rural areas) (Ministry of Health and Population Malawi, 2005a; National AIDS Commission Malawi, 2007). HIV prevalence among women using antenatal services in the capital, Lilongwe, fell from 27% in 1996 to 17% in 2003, before rising slightly again in 2005 to 19% (National AIDS Commission Malawi, 2005; Bello, Chipeta & Aberle-Grasse, 2006). However, there are regional differences in the spread of HIV. Infection levels in the south are as high as 20–22% (in Mulanje, Mangochi, Thyolo and Blantyre), but are considerably lower in the north (8%) and centre (7%) (National Statistical Office & ORC Macro, 2005).

Overall, it appears that young women have higher risks of acquiring HIV than young men. Among young people (15–24 years) nationally, women are much more likely to be infected with HIV than men (prevalence of 9% versus 2%). Regionally, such gender-related differences also occur. HIV prevalence among young females in the north was higher than among young males, (9% compared with 0.7%) while in the south and central regions it was four and three times higher (3.9% compared with 1.2%, and 13.4% compared with 3.2%, respectively) (National Statistical Office & ORC Macro, 2005).

There is still considerable room for strengthening HIV prevention in **Malawi**. Comprehensive knowledge about HIV (defined as “knowing at least two ways to prevent infection” and “holding no major misconceptions about the virus”) is low. Only one in five adult women (22%) and slightly more than one in three adult men (39%) demonstrated such knowledge when surveyed; proportions were similar in young men and women (National Statistical Office & ORC Macro, 2005). At the same time, the proportion of men reporting sex with non-regular, non-cohabiting partners decreased from 33% to 26% in 2003–2004 (although it did not change among women), while the percentage of men who said they had used condoms the last time they had sex with a non-regular, non-cohabiting partner rose from 39% to 47% (Ministry of Health and Population Malawi, 2005b).

Injecting drug use is an increasingly important factor in some of the HIV epidemics in sub-Saharan Africa, including those in Kenya, Mauritius, South Africa and the United Republic of Tanzania.

Progress is evident in other areas. The number of women accessing services for preventing mother-to-child transmission of HIV rose between 2002 and 2005, from 5000 to 53 000. Almost three quarters (72%) of pregnant women who tested HIV-positive at antenatal clinics received antiretroviral prophylaxis (Ministry of Health and Population Malawi, 2005b).

While there is little sign of a decline in HIV infections at the national level in **Zambia**, the epidemic appears to be receding in some parts of the country. Slightly more than 1 million

[1.1 million–1.2 million] Zambians were living with HIV in 2005, equivalent to approximately 17% [15.9%–18.1%] of the adult (15–49 years) population (UNAIDS, 2006).

The most recent HIV surveys at antenatal clinics showed HIV infection levels among pregnant women to be higher in urban than in rural areas (25% versus 12%) (Ministry of Health Zambia, 2005), as did earlier population-based survey estimates (23% versus 11%) (Central Statistical Office Zambia, Central Board of Health Zambia & ORC Macro, 2003). Prevalence is especially high in cities and towns along main transport routes (such as Kabwe, Livingstone and Ndola), compared with more secluded rural areas. HIV prevalence of up to 30% has been found among pregnant women in Livingstone, but was less than 10% in Kasama (in the far north), Macha (in the south) and Mukinge (in the centre) (Ministry of Health Zambia, 2005).

HIV prevalence has declined among 20–24-year-old pregnant women in urban areas (where it dropped from 30% in 1994 to 24% in 2004) and their 15–19-year-old counterparts (down from 20% in 1994 to 14% in 2004) (Ministry of Health Zambia, 2005). In some communities, there was a decrease in HIV prevalence among the most educated women; in other communities, infection levels among young pregnant women increased (Sandøy et al., 2006). Additionally, changes in HIV prevalence are reported in some population-based surveys, which show HIV prevalence in young people (15–24 years) declining steeply between 1995 and 2003. Among young rural residents surveyed in 1995 and 2003, prevalence fell from 16% to 6.4% in women and from 5.6% to 3.1% in men, while among their urban peers it decreased from 23% to 12% in women and from 7.5% to 3.2% in men (Michelo et al., 2006). Behaviour changes were reported among higher educated, urban young people (Michelo, Sandøy & Fylkesnes, 2006), among whom condom use during sex with a non-regular partner increased significantly between 1995 and 2003 (Sandøy et al., 2007).

Other research confirms that some Zambians are adopting behaviours that can protect them against HIV infections. The proportion of sexually active men who reported having sex with a non-regular partner in the previous 12 months, for example, declined from 39% in 1998 to 28% in 2005. Among married men, the proportion who said

they had no non-regular partners in the previous year increased from 79% to 90% over the same period. No such change was observed among women (Central Statistical Office Zambia, 2006). However, the proportion of young (15–24 years) urban women who said they used a condom the last time they had sex with a non-regular partner almost doubled between 1995 and 2003, from 46% to 82%, while the percentage of young urban men reporting more than two non-regular partners in the previous year declined from 52% to 39% (Sandøy et al., 2007). It appears that a fear of AIDS-related mortality, combined with prevention programmes, has prompted changes in behaviour, which in turn have reduced the risk of acquiring HIV infection (Michelo et al., 2006).

However, these positive changes should be set against other challenges. For example, approximately 40% of health workers surveyed at five Zambian hospitals did not believe that condoms were effective in preventing HIV. Of the quarter (26%) of sexually active health workers who reported having several sexual partners, more than a third (37%) did not use condoms (Kiragu et al., 2007). Similarly, in a study in five rural areas, almost half (46%) of the sexually active young people said they did not use condoms (Mwansa, 2006).

Stigma also remains a concern. In a survey of five districts, two thirds of married women who were starting antiretroviral therapy said they had not disclosed their HIV status to their husbands for fear of blame or abandonment (Zulu, 2005).

As in many other countries, the frequency of sex between men in **Zambia** and its possible role in the country's HIV epidemic is still poorly understood. One recent study found high levels of sexual risk-taking behaviour (defined as “unprotected anal sex”) among surveyed men who have sex with men. More than two thirds of the men (68%) said they had had unprotected anal sex with men and women, and almost three quarters (73%) thought anal sex was safer than vaginal sex. One in three (33%) of the men tested HIV-positive (Zulu, Bulawo & Zulu, 2006).

Much smaller epidemics are occurring in the island nations of southern Africa. Recent HIV

data collected from pregnant women using antenatal services in **Madagascar** show HIV prevalence of 0.2%, although infection levels were 1.1% in the city of Sainte Marie and 0.8% in Morondava. The same surveillance data revealed high levels of syphilis infection among pregnant women—5.1% nationally, and almost 10% in the city of Sainte Marie and Toliara (Ministère de la Sante et du Planning Familial Madagascar, 2005), suggesting a high frequency of unprotected sex. Earlier studies have shown condom use to be infrequent and HIV knowledge to be poor. Only 1 in 5 Malagasy could name two methods for preventing the sexual transmission of HIV when surveyed in 2003–2004, and 1 in 10 (12%) sexually active young men and 1 in 20 (5%) young women said they had used a condom the last time they had sex with a non-regular partner (Institut National de la Statistique du Madagascar & ORC Macro, 2005). No information is available on injecting drug use and on men who have sex with men in **Madagascar**.

Exposure to non-sterile injecting equipment is the most important factor for HIV infection in the currently small HIV epidemic in **Mauritius**, where approximately three quarters of the HIV infections diagnosed in the first six months of 2004 were among injecting drug users (Sulliman & Ameerberg, 2004). Use of non-sterile injecting equipment appears to be common: 80% of injecting drug users said they had used non-sterile needles in the previous three months, when surveyed in a 2004 Rapid Situation Assessment (Sulliman, Ameerberg & Dhannoo, 2004). Among those injecting drug users who were tested for HIV, 4% were found to be infected. Also of concern is the large percentage of sex workers (75%) who said that they also injected drugs, and the comparatively low reported rate of condom use (only 32% said they had consistently used condoms during the previous three months). Overall, 13% of the surveyed sex workers tested HIV-positive (Sulliman, Ameerberg & Dhannoo, 2004).

Mauritius needs stronger prevention efforts to be focused on injecting drug users, and particularly on those who also engage in sex work (Dewing et al., 2006).

THE TWIN CHALLENGE OF TUBERCULOSIS AND HIV

Tuberculosis remains a major cause of illness and death in people living with HIV. An estimated 8.8 million new tuberculosis cases occurred worldwide in 2005—more than 80% of them in Asia and sub-Saharan Africa. It is estimated that more than 600 000 of those people were coinfecting with HIV.

People living with HIV are at much greater risk of developing tuberculosis than people who are HIV-negative (Selwyn et al., 1989; Antonucci et al., 1995). Furthermore, HIV is responsible for the high tuberculosis incidence in many parts of Africa and some parts of Asia (WHO, 2007). In southern Africa—the subregion with the highest HIV prevalence—it is estimated that 50–80% of tuberculosis patients are also HIV-positive (Sharma, Mohan & Kadiravan, 2005; Sonnenberg et al., 2005). In **Swaziland**, for example, 80% of tuberculosis patients tested HIV-positive in the 2006 sentinel survey, and tuberculosis continues to be the most likely cause of death for HIV-positive people (Ministry of Health and Social Welfare Swaziland, 2006). HIV is an important factor in tuberculosis in other parts of Africa; for example, in **Ethiopia**, an estimated third (34%) of the 141 000 tuberculosis cases in 2005 were in people who were also infected with HIV (Federal Ministry of Health Ethiopia, 2006).

Despite this heavy burden of HIV among tuberculosis patients, in 2005, only 7% of tuberculosis patients were tested for HIV globally, and only 14% of the estimated total number of tuberculosis cases among people living with HIV were detected (WHO, 2007). Yet, when tuberculosis patients are tested for HIV, a significant proportion of those found to be HIV-positive do receive treatment. Thus, in 2005, 91% of HIV-positive tuberculosis patients accessed cotrimoxazole and 38% accessed antiretroviral therapy (WHO, 2007). A lack of access to HIV counselling and testing for tuberculosis patients stands in the way of increasing access to HIV treatment and care. However, the introduction of provider-initiated HIV counselling and testing has led to substantial increases in the numbers of tuberculosis patients tested for HIV and the numbers of HIV-positive tuberculosis patients starting on cotrimoxazole preventive and antiretroviral therapy (see Figure 3).

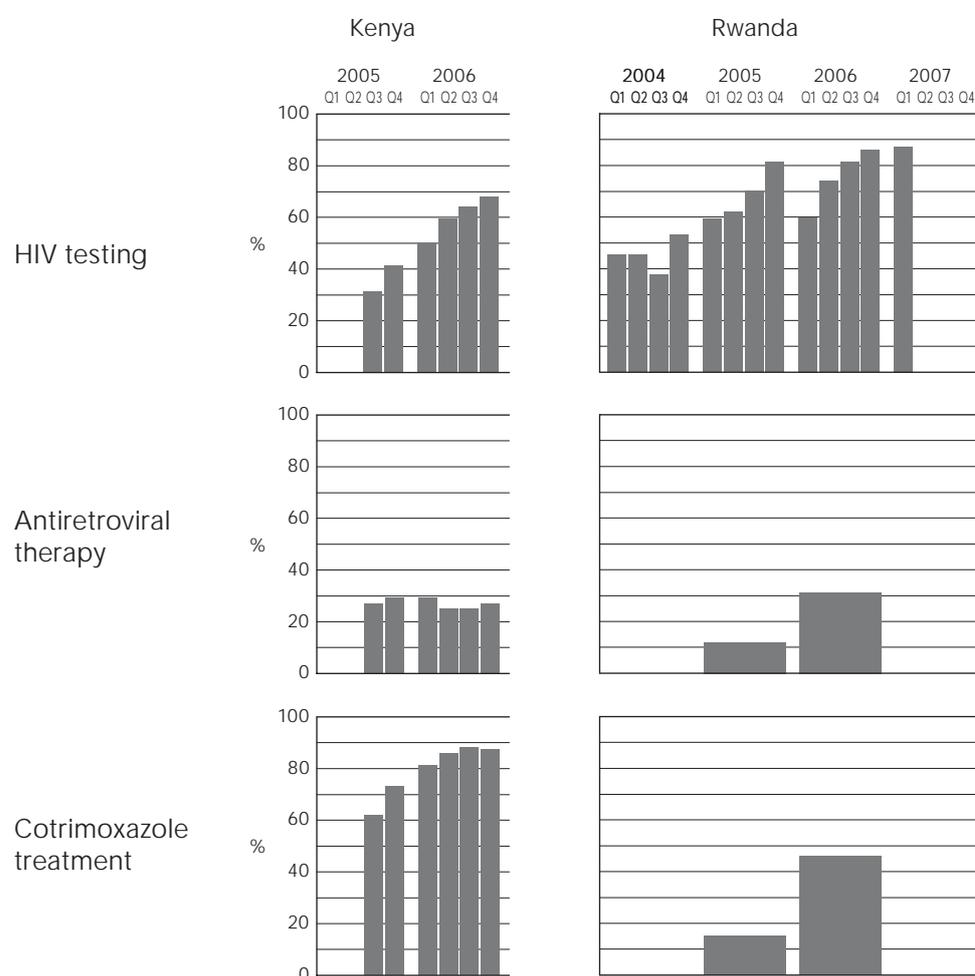
Globally, less than 0.5% of people living with HIV were screened for tuberculosis in 2005. However, in the increasing number of countries that reported screening for tuberculosis symptoms among people living with HIV in 2005, approximately 12% of people living with HIV who were screened were found to have active tuberculosis (WHO, 2007).

Incidence of HIV, and consequently of tuberculosis, is increasing in many parts of the world, placing additional stress on already under-resourced tuberculosis control programmes, and contributing to the development and spread of drug-resistant tuberculosis. Drug-resistant tuberculosis, and especially extensively drug-resistant tuberculosis (with resistance to both first- and second-line anti-tuberculosis drugs) can spread rapidly in communities of people living with HIV, resulting in very high mortality—as seen in **South Africa**, for example (Gandhi et al., 2006). Tuberculosis case reports collected by the Department of Health in South Africa show that the tuberculosis incidence rate increased from 169 per 100 000 people in 1998 to 645 per 100 000 people in 2005 (Government of South Africa, 2007).

Efforts to scale up collaborative tuberculosis and HIV activities are currently inadequate, and many opportunities to provide life-saving prevention and treatment for both diseases are being missed. Moreover, data collection is often poor. Much stronger coordination of tuberculosis and HIV programmes is needed to achieve universal access to tuberculosis and HIV prevention, treatment, care and support.

Figure 3

Progress of HIV testing, antiretroviral therapy and cotrimoxazole treatment of tuberculosis patients in Kenya and Rwanda, 2004–2007



Sources: (1) National Tuberculosis Programme, Kenya; (2) National Tuberculosis Programme, Rwanda.

East Africa

In most of the countries in East Africa, adult HIV prevalence is either stable or declining slightly. The latter trend is most evident in **Kenya**, which is experiencing a slow but steady decline in HIV prevalence amid evidence of changing behaviour. Besides behaviour change, mortality of people infected several years ago also contributes to the decline in HIV prevalence.

Uganda was the first country in sub-Saharan Africa to register a drop in adult national HIV prevalence. Its epidemic, however, remains serious. An estimated 6.7% [5.7%–7.6%] of adults (15–49 years) were living with HIV in 2005—approximately 1 million people [850 000–1.2 million] (UNAIDS, 2006). Infection levels are highest

among women (7.5% compared with 5.0% among men) and urban residents (10.0% compared with 5.7% among rural residents). Prevalence among children younger than five years of age was 0.7% (Ministry of Health Uganda & ORC Macro, 2006).

Starting in 1992, significant decreases in HIV prevalence were observed in **Uganda**, alongside evidence of substantial behaviour change that inhibited the spread of HIV (Asamoah-Odei, Garcia-Calleja & Boerma, 2004). However, that trend appears to have stabilized in the early 2000s, and there are now concerns that the HIV epidemic could grow again. While the decline in HIV prevalence observed among pregnant

MALE CIRCUMCISION AND HIV PREVENTION

Male circumcision—a surgical procedure carried out on young men and infant boys in many parts of the world—reduces the risk of heterosexual HIV transmission in men. Numerous observational studies over the past 20 years have suggested that the geographical correlation between low HIV prevalence and high levels of male circumcision in countries in Africa and elsewhere was, at least in part, a causal association. Now, compelling evidence from three randomized controlled trials in Africa, involving more than 10 000 men in Kisumu, **Kenya** (Bailey et al., 2007); Rakai District, **Uganda** (Gray et al., 2007); and Orange Farm, **South Africa** (Auvert et al., 2005) demonstrates the partially protective effect of male circumcision in reducing male-to-female transmission of HIV by 60%—an important landmark in the history of HIV prevention.

Globally, an estimated 665 million men (approximately 30%) are circumcised, two thirds of them Muslim (London School of Hygiene and Tropical Medicine, WHO & UNAIDS, 2007). Common determinants of male circumcision are religion, ethnicity, perceived health and sexual benefits, and conformity to social norms. Neonatal male circumcision is common in Australia, Canada, Israel, New Zealand and the United States of America, and in much of the Middle East, Central Asia and West Africa. Median age at circumcision in East and southern Africa, where it is less common, varies from boyhood to the late teens or twenties.

Male circumcision rates in sub-Saharan Africa vary greatly; they tend to be highest in West Africa, where, for example, an estimated 95% of men in **Ghana** (Ghana Statistical Services, Noguchi Memorial Institute for Medical Research & ORC Macro, 2004) and 93% of men in **Cameroon** are circumcised (Institut National de la Statistique du Cameroun & ORC Macro, 2005). In East and southern Africa, by comparison, an estimated 25% of men in **Botswana** (Kebaabetswe et al., 2003) and 35% in **South Africa** are circumcised (Shisana et al., 2005). There is also variation between ethnic groups within countries. In **Kenya**, for example, circumcision rates vary from 17% among Luo men to 100% among Somali men (Central Bureau of Statistics Kenya, Ministry of Health Kenya & ORC Macro, 2004).

A high-level WHO/UNAIDS technical consultation issued a set of conclusions and recommendations on male circumcision in March 2007. These emphasized that the introduction or scaling-up of services offering male circumcision would have the strongest effect on prevention of HIV transmission in places where the burden of HIV is heaviest—such as hyperendemic countries in sub-Saharan Africa, or areas within them, where HIV prevalence is high and where typically a third or less of men are circumcised. There is some evidence that men are more likely to take risks after adult circumcision, so male circumcision provision should be included in comprehensive HIV prevention programmes. Those programmes should include intensive counselling on safer sex, especially reduction of the number of concurrent sexual partners and correct and consistent use of male and female condoms (WHO & UNAIDS, 2007).

Modelling studies project that full coverage of male circumcision could avert about 5.7 million new HIV infections and 3 million deaths over 20 years in sub-Saharan Africa (Williams et al., 2006). Cost-effectiveness studies in **South Africa**, **Swaziland** and **Zambia** suggest that male circumcision has potentially substantial cost-benefits, based on cost per infection averted compared with cost of lifelong antiretroviral treatment (Kahn, Marseille & Auvert, 2007; Martin et al., 2007; The Lancet Infectious Diseases, 2007).

women attending antenatal clinics in Kampala and some other urban areas appears to have persisted through 2005, other urban and most rural surveillance sites indicate an overall levelling of prevalence during the current decade (Kirungi et al., 2006; Shafer et al., 2006). Similarly, a cohort study in a rural area in southern **Uganda**

suggests that HIV prevalence and incidence rates have levelled since about 2000 in both men and women (Shafer et al., 2006). With a population growing as rapidly as that of Uganda (which had a total fertility rate of 6.7, according to the 2006 Demographic and Health Survey), a stable HIV incidence rate means that an increasing number

HIDDEN EPIDEMICS AMONG MEN WHO HAVE SEX WITH MEN

The role of sex between men in sub-Saharan Africa's HIV epidemics is poorly understood; however, a number of recent studies indicate that sex between men could be an important factor in several of the epidemics in this region, despite the widely held assumption that sex between men is "alien" to African societies.

One study has estimated that more than 700 men were selling sex to other men in Mombassa, **Kenya** (Geibel et al., 2007), which implies a reasonably large population of men who are willing to pay for sex with men (van Griensven, 2007). Several other studies have easily located and enrolled men who have sex with men as participants. In one continuing study among men who have sex with men in the town of Kilifi, located on **Kenya's** coastline between Mombassa and Malindi, more than 38% of the 60 men in the study group were HIV-positive at baseline (Sanders et al., 2006). Lower levels of HIV infection have been found among men who have sex with men in other parts of **Kenya** (11% among men at voluntary testing and counselling sites); in Dakar, **Senegal** (22%); and in Khartoum, **Sudan** (9%) (Angala et al., 2006; Wade et al., 2005; Elrasheid, 2006). In all those studies, prevalence among men who have sex with men was higher than in the general population.

As in other regions of the world, it appears that the majority of African men who have sex with men also have sex with women—two thirds or higher, according to some studies (Onyango-Ouma, Biringi & Geibel, 2005; Wade et al., 2005; Angala et al., 2006). Once HIV is introduced into networks of men who have sex with men, the virus is therefore also likely to be transmitted to the men's female partners (given the typically low rates of condom use between regular partners), and subsequently to their newborn babies (van Griensven, 2007).

There is a clear need for further research on this aspect of the HIV epidemics in sub-Saharan Africa, and for prevention efforts that focus on averting HIV transmission among men who have sex with men, and their female partners. In Dakar, for example, men who have sex with men have reported experiencing widespread stigma and violence (Niang et al., 2003). Similarly, in a study in Nairobi, one in four men who have sex with men said they had experienced aggression or humiliation in public in the previous 12 months. Other research has shown that men who had been subjected to physical and other violence were less likely to use condoms during anal sex (Onyango-Ouma, Biringi & Geibel, 2005).

of people acquire HIV each year (Uganda Bureau of Statistics & Macro International, 2007).

The stable HIV trends are occurring alongside an apparent increase in behaviour that favours HIV transmission. In national population-based surveys conducted in 1995, 2000, 2004–2005 and 2006, sex with a non-regular partner was reported by 12%, 14%, 15% and 16% of adult women, respectively, and by 29%, 28%, 37% and 36% of adult men, respectively (Kirungi et al., 2006; Ministry of Health Uganda & ORC Macro, 2006; Uganda Bureau of Statistics & Macro International, 2007). In the same surveys, condom use during sex with these partners was reported by 20%, 39%, 47% and 35% of women in 1995, 2000, 2004–2005 and 2006, respectively, and by 35%, 59%, 53% and 57% of men, respectively, indicating a lack of progress in promoting safer sex in recent years. The 2004–2005 AIDS Indicator Survey also highlighted the importance of the potential

for transmission within couples (Tanzania Commission for AIDS, National Bureau of Statistics & ORC Macro, 2005). Of almost 4000 couples tested for HIV, 3% were concordant HIV-positive and 5% were discordant. There is an urgent need to revive and adapt the type of prevention efforts that helped bring **Uganda's** HIV epidemic under control in the 1990s.

Behaviour change in Kenya seems to be associated with a recent decline in HIV prevalence.

Kenya's AIDS epidemic is of the same scale as **Uganda's**. The estimated 5.1% of adults (15–49 years) living with HIV in 2006 represented nearly 1 million people—a large epidemic, despite evidence of a slow but steady decline in HIV prevalence (National AIDS Control Council

Kenya, 2007). Adult HIV prevalence is almost twice as high among women (8.7%) than men (4.6%), according to a national population-based HIV survey (Central Bureau of Statistics Kenya, Ministry of Health Kenya & ORC Macro, 2004).

Nationally, HIV infection levels decreased from about 14% in the mid-1990s to 5% in 2006 (Ministry of Health Kenya, 2005; National AIDS Control Council Kenya, 2007). The downward trend was especially profound in the urban sites

of Busia, Meru, Nakuru and Thika, where median prevalence declined from 28% in 1999 to 9% in 2003 among 15–49-year-old women attending antenatal clinics, and from 29% in 1998 to 9% in 2002 among those women aged 15–24 years (Hallett et al., 2006).

Behaviour change in **Kenya** may be linked to these declines in HIV prevalence. In population-based surveys, the proportion of unmarried young people (15–24 years) who said they were sexually

INJECTING DRUG USE: A GROWING FACTOR IN SEVERAL SUB-SAHARAN AFRICAN HIV EPIDEMICS

Although a relatively new phenomenon in sub-Saharan Africa, injecting drug use is an increasingly important factor in several of the HIV epidemics in this region, including those in **Kenya**, **Mauritius**, **South Africa** and the **United Republic of Tanzania**. Available research shows that high-risk behaviour such as the use of non-sterile injecting equipment and unprotected sex is common within injecting drug user populations, and that HIV prevalence is high. In various studies, up to half of the injecting drug users tested in Mombassa and Nairobi (**Kenya**) were found to be HIV-positive, as were 26% in Zanzibar and 28% in **South Africa** (Ndetei, 2004; Odek-Ogunde, 2004).

The situation is most dramatic in **Mauritius** where, uniquely in sub-Saharan Africa, the HIV epidemic is driven primarily by injecting drug use. Unusually, HIV transmission initially occurred mainly through unprotected sex but transmission patterns have shifted dramatically since 2000 and most of the new reported HIV infections are now attributable to injecting drug use (Sulliman & Ameerberg, 2004).

In **Mauritius**, up to 80% of injecting drug users surveyed in a 2004 Rapid Situation Assessment stated they had used non-sterile injecting equipment in the previous three months (Sulliman, Ameerberg & Dhannoo, 2004). In the same study, three quarters (75%) of sex workers reported injecting drug use and only a quarter (23%) said they never used non-sterile injecting equipment. Of the injecting sex workers who had previously been tested for HIV, 13% were infected with the virus, yet two thirds (68%) of the sex workers said they had not consistently used condoms during the previous three months. A quarter (22%) said they never used condoms with clients, and three quarters (77%) said they did not use condoms with regular partners (Sulliman, Ameerberg & Dhannoo, 2004).

In **Kenya**, about 80% of injecting drug users interviewed in Malindi, Mombassa and Nairobi said that they had used needles after someone else had used them. Given this situation, it was not surprising that 50% of the injecting drug users tested in Mombassa were found to be HIV-positive (Ndetei, 2004). In another study in Nairobi, 53% of injecting drug users were found to be HIV-positive, of whom two thirds (67%) said they were sexually active (Odek-Ogunde, 2004).

In some urban areas on the Tanzanian mainland, injecting drug use has also emerged as a potentially important factor in the HIV epidemic (McCurdy et al., 2005). In Dar es Salaam, for example, 27% of 319 male and 58% of 98 female injecting heroin users participating in a 2005–2006 study were found to be HIV-positive. Again, the high levels of HIV prevalence reflect a combination of unsafe injecting practices and risky sexual behaviour. All the injecting drug users claimed to be sexually active, with 85% of the female injectors saying that they traded sex for money. Two thirds (68%) of those women said they used condoms consistently during commercial sex, but condom use seemed infrequent with regular partners, given that almost two thirds (62%) of the male and female injectors who had had sex in the previous week had not used condoms (Timpson et al., 2006).

Injecting drug use is an important risk factor also in Zanzibar's smaller HIV epidemic. In 2005, HIV prevalence of 26% was found among injecting drug users on the islands of Unguja and Pemba, with almost half (46%) of the injecting drug users, most of whom were males, stating that they used non-sterile injecting drug equipment (Dahoma et al., 2006). A total of 17% of the injecting drug users were also infected with syphilis, which indicates that unsafe sex is common, hence increasing the risk of HIV transmission into the general population. Almost all (86%) of the female and 8% of male injecting drug users said they had exchanged sex for drugs.

Injecting drug use is a growing phenomenon also in **South Africa** (Plüddemann et al., 2005), where injecting of heroin has increased in recent years in the Gauteng and Mpumalanga provinces, while the trend appears to be fluctuating in the port city of Cape Town. In one attempt to measure the level of HIV among arrested injecting drug users in three cities (Durban, Pretoria and Cape Town), prevalence of 20% was found (Parry & Pithey, 2006), similar to infection levels in the general population.

active fell from 56% to 41% for males and from 32% to 21% for females between 1998 and 2003. In addition, the percentage of adults (15–49 years) with multiple partners decreased by almost half in the same period. People with more than one partner were also more likely to have used condoms the last time they had higher risk sex in 2003, compared with 1998 (National Council for Population and Development, Central Bureau of Statistics & Macro International, 1999; Central Bureau of Statistics Kenya, Ministry of Health Kenya & ORC Macro, 2004).

Commercial sex still features prominently in **Kenya's** epidemic, and research suggests that prevention projects that result in increased condom use during paid sex could significantly reduce the number of new HIV infections in the country. For example, an estimated 8000 female sex workers operate along the trans-Africa highway that links Mombassa and Kampala (in neighbouring **Uganda**). According to a recent study, condoms are used in about 77% of paid sex liaisons along this route, where prevalence among sex workers is estimated at about 50%, and the annual number of sexual acts per female sex worker is estimated at 634 (with 129 different partners per year). If condom use increased to 90%, about 2000–2500 new HIV infections could be prevented annually on that section of the highway (with a decline in HIV incidence from 1.3% to 0.4%) (Morris & Ferguson, 2006).

Meanwhile, other research has highlighted the need to promote safer sex between sex workers and their regular partners. A study in Nyanza province has found that most sex workers have one or two regular partners, many of whom are

married to someone else. Although condom use with clients was relatively high (about 75%), it was infrequent with regular partners (less than 40%)—despite the fact that many of the latter were high-risk partners who also frequently had unprotected sex with other “regular” sex worker's partners, as well as with non-regular partners or new partners. Three quarters (75%) of the men were married (Voeten et al., 2007). Earlier studies in **Benin** and **Ghana** in 2000 and 2004 have also shown that regular partners of sex workers could pose a higher risk of HIV infection than clients (Lowndes et al., 2000; Cote et al., 2004). In one **Ghana** study, for example, HIV prevalence was 32% among sex workers' boyfriends, compared with 13% among the workers' clients (Cote et al., 2004).

Uganda's decline in HIV prevalence seems to have ended in the early 2000s, and there are now concerns that the epidemic could grow again.

These findings indicate that HIV prevention programmes for sex workers should promote condom use in both regular and commercial sex partnerships (Voeten et al., 2007), and should encourage sex workers and their clients to use condoms during anal sex. A high proportion of surveyed sex workers in Meru (in **Kenya**) reported having anal sex (41%), and more than a quarter (27%) of those women said they never used condoms when doing so (Schwandt et al., 2006). The risk of HIV transmission during unprotected anal sex is thought to be at least 10

times higher than during vaginal sex (Royce et al., 1997).

HIV infection levels have declined also in the **United Republic of Tanzania**, where an estimated 6.5% [5.8%–7.2%] of adults (15–49 years) were living with HIV in 2005, down from slightly more than 8% a decade earlier (Somi et al., 2006; UNAIDS, 2006). There is substantial regional variation in HIV prevalence, both between Zanzibar and the mainland, and on the mainland itself. The most recent information shows that HIV prevalence among antenatal clinic attendees in Zanzibar ranged from 0.7% in the island of Unguja to 1.4% in the island of Pemba (Salum et al., 2003), while on the mainland, it was 8.7% among women using antenatal services in 2003–2004 (Swai et al., 2006).

On the mainland, a national population-based HIV survey in 2003–2004 found adult HIV prevalence to be almost twice the national average (of 7%) in Mbeya and Iringa (>13%), high in Dar es Salaam (11%), and lowest in the town of Kigoma and the region of Manyara (2%) (Tanzania Commission for AIDS, National Bureau of Statistics & ORC Macro, 2005). However, a study during the same period in the remote rural Manyara and Singida regions (with relatively low HIV prevalence, of <2%) found patterns of behaviour that could cause the HIV epidemic to escalate. Almost half the men surveyed had multiple partners and almost 80% of men and women had never used a condom. Effective prevention measures will be needed to prevent wider spread of the virus in those areas (Yahya-Malima et al., 2007).

Recent national population-based surveys also suggest that behaviours that can protect against sexual transmission of HIV are waning in some sections of society. Between 1996 and 2004–2005, the percentage of married men who reported having had a non-regular partner in the previous 12 months, for example, rose from 19% to 22%; for women, the percentage rose from 5% to 9% (Bureau of Statistics Tanzania & Macro International, 1997; National Bureau of Statistics Tanzania & ORC Macro, 2005). Among young people (aged 15–24 years) surveyed in 2004–2005, 34% of young women and 83% of young men said they had engaged in risky sexual behaviours in the previous 12 months, on a par with the 81% of young men and 37% of

young women who reported similar behaviour in a 2003–2004 national survey. However, in the 2004–2005 survey, less than half (46%) of the young men reported using a condom the last time they had higher risk sex, as did only a third (32%) of the young women (down from 42% in the 2003–2004 survey). A similar reduction in condom use during sex with a non-regular partner was evident among adult women (15–49 years) generally—from 38% to 28% over the same period. Among young and adult men, however, condom use levels during sex with a non-regular partner remained steady in the two surveys. Age mixing appears to be on the decrease. Only 6% of women in their late teens (15–19 years) reported in the 2004–2005 survey that they had had non-marital sex with someone at least 10 years older than them during the previous year, compared with 9% in the 2003–2004 survey (National Bureau of Statistics Tanzania & ORC Macro, 2005; Tanzania Commission for AIDS, National Bureau of Statistics & ORC Macro, 2005).

In addition to the early decline in HIV infection levels observed in Uganda, prevalence has decreased in Burundi, Rwanda and the United Republic of Tanzania.

Adult national HIV prevalence in **Burundi** declined markedly, from nearly 6% in the late 1990s to an estimated 3.3% [2.7%–3.8%] in 2005 (UNAIDS, 2006). However, recent HIV surveillance among women seeking antenatal care suggests that the decline did not continue beyond 2005, when HIV infection levels started to increase again (sometimes substantially) at most surveillance sites. The highest prevalence was found in the capital, Bujumbura, where, in 2005, 18% (up from 13% in 2004) of adult and 16% (up from 9% in 2004) of young pregnant women (15–24 years) tested HIV-positive, while in the Commune of Butezi and Ijenda (a zone of the Commune of Mugongo-Manga), HIV prevalence of less than 2% was found among antenatal clinic attendees (Ministère de la Santé Publique du Burundi, 2005). It is too early to know whether the recent increase in HIV prevalence is an anomaly or whether it heralds a rising trend in infection levels. Inconsistent trends in recent infection levels among young pregnant women at various sites across the country also make

it difficult to understand recent trends in new HIV infections. It seems likely that the apparent decline in national HIV prevalence could be due mainly to the substantial drop in HIV prevalence observed up to 2004 in Bujumbura.

Adult national HIV prevalence in **Rwanda** was estimated to be 3.1% [2.7%–3.8%] in 2005 (UNAIDS, 2006). The 2005 antenatal clinic survey showed that 4.1% of pregnant women were HIV-positive, with prevalence highest in Kigali (13%) but, on average, about 5% in other urban areas and slightly more than 2% in rural areas. Substantial declines in HIV prevalence were observed in Rwamagana (from 13% to 4% between 1998 and 2005) and in Gikondo in the city of Kigali (14% to 8%) (Ministère de la Santé du Rwanda, 2005). As in neighbouring **Burundi**, the declines in HIV prevalence among pregnant women in urban areas of **Rwanda** were strongest in the late 1990s, and infection levels appeared to stabilize subsequently (Kayirangwa et al., 2006). In Kigali, for example, HIV prevalence in women attending antenatal clinics remained steady (at 13%) in three successive antenatal surveys between 2002 and 2005 (Ministère de la Santé du Rwanda, 2005). In rural areas, HIV prevalence has remained stable, but at much lower levels (Kayirangwa et al., 2006). Indeed, infection levels in pregnant women range from a low of 0.2% (at one rural clinic) to as high as 18% (at a clinic in Kigali).

Although still infrequent, condom use among young people appears to be increasing. In 2000, 3% of young women surveyed said they consistently used condoms; this percentage rose to 15% in a similar 2006 survey. Among their male counterparts, consistent condom use increased from 14% in 2000 to 21% in 2006. In addition, fewer sexually active young women reported having had two or more sexual partners in the previous 12 months (32% in 2000 versus 22% in 2006), although the corresponding proportions increased slightly for young men (41% versus 44%) (Centre de traitement et de recherche sur le SIDA, 2007).

HIV data collected in the 2005 national population-based survey showed HIV prevalence to be more than three times higher in urban than in rural areas (7.3% versus 2.2%), with infection levels peaking in and around the capital Kigali (Institut National de la Statistique du Rwanda & ORC Macro, 2006). The same patterns were evident among young people (15–24 years),

although HIV prevalence was relatively low in this age group, at about 1% nationally (Institut National de la Statistique du Rwanda & ORC Macro, 2006).

Among the recent improvements in **Rwanda's** HIV response is the expansion of services for preventing HIV transmission from mothers to children, which are now available in more than half of the country's health facilities. Compared with 2005, 1.5 times more women (636 000) agreed to be tested for HIV in 2006 (Ministry of Health Rwanda, 2007). In addition, more male partners are attending prevention of mother-to-child transmission services with their wives and girlfriends. According to one study, the percentage of men doing so increased from 9% in 2003 to 74% at the end of 2006 (Ngendahimana et al., 2007). However, despite huge increases in the numbers of condoms distributed (Ministry of Health Rwanda, 2007), consistent condom use by young people (Kayitesi et al., 2007) and during paid sex (Kabeja et al., 2007) remains low.

Until recently, understanding of the HIV epidemic in **Ethiopia** has been limited by the reliance on HIV information collected at antenatal clinics, which are used by a minority of pregnant women (about one in four pregnant women receive care at antenatal clinics) (Central Statistical Agency Ethiopia & ORC Macro, 2006). Recent, additional information derived from a national population-based survey and other HIV surveys has enabled a more complete picture to be drawn. The 2005 Demographic and Health Survey estimated national adult HIV prevalence to be 1.4%, with infection levels highest in the regions of Gambela (6%) and Addis Ababa (4.7%) (Central Statistical Agency Ethiopia & ORC Macro, 2006). Both antenatal clinic data and population-based survey data indicate that HIV prevalence is at least five times higher in urban than in rural areas (Federal Ministry of Health Ethiopia, 2006; Central Statistical Agency Ethiopia & ORC Macro, 2006). Indeed, the epidemic shows great variation, with infection levels observed among pregnant women at some surveillance sites in 2003 up to 40 times higher than those observed at others—HIV prevalence ranged from 0.5% in rural Aira to 20% in urban Bahir Dar (Hladik et al., 2006).

Overall, the country's epidemic appears to be stable, with roughly equal numbers of Ethiopians acquiring HIV (an estimated 350 per day in

2005) and dying of AIDS-related illness (370 per day in 2005), according to recent modelling. Ethiopia's epidemic stabilized in urban areas in 1996–2000, after which HIV infection levels declined slowly, notably in parts of the capital, Addis Ababa. In rural **Ethiopia**, where the majority of the population resides, the epidemic has remained relatively stable since HIV prevalence peaked in 1999–2001 (Federal Ministry of Health Ethiopia, 2006).

Knowledge about HIV and AIDS remains relatively poor. Only 16% of adult women and 29% of adult men (and 21% and 33% of 15–24 year-old females and males, respectively) could demonstrate comprehensive knowledge of AIDS when surveyed in 2005.⁴ However, it appears that small proportions of adult Ethiopians engage in risky sexual behaviours. In the 2005 survey, only about 3% of adult women and 7% of adult men said they had had sexual intercourse with a non-cohabiting partner in the previous year. About one in four (24%) of those women and one in two (52%) of those men said they had used a condom the last time they had sex with a non-regular partner (Central Statistical Agency Ethiopia & ORC Macro, 2006).

North of **Ethiopia**, in neighbouring **Eritrea**, approximately 2.4% of women seeking antenatal care were found to be HIV-positive when tested in 2005—the same prevalence as that found among antenatal clinic attendees in 2003. HIV infection levels in 2005 were highest in urban areas (3% versus 0.9% in rural areas), and ranged from as high as 7.4% in the port city of Assab (in the far south) to 4.2% in the capital (Asmara) and 3.3% in Massawa, another port city. The epidemic appears to be most serious in the Southern Red Sea Zone, where about 6% of antenatal clinic attendees tested HIV-positive in 2005 (Ministry of Health Eritrea, 2006).

In **Somalia**, HIV surveys among women attending antenatal clinics have found HIV prevalence as high as 2.3% in Berbera (WHO, 2005). HIV knowledge appears to be very poor, with only 8% of young women (15–24 years) and 13% of young men knowing how to prevent the transmission of HIV when surveyed in 2004 (UNICEF, 2004).

West and Central Africa

In most of the comparatively smaller epidemics in West and Central Africa, adult national HIV prevalence has remained stable overall. However, signs of declining HIV prevalence are evident in an increasing number of countries (notably **Côte d'Ivoire**, **Mali** and urban **Burkina Faso**). The available evidence also points to the continuing centrality of unprotected paid sex in most of the epidemics in this region. Unfortunately, in several countries (including **Cameroon**, **Central African Republic**, **Liberia** and **Sierra Leone**), HIV surveillance is either too inadequate or too recent to allow for accurate assessments of epidemic trends at this stage. In others (including the **Democratic Republic of the Congo**, **Gabon** and **Togo**), improved HIV surveillance activities are enabling a more precise understanding of their respective epidemics.

The epidemics in West Africa are stable overall, with the exception of Burkina Faso, Côte d'Ivoire and Mali, where HIV prevalence is declining.

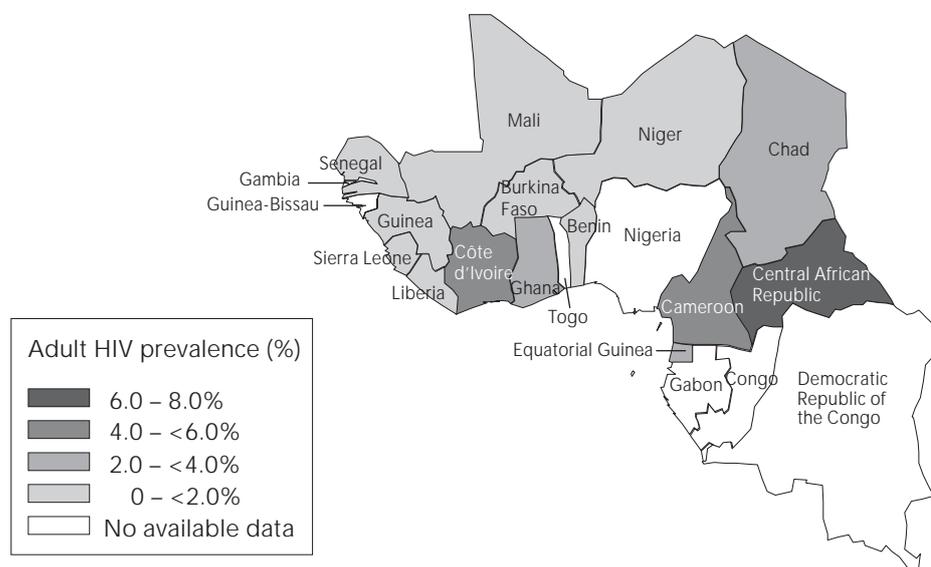
Nigeria still has the largest epidemic in this subregion. Although the percentage of adults infected with HIV (an estimated 3.9% [2.3%–5.6%] in 2005) is smaller than many other sub-Saharan African countries (notably in East and southern Africa), the country's large population means that almost 3 million [1.7 million–4.2 million] Nigerians were living with HIV in 2005, second in number globally only to **South Africa** (UNAIDS, 2006). The national HIV prevalence among women attending antenatal clinics in **Nigeria** appears to be stable, but with large variations between different regions and states (Utulu & Lawoyin, 2007). State-wide HIV prevalence among pregnant women, for example, ranges from as low as 1.6% in Ekiti (in the west) to 8% in Akwa Ibom (in the south) and 10% in Benue (in the south-east) (Federal Ministry of Health Nigeria, 2006).

In neighbouring **Benin**, sentinel surveys among pregnant women attending antenatal clinics indicate a relatively stable national epidemic, with HIV prevalence remaining around 2% since 2003. In only one area, Bourgou, did HIV prevalence

⁴ Respondent knew that using a condom at every sexual intercourse and having just one uninfected and faithful partner can reduce the risk of acquiring HIV, and knew that a healthy-looking person could be HIV-infected, and rejects the two most common local misconceptions about HIV transmission.

Figure 4

HIV prevalence from national population-based surveys in countries
in West and Central Africa, 2003–2007



Sources: (Central African Republic) [1] Institut Centrafricain de la Statistique et des Études Économiques et Sociales; [2] United Nations Population Fund; [3] MEASURE DHS, Macro International Inc. Enquête de sérologie VIH en République Centrafricaine, 2006. (Cameroon) [1] Institut National de la Statistique, Ministère de la Planification de la Programmation du Développement et de l'Aménagement du Territoire; [2] ORC Macro. Enquête Démographique et de Santé. Cameroun 2004. (Côte d'Ivoire) [1] Project RETRO-CI, Institut National de la Statistique, Ministère de la Lutte contre le Sida; [2] ORC Macro. Enquête sur les Indicateurs du Sida. Côte d'Ivoire 2005. (Chad) [1] Institut National de la Statistique, des Études Économiques et Démographiques; [2] ORC Macro. Enquête Démographique et de Santé. Tchad 2004. (Equatorial Guinea) Programa Nacional de Lucha Contra el SIDA, Proyecto Centro de Referencia para el Control de Endemias en Guinea Ecuatorial. Informe Final de la Encuesta de Seroprevalencia del VIH en Guinea Ecuatorial 2004. (Ghana) [1] Ghana Statistical Service; [2] Noguchi Memorial Institute for Medical Research; [3] ORC Macro. Ghana Demographic and Health Survey 2003. (Burkina Faso) [1] Institut National de la Statistique et de la Démographie; [2] ORC Macro. Burkina Faso Enquête Démographique et de Santé 2003. (Liberia) [1] Liberia Institute of Statistics and Geo-Information Services; [2] Ministry of Health and Social Welfare; [3] National AIDS Control Program; [4] MEASURE DHS, Macro International. Liberia Demographic and Health Survey 2007. (Guinea) [1] Direction Nationale de la Statistique; [2] ORC Macro. Démographique et de Santé Guinée 2005. (Sierra Leone) [1] Nimba Research and Consulting Company; [2] Statistics Sierra Leone; [3] Ministry of Health and Sanitation; [4] National HIV/AIDS Secretariat. National Population Based HIV Seroprevalence Survey of Sierra Leone 2005. (Mali) [1] Cellule de Planification et de Statistique, Ministère de la Santé; [2] Direction Nationale de la Statistique et de l'Informatique, Ministère du Plan et de l'Aménagement du Territoire; [3] MEASURE DHS. Enquête Démographique et de Santé EDSM-IV, Mali 2006. Rapport Préliminaire. (Benin) [1] Institut National de la Statistique et de l'Analyse Économique; [2] Programme National de Lutte contre le Sida; [3] Demographic and Health Surveys, Macro International, Inc. Enquête Démographique et de Santé (EDSB-III) Bénin 2006. Rapport Préliminaire. (Niger) [1] Institut National de la Statistique, Ministère de l'Économie et des Finances; [2] Macro International Inc. Enquête Démographique et de Santé et à Indicateurs Multiples 2006. (Senegal) [1] Ministère de la Santé et de la Prévention Médicale Centre de Recherche pour le Développement Humain; [2] ORC Macro. Enquête Démographique et de Santé Sénégal 2005.

decline significantly between 2003 and 2006. However, in a limited number of urban sites where data have been collected consistently since 2001, HIV prevalence declined slightly between 2001 and 2006 (from 4.1% to 3.8%) (Ministère de la Santé du Bénin, 2006). According to the 2006 Demographic and Health Survey, 1.2% of adults nationally were living with HIV; prevalence in women (1.5%) was almost twice as high as those in men (0.8%) (Institut National de la Statistique et de l'Analyse Économique & ORC Macro, 2007).

HIV prevalence in **Togo**, to the west of **Benin**, is among the highest in West Africa: 4.2% of pregnant women tested for HIV at antenatal clinics in 2006 were found to be HIV-positive, representing a slight decline in national infection levels. (In 2003, 4.8% of antenatal clinic attendees

tested HIV-positive; this fell to 4.6% in 2004.) This trend, along with the steeper declines observed in the Maritime, Plateaux and Savanes regions suggests that the epidemic in **Togo** might have peaked around 2003. In the most recent antenatal clinic survey, the highest HIV infection levels were found in the capital, Lomé, and its surroundings, and in Sotouboua, where more than 8% of pregnant women tested HIV-positive. Even in this small country, prevalence varies substantially and was under 2% in the Savanes region (Ministère de la Santé du Togo, 2007 & 2006).

Burkina Faso's epidemic continues to decline in *urban* areas. Approximately 2% [1.5%–2.5%] of adults were living with HIV in 2005 (UNAIDS, 2006). Among young pregnant women using antenatal services in urban areas, HIV prevalence

fell by half in 2001–2003 (to a little below 2%), signalling a possible slowing of the epidemic (Présidence du Faso, 2005; Institut National de la Statistique et de la Démographie & ORC Macro, 2004). One contributing factor to the decline in HIV prevalence is the mortality of people infected several years ago. However, high preva-

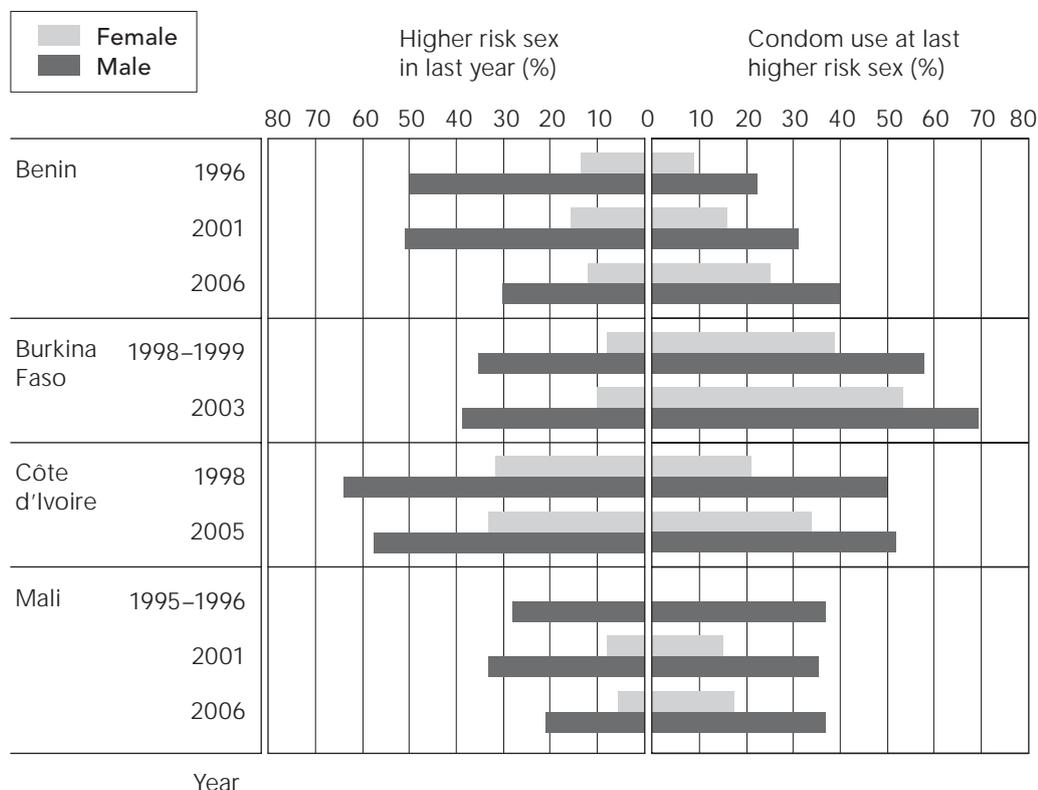
lence is still being found in the cities of Bobo Dioulasso, Ouagadougou and Ouahigouya—where 3.8%, 5.4% and 3.6%, respectively, of adult women (aged 15–49 years) attending antenatal clinics were found to be HIV-positive in the 2005 round of sentinel surveillance (Ministère de la Santé du Burkina Faso, 2006).

Signs of a shift towards safer behaviour

Several West African countries present evidence of a shift towards behaviours that can limit the spread of HIV, as Figure 5 illustrates. In both **Burkina Faso** and **Côte d’Ivoire**, for example, condom use during sex with a non-regular partner increased substantially for women—from 39% to 53% between 1998–1999 and 2003 in the former, and from 21% to 34% between 1998 and 2005 in the latter. Meanwhile, in both **Benin** and **Mali**, fewer men have been engaging in sex with a non-regular partner. That proportion decreased from 50% in 1996 to 30% in 2006 in **Benin**, and from 28% in 1995–1996 to 21% in 2006 in **Mali**. Additionally, in **Benin**, those women and men who had sex with a non-regular partner were more likely to use condoms when doing so. Condom use in higher risk sex rose from 9% to 25% for women and from 22% to 40% for men between 1996 and 2006.

Figure 5

Trends in behaviours, selected countries in West Africa, 1995–2006



Sources: (Benin) Institut National de la Statistique et de l'Analyse Économique; and, ORC Macro. DHS reports 1996, 2001 and 2006. (Burkina Faso) Institut National de la Statistique et de la Démographie; and ORC Macro. DHS Reports 1998–1999 and 2003. (Côte d'Ivoire) Institut National de la Statistique; and, ORC Macro. DHS reports 1998–1999 and 2006. (Mali) Cellule de Planification et de Statistique du Ministère de la Santé, Direction Nationale de la Statistique et de l'Informatique; and, ORC Macro. DHS reports 1995–1996, 2002 and 2007.

The most recent data for **Mali**, collected during a 2006 Demographic and Health Survey, also point to a possibly declining epidemic. Adult national HIV prevalence was an estimated 1.2%. As elsewhere in sub-Saharan Africa, women were more likely to be infected with HIV than men: HIV prevalence in adult women was 1.4%, compared with 0.9% in men (Ministère de la Santé du Mali & ORC Macro, 2007). Infection levels found in this latest survey are lower than those recorded in a similar survey in 2001, when adult national HIV prevalence was estimated at 1.7% (2% for women and 1.3% for men) (Cellule de Planification et de Statistique du Ministère de la Santé, Direction nationale de la Statistique et de l'Informatique & ORC Macro, 2002). Again, mortality would be a contributing factor for the decline in prevalence. Among pregnant women using public antenatal services, prevalence was 3.4% in 2005, similar to prevalence in previous years (Ministère de la Santé du Mali, 2005).

Unprotected paid sex remains central to HIV transmission in most of West and Central Africa.

Unprotected paid sex appears to be a major contributing factor in **Mali's** epidemic. Among female sex workers, HIV infection levels remain high: more than one in three (35%) sex workers participating in a 2006 survey tested HIV-positive—higher than the prevalence of 29% and 32% found in 2000 and 2003 surveys, respectively. Prevalence was 50% among women who had been selling sex for more than six years, and 58% among those older than 40 years. Almost all the women (95%) said they used condoms the last time they sold sex to a client; however, only half of them (51%) had used condoms the last time they had sex with a regular partner. Notably, 6% of travelling saleswomen were also found to be infected with HIV, as were 2.5% of the truck drivers who took part in the survey (Ministère de la Santé du Mali, 2006).

The epidemic has spread unevenly across **Ghana**, with prevalence among pregnant women attending antenatal clinics ranging from a low of 1.3% in the northern region to as high as 4.9% in the eastern region. Prevalence of 3.4% was found among pregnant women in Greater Accra (Ministry of Health Ghana, 2007). Variable HIV

infection trends are apparent in **Ghana** where, in 2006, an estimated 2.2% of adults were living with HIV (National AIDS Control Programme Ghana, 2007). Median HIV prevalence among women attending antenatal clinics in **Ghana** has ranged between 2.4% and 4.1% between 2000 and 2006 (see Figure 6). The main exceptions are Adabraka and Cape Coast, where significant declines in HIV prevalence among antenatal clinic attendees occurred in 2003–2006. However, among consistently reporting sentinel sites in the country, HIV prevalence has remained around 3.4% between 2001 and 2006 (Ministry of Health Ghana, 2007).

Several West African countries show evidence of a shift towards behaviours that can limit the spread of HIV, including Benin, Burkina Faso, Côte d'Ivoire and Mali.

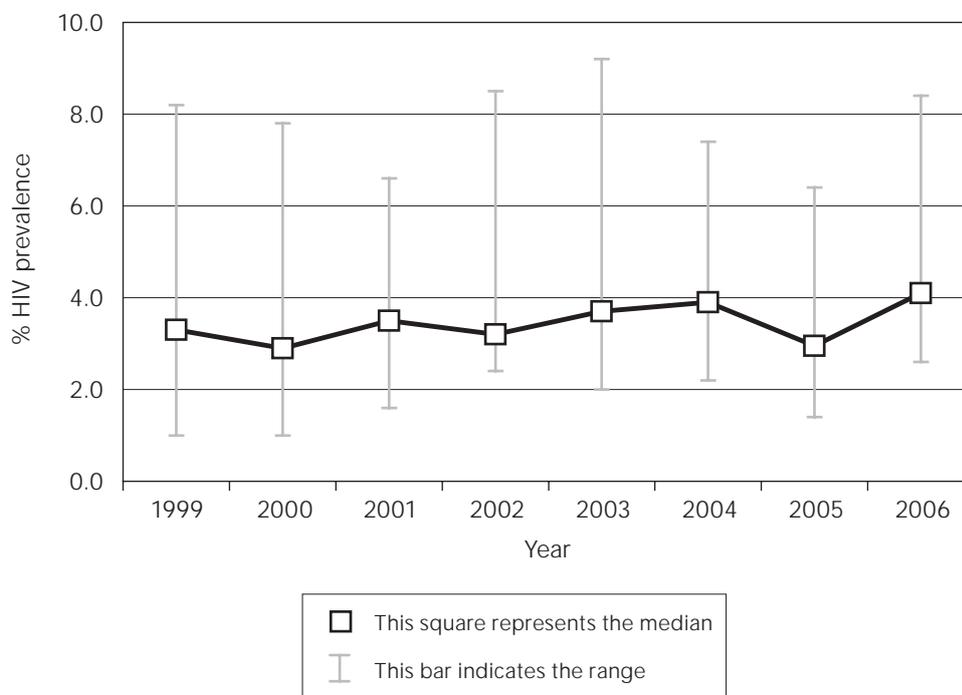
The lack of decline in prevalence could be explained by HIV infection trends among young people, mostly in urban areas. Women aged 15–24 years accounted for almost a third (30%) of all HIV infections recorded in the 2006 antenatal clinic survey, and prevalence in this age group rose from 1.9% in 2005 to 2.5% in 2006. This could reflect an increase in HIV incidence, since infections in that age group are likely to have been acquired relatively recently. These data emphasize the need to strengthen prevention efforts that focus especially on younger Ghanaians (Ministry of Health Ghana, 2007).

In **Côte d'Ivoire**, the latest Demographic and Health Survey estimated national adult HIV prevalence to be 4.7% (Institut National de la Statistique et Ministère de la Lutte contre le Sida Côte d'Ivoire & ORC Macro, 2006), which is lower than earlier estimates that were based primarily on HIV data collected at antenatal clinics in the provincial or district capitals. HIV surveillance among pregnant women suggests that prevalence is declining, at least in urban areas, where prevalence fell from 10% in 2001 to 6.9% in 2005 (Ministère de la Santé et de l'Hygiène Publique de la Côte d'Ivoire et al., 2007). As in **Burkina Faso** and **Mali**, mortality of people infected several years ago is a contributing factor to the decline in HIV prevalence.

HIV prevalence is highest in Abidjan and in the south and centre-east regions of the country

Figure 6

HIV prevalence among pregnant women (15–49 years) attending antenatal clinics in consistent surveillance sites, Ghana, 1999–2006



Sources: Sentinel surveillance reports, 1999–2006. (1) National AIDS/STI Control Programme (2) Ghana Health Service.

where between 5.5% and 6.1% of adults (15–49 years) were found to be HIV-positive. In both rural and urban areas, prevalence is more than twice as high for women (6.4%) as for men (2.9%). Among women aged 30–34 years, HIV prevalence was 15% (Institut National de la Statistique et Ministère de la Lutte contre le Sida Côte d'Ivoire & ORC Macro, 2006).

National adult HIV prevalence has remained stable in **Senegal** and was an estimated 0.9% [0.4%–1.5%] in 2005 (UNAIDS, 2006). However, infection levels of 2% and 2.2% among adults tested in a population-based survey have been found in the Kolda and Ziguinchor regions, respectively, in the south-west (Ndiaye & Ayad, 2006). Here, too, most HIV transmission seems still to be linked to unprotected paid sex: in Ziguinchor, for example, HIV prevalence as high as 30% has been found among female sex workers (Gomes do Espirito Santo & Etheredge, 2005).

Meanwhile, in the **Gambia**, divergent epidemic trends of HIV-1 and HIV-2 have been observed. A 16-year study among research clinic patients

found that prevalence of HIV-1 rose from 4.2% in 1988–1991 to 18% in 2001–2003, while prevalence of HIV-2 declined from 7% to 4% over the same period. There was no apparent trend of dual infection of HIV-1 and HIV-2 in patients, with prevalence remaining around 1% during the same period (van der Loeff et al., 2006). The divergent trends may be explained by the lower sexual transmission rate of HIV-2, which is estimated to be a third that of HIV-1 (Gilbert et al., 2003). Recent national HIV data are not available, but prevalence of HIV-1 among pregnant women in the **Gambia** also increased from 0.7% to 1.0% between 1994 and 2000, while prevalence of HIV-2 decreased from 1.0% to 0.8% in the same period (van der Loeff et al., 2003).

Prevalence in **Guinea** is slightly higher than in neighbouring **Senegal**, with adult national HIV prevalence estimated at 1.5% [1.2%–1.8%] in 2005 (UNAIDS, 2006). Infection levels vary little across the country, and appear to have peaked at 2.1% in the capital, Conakry, according to a national population-based survey in 2005 (Direction Nationale de la Statistique & ORC Macro, 2006). However, the HIV surveillance

system is weak and does not collect sufficient data from consistent sites to enable confident assessments of recent trends in the epidemic.

In **Liberia**, preliminary results from the 2007 Demographic and Health survey show adult (15–49 years) national HIV prevalence of 1.5%, with infection levels varying from 2.5% in urban areas to 0.8% in rural areas. Adult prevalence was highest in the Monrovia region, at 2.6% (Liberia Institute of Statistics and Geo-Information Services & Macro International, 2007). Sentinel surveillance among antenatal clinic attendees in urban areas showed an average HIV prevalence of 5.7% in 2006. The high infection levels of 5.7% among young (15–24 years) pregnant women suggests that the epidemic in urban Liberia might still be on the rise (Ministry of Health and Social Welfare Liberia, 2007). However, formal HIV surveillance began only recently and does not yet allow for an assessment of recent trends in the Liberian epidemic. Unfortunately current behaviour patterns seem to favour a continuing epidemic. One in three (33%) sexually active women and one in two (52%) sexually active men who had sex with a non-regular partner in the previous year, and yet only one in seven (14%) of those women and one in four (25%) of the men said they used a condom during those encounters (Liberia Institute of Statistics and Geo-Information Services & Macro International, 2007).

More information is becoming available on the HIV epidemic in **Sierra Leone**, where the country's second national sentinel survey showed HIV prevalence of 4.1% among pregnant women attending (mostly urban) antenatal clinics in 2006. The epidemic is geographically varied, with infection levels under 2% in Kenema and Mattru Jong but exceeding 8% in Makeni and Pujehun. Compared with the HIV prevalence of 3% among pregnant women in a similar survey in 2003, the latest data suggest that the epidemic in **Sierra Leone** might be growing (Ministry of Health and Sanitation Sierra Leone, 2007). A 2005 population-based survey found national adult prevalence of 1.5% (National AIDS Secretariat & Nimba Research Consultancy, 2005).

In **Chad**, a national HIV survey found that 3.3% of adults were living with HIV in 2005. The epidemic appears to be concentrated largely in urban areas, where average HIV prevalence was

7%, more than three times higher than in rural areas. HIV prevalence was highest in the capital, N'Djamena, where 8.3% of survey participants tested HIV-positive, and in Logone Occidental, where prevalence was 6.4%. The epidemic is being affected by changing levels of high-risk behaviour, conflict situations and substantial migration within and across country borders (Institut National de la Statistique, des Etudes économiques et démographiques & Programme National de Lutte contre le sida, 2006). HIV prevalence is considerably lower in neighbouring **Niger**, where a 2006 Demographic and Health Survey estimated that 0.7% of adults were infected with HIV. Prevalence was highest in the Agadez and Diffa regions, at 1.6% and 1.7%, respectively (Institut National de la Statistique du Niger & Macro International, 2007).

Central Africa

Cameroon has one of the largest HIV epidemics in this subregion, with almost half a million [460 000–560 000] adults living with HIV in 2005. Adult national prevalence was estimated at 5.4% [4.9%–5.9%] in 2005 (UNAIDS, 2006). A national population-based survey in 2004 showed large variation in prevalence, from 1.7% in the North and 2.0% in the Extreme North, to substantially higher levels of infection in the capital Yaoundé (8.3%) and the south-west (8%), east (8.6%) and north-west (8.7%) provinces (Institut National de la Statistique du Cameroun & ORC Macro, 2005).

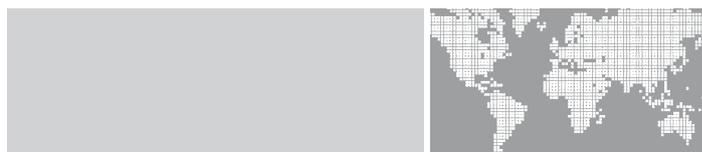
Women, especially those in urban areas, have higher HIV prevalence. More than 8% of urban women (15–49 years) tested HIV-positive in the 2004 Demographic and Health Survey, almost twice the level of infection found among adult men in urban areas. Overall, for every 100 men infected with HIV, 170 women are infected. Among young women, a sevenfold increase in HIV prevalence occurs between the ages of 15–17 and 23–24 years—from 1.6% to 11.8% (Institut National de la Statistique du Cameroun & ORC Macro, 2005). Data from surveillance among pregnant women are lacking for recent years, making it difficult to assess trends in the epidemic.

In the **Democratic Republic of the Congo** it is estimated that as many as 1 million [560 000–1.5 million] people were living with HIV in 2005. Estimated adult national HIV preva-

lence was 3.2% [1.8%–4.9%] in the same year (UNAIDS, 2006). Armed conflict and poor transport infrastructure mean that parts of this large country have remained relatively isolated; partly as a consequence, there is variation in the trends in HIV infections between different places. Thus, while HIV prevalence among antenatal clinic attendees has remained relatively stable in the capital, Kinshasa (fluctuating between 3.8% and 4.2% between 1995 and 2005), prevalence has risen in the country's second-largest city, Lubumbashi (from 4.7% to 6.6% between 1997 and 2005), as well as in Mikalayi (from 0.6% to 2.2% between 1999 and 2005) (Kayembe et al., 2007). Prevalence is also high in the cities of Matadi, Kisangani and Mbandaka (where 6% of women using antenatal services were HIV-positive in 2005), as well as in Tshikapa (where prevalence was 8%) (Programme National de Lutte contre le sida, 2005).

Unprotected paid sex is an important factor in the **Democratic Republic of the Congo's** epidemic. About 12% of sex workers surveyed in five cities in 2005 were found to be HIV-positive, although infection levels varied substantially—from 1.4% in Kikwit to as high as 16% in Goma and 18% in Kananga (Ministère de la Santé du République Démocratique du Congo, 2006). An earlier study in Kinshasa in 2003 found HIV prevalence of 14% among sex workers (Mpanya et al., 2004).

Adult national HIV prevalence in neighbouring **Central African Republic** is among the highest in all of West and Central Africa, and was estimated at 6.2% in a 2006 national population-based survey. Nationally, prevalence among women was almost twice as high as among men (7.8% versus 4.3%), and there is considerable regional variation in HIV prevalence. HIV prevalence was as high as 11% in Bamingui-Bangoran (in the north) and 14% in Haut-Mbomou (in the east), while it was about 3% or lower in Basse-Kotto (in the south), Nana-Mambéré and Ouham-Pendé (both in the west) (Ministère de l'Economie, du Plan et de la Coopération internationale de la République centrafricaine, 2007).



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