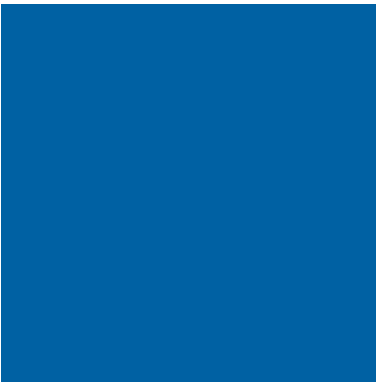
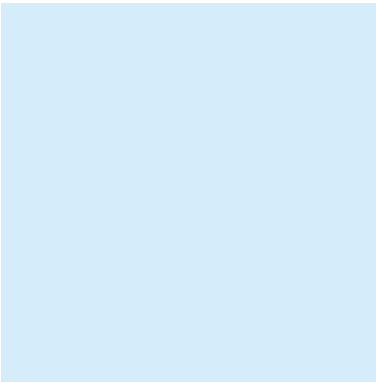
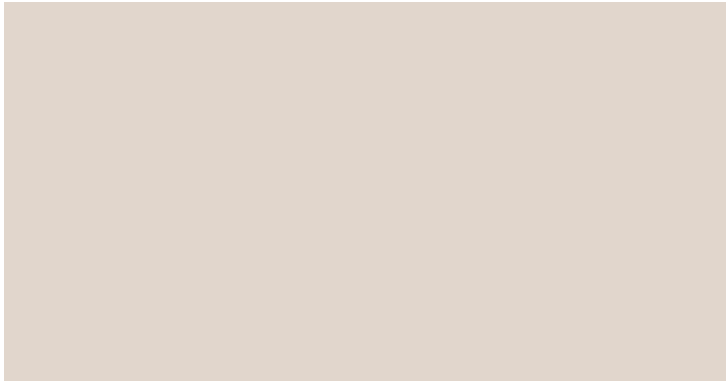


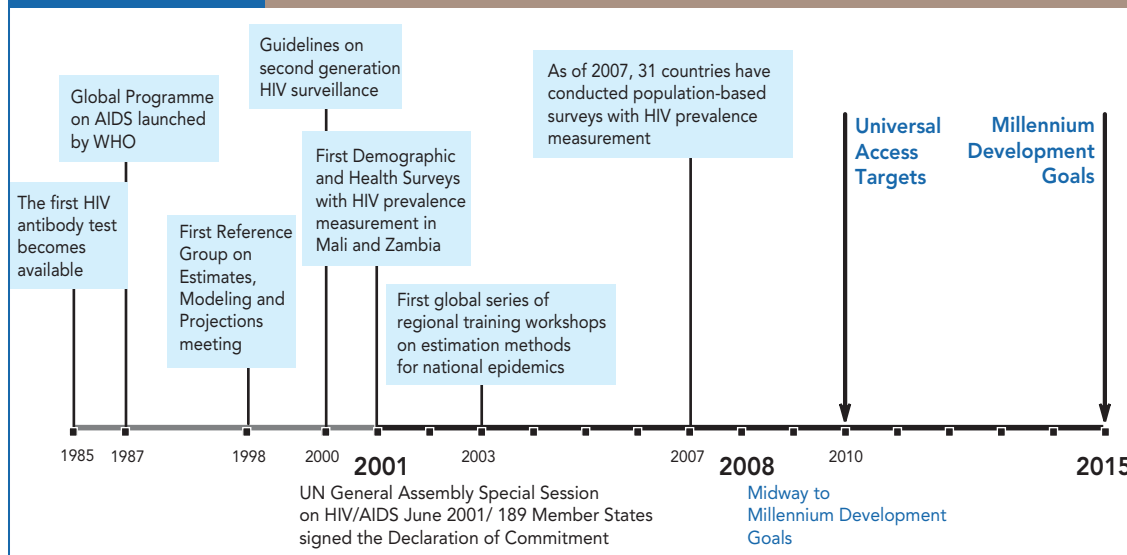
## Status of the global HIV epidemic



## Chapter 2


**FIGURE 2.1**

Selected events in tracking the epidemic



## Key Findings

- The global percentage of adults living with HIV has leveled off since 2000.
- In 2007 there were 2.7 million new HIV infections and 2 million HIV-related deaths.
- The rate of new HIV infections has fallen in several countries, but globally these favourable trends are at least partially offset by increases in new infections in other countries.
- In 14 of 17 African countries with adequate survey data, the percentage of young pregnant women (ages 15–24) who are living with HIV has declined since 2000–2001. In 7 countries, the drop in infections has equalled or exceeded the 25% target decline for 2010 set out in the *Declaration of Commitment*.
- As treatment access has increased over the last ten years the annual number of AIDS deaths has fallen.
- Sub-Saharan Africa remains the region most heavily affected by HIV, accounting for 67% of all people living with HIV and for 75% of AIDS deaths in 2007. However, some of the most worrisome increases in new infections are now occurring in populous countries in other regions, such as Indonesia, the Russian Federation, and various high-income countries.
- Globally, the percentage of women among people living with HIV has remained stable (at 50%) for several years, although women’s share of infections is increasing in several countries.
- In virtually all regions outside sub-Saharan Africa, HIV disproportionately affects injecting drug users, men who have sex with men, and sex workers.

HIV remains a global health problem of unprecedented dimensions. Unknown 27 years ago, HIV has already caused an estimated 25 million deaths worldwide and has generated profound demographic changes in the most heavily-affected countries.

The most recent international epidemiological data contain some good news. In some countries in Asia, Latin America and sub-Saharan Africa, the annual number of new HIV infections is falling. The estimated rate of AIDS deaths has also declined, in part as a result of success in expanding access to antiretroviral drugs in

resource-limited settings. Yet these favourable trends are not uniformly evident, either within or between regions, underscoring the need for more comprehensive progress in implementing effective policies and programmes.

This chapter summarizes the current status of the epidemic—analysing broad global trends and providing regional snapshots of the epidemic’s path. It draws on the latest epidemiological data from countries; in many cases, these data have significantly improved (see box “Improving HIV estimates”). Annex I provides specific epidemiological information for 168 countries.

### Improving HIV estimates

HIV surveillance in designated sites (“sentinel surveillance”) has expanded and improved considerably (especially in sub-Saharan Africa and Asia), leading to more reliable estimates of the HIV epidemic and its impact. In addition, a growing number of countries have conducted national population-based surveys that include HIV testing. Together, these data sources provide complementary information on both adult HIV prevalence and on epidemiological trends over time.

UNAIDS and WHO primarily use three tools to generate HIV estimates for countries and regions: the Estimation and Projection Package (EPP), WORKBOOK, and Spectrum.<sup>1</sup> These models generate estimates of HIV prevalence<sup>2</sup> over time, the number of people living with HIV, new infections, deaths due to AIDS, children orphaned by AIDS, and treatment needs. The estimates are based on data from sentinel surveillance, surveys, and special studies; the models and assumptions used in these tools are regularly updated on the basis of the latest available research.

HIV prevalence data collected in national population-based surveys, in particular in countries with generalized epidemics, have improved the reliability of national HIV estimates. These surveys are geographically more representative than sentinel surveillance, and include both men and women. Since 2001, 30 countries in the Caribbean, sub-Saharan Africa, and Asia have conducted national population-based surveys with HIV prevalence measures. In almost all of those surveys, new estimates of HIV prevalence were lower than estimates of prevalence published before the new survey data became available.

Such surveys have also made it possible to update and revise assumptions in the EPP and Spectrum software tools. For example, national population-based HIV surveys

<sup>1</sup> More information about these tools can be found at: <http://www.unaids.org/en/KnowledgeCentre/HIVData/Methodology/>

<sup>2</sup> HIV prevalence refers to the total number of infections at a given time. Incidence or new infections refers to the percentage or number of people who have become newly infected over a period of time, traditionally a given year.

have found HIV prevalence to be approximately 20% lower than the prevalence among antenatal clinic attendees, in both rural and urban areas (Gouws et al., in press). Some countries in sub-Saharan Africa have not conducted such surveys—notably Angola, Eritrea, Gambia, Guinea-Bissau, Mozambique, Namibia, Nigeria, Somalia, and Sudan. To develop the estimates included in this report, HIV prevalence data from antenatal clinic attendees in these countries have been adjusted downward to a level of approximately 0.8 times the prevalence found in antenatal clinic surveillance. The level of adjustment varies, based on the proportion of urban to rural populations within a country.

New research has also led to important revisions in the assumptions used in the models developed by UNAIDS and WHO. One such revision relates to estimates of HIV incidence and AIDS mortality. Central to these is an assumption about the average time people survive from HIV infection to death in the absence of antiretroviral treatment (Stover et al. in press). Longitudinal studies (Marston et al., 2007; Todd et al., 2007) indicate that, in the absence of such treatment, the estimated net median survival time after infection with HIV is 11 years (UNAIDS Reference Group on Estimates, Modelling and Projections, 2006), instead of the previously estimated 9 years (UNAIDS Reference Group on Estimates, Modelling and Projections, 2002).<sup>3</sup>

Improved surveillance systems and data sources, together with the changes in assumptions, have enabled more reliable epidemiological estimates. Since revisions also affect historical trends, latest estimates should not be compared directly with estimates published in previous reports. Where this report cites epidemiological trends, revisions to historical estimates are given.

The UNAIDS Secretariat and WHO will continue to update the HIV and AIDS estimation methods as new scientific data and research become available.

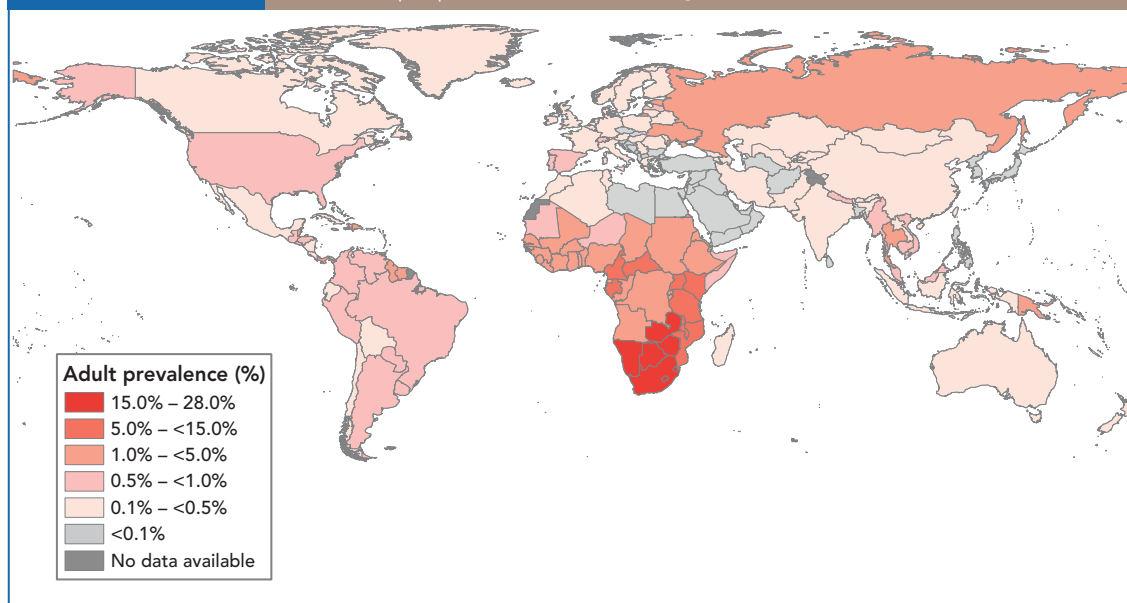
On a global scale, the HIV epidemic has stabilized, although with unacceptably high levels of new HIV infections and AIDS deaths.

- Globally, there were an estimated 33 million [30 million–36 million] people living with HIV in 2007 (Figure 2.2).
- The annual number of new HIV infections declined from 3.0 million [2.6 million–3.5 million] in 2001 to 2.7 million [2.2 million–3.2 million] in 2007.
- Overall, 2.0 million [1.8 million–2.3 million] people died due to AIDS in 2007, compared with an estimated 1.7 million [1.5 million–2.3 million] in 2001.
- While the percentage of people living with HIV has stabilized since 2000, the overall number of people living with HIV has steadily increased as new infections occur each year, HIV treatments extend life, and as new infections still outnumber AIDS deaths (Figure 2.3).
- Southern Africa continues to bear a disproportionate share of the global burden of HIV: 35% of HIV infections and 38% of AIDS deaths in 2007 occurred in that subregion. Altogether, sub-Saharan Africa is home to 67% of all people living with HIV.

<sup>3</sup> This applies to all countries except those where HIV subtype E accounts for most infections. In the latter countries, the median net survival time is estimated to be nine years (UNAIDS Reference Group on Estimates, Modelling and Projections, 2006).

FIGURE 2.2

A global view of HIV infection, 2007  
33 million people [30 – 36 million] living with HIV, 2007



- Women account for half of all people living with HIV worldwide, and nearly 60% of HIV infections in sub-Saharan Africa. Over the last 10 years, the proportion of women among people living with HIV has remained stable globally, but has increased in many regions (Figure 2.4).
- Young people aged 15–24 account for an estimated 45% of new HIV infections worldwide.
- An estimated 370 000 [330 000–410 000] children younger than 15 years became infected with HIV in 2007. Globally, the number of children younger than 15 years living with HIV increased from 1.6 million [1.4 million–2.1 million] in 2001 to 2.0 million [1.9 million–2.3 million] in 2007. Almost 90% live in sub-Saharan Africa (see box “HIV among children”).

### Young people: recent HIV infection and sexual behaviour trends

The *Declaration of Commitment* established a target of reducing HIV prevalence by 25% in young people (ages 15–24) in the most-affected countries by 2005. To assess progress towards this goal, 35 high-prevalence countries (with national prevalence that exceeded 3%) and four additional countries in Africa with notable prevalence levels (Table 2) were asked to compile data on recent trends in HIV and sexual behaviour among young people.

Given the practical difficulties of conducting HIV incidence studies,<sup>4</sup> serial HIV prevalence over time in young women (ages 15–24) attending antenatal clinics serves as a proxy measure for incidence, providing important indications of recent epidemiological trends.

<sup>4</sup> As most people are unaware when they become infected and are diagnosed only months or years later, tracking HIV incidence typically requires special epidemiological studies that are complex and expensive. Certain high-income countries are using new epidemiological technologies to help public health agencies to gauge HIV incidence, but these technologies have not been validated for use in high-prevalence settings.

**TABLE 2**

Analysis of trends among 15–24-year-olds in high-prevalence countries (all countries with national prevalence that exceeded 3% and four additional countries in Africa with notable prevalence levels): HIV prevalence among pregnant women (2000–2007) in sentinel surveillance systems, and selected sexual behaviours among women and men (1990–2007) from national surveys

COUNTRY	Time period for which prevalence data were available	Prevalence trend <sup>a</sup>		Percent of young people (15–19 years) having had sex before age 15 <sup>b</sup>		Proportion having sex with more than one partner in the last 12 months <sup>c</sup>		Condom use during last sex among those with more than one partner in the last 12 months <sup>d</sup>	
		Urban	Rural	Females	Males	Females	Males	Females	Males
Angola <sup>a</sup>		ID	ID						
Bahamas		▼							
Benin <sup>b</sup>	2000–2006	▼*	↔	↔	▼*	▼*	▲	▲	▲
Botswana	2001–2006	▼*	▼*						
Burkina Faso	2000–2006	▼*	▼	▼*	▼*	▼*	▼*	↔	▲*
Burundi	1999–2004	▼	↔	▲*					
Cameroon <sup>a</sup>		ID	ID	▼*	▼*	▼*	▼*	▲*	▲*
Central African Republic <sup>b</sup>				▲	▼				
Chad <sup>a</sup>		ID	ID	▼*	▲	▼	▼*	▼	▲
Congo <sup>a</sup>		ID	ID						
Côte d'Ivoire	2000–2004	▼*	ID	▼*	▲	▼*	▼*	▲*	↔
Democratic Republic of the Congo <sup>a</sup>		ID	ID						
Djibouti <sup>b</sup>									
Ethiopia <sup>b</sup>				▼*	▼*	▼*	▼*		▼
Gabon <sup>b</sup>									
Gambia <sup>b</sup>									
Ghana <sup>b</sup>				▼*	▼*	↔	↔	▲*	▲
Haiti <sup>b</sup>				▲*	▲*	▲	▼	▼	▲*
Kenya	2000–2005	▼*	▼*	↔	↔	▼*	▼*	▼	▲*
Lesotho <sup>a</sup>	2003–2007	↔	▼						
Liberia <sup>b</sup>									
Malawi <sup>a</sup>	1999–2005	▼*	↔	▼*	▼*	▲	▼*	↔	▲
Mozambique <sup>f</sup>	2000–2007		↔	↔	▲*				
Namibia	2002–2006	▼	▼	↔	▼*	↔	▼*	▲*	▲
Nigeria <sup>a</sup>									
Rwanda	1998–2003	▼	ND	▲*	▲*	▼*	▼		
Sierra Leone <sup>a</sup>		ID	ID						
South Africa <sup>a</sup>	2000–2006		↔			▼*	↔		
Sudan <sup>a</sup>									
Swaziland	2002–2006	▼	▼						
Togo <sup>a</sup>									
Uganda <sup>b</sup>				▼*	▼	↔	↔	▲*	▲*
United Republic of Tanzania	2000–2006	↔	▼	↔	▼*	▼*	▼*	▲*	▲*
Zambia <sup>h</sup>	1998–2004		↔	▼*	▼*	▼*	▼*	▲	▲
Zimbabwe	2000–2004	▼*	▼	↔	▼*	▼*	▼*	↔	↔

**Notes:**

[1] Highlighted cells indicate positive trends in prevalence or behaviour.

 [2] \* Consistent sites only were used in the analysis of change in HIV prevalence over time, for a minimum of three years. Significance test based on  $H_0: \text{slope} = 0$ 
**Legend:**
<sup>a</sup> Prevalence obtained from pregnant women attending antenatal clinics in selected countries.

<sup>b</sup> Among 15–19-year-olds, proportion reported having had sex by age 15. Analyses based on DHS, MICS or national surveys conducted between 1990 and 2007.

<sup>c</sup> Among 15–24-year-olds, proportion reported having had sex with more than one partner in the last 12 months. Analyses based on data from repeat DHS or national surveys conducted between 1990 and 2007.

<sup>d</sup> Among 15–24-year-olds, proportion of those with more than one partner reporting having used a condom the last time they had sex. Analyses based on data from repeat DHS or national surveys conducted between 1990 and 2007.

▲ Observed increase in HIV prevalence or behaviour.

▼ Observed decrease in HIV prevalence or behaviour.

▼\* Statistically significant decrease in HIV prevalence of more than 25% or significant decrease in measured behavioural indicator. Analysis of prevalence based on regression analysis; analysis of behaviour based on Chi-square or Chi-square test for trend.

▲\* Statistically significant increase in measured behavioural indicator. Analysis of behaviour based on Chi-square or Chi-square test for trend.

↔ No evidence of change.

\*ID Insufficient data, i.e. less than three years of data received.

\*\*ND Data not received.

<sup>e</sup> Semi-urban and urban areas were combined in analysis of urban data.

<sup>f</sup> Analysis in Mozambique combined for South, North and Central.

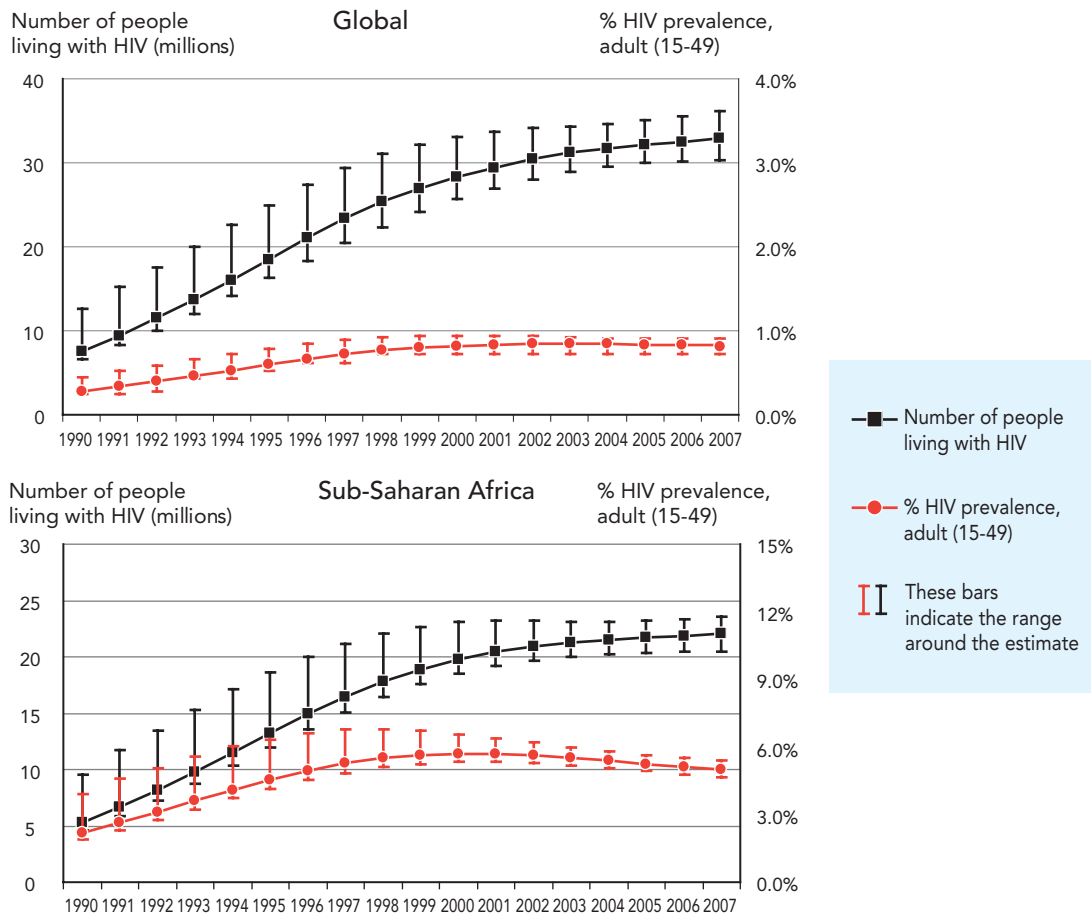
<sup>g</sup> No data received in response to working group process; analyses based on data in South Africa surveillance report.

<sup>h</sup> No data received in response to working group process; analyses based on data reported in Zambia 2005 surveillance report. Analysis based on urban and rural data combined.

HIV prevalence among young women attending antenatal clinics in urban or rural areas (or both) has declined since 2000–2001 in 14 of the 17 countries with sufficient data to analyse recent trends in the most-affected countries (sufficient prevalence data from three different years). These countries include the

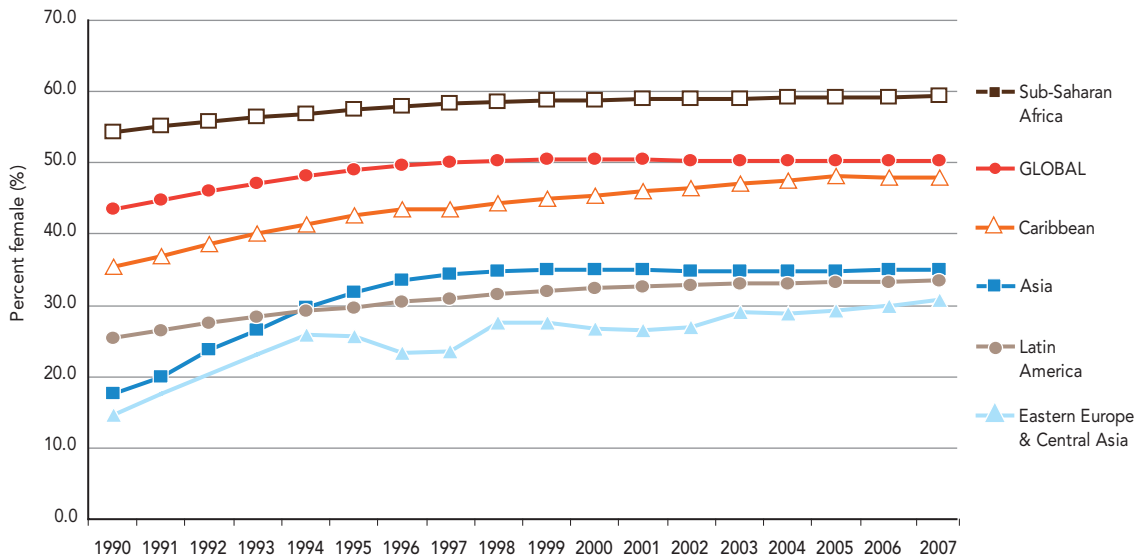
Bahamas, Benin, Burkina Faso, Burundi, Côte d’Ivoire, Kenya, Lesotho, Malawi, Namibia, Rwanda, Swaziland, the United Republic of Tanzania, and Zimbabwe. Declines in HIV prevalence exceeded 25% in seven countries. In two of these countries—Botswana and Kenya—declines occurred in both urban and

**FIGURE 2.3** Estimated number of people living with HIV and adult HIV prevalence. Global HIV epidemic, 1990–2007; and, HIV epidemic in Sub-Saharan Africa, 1990–2007



Note: Even though the HIV prevalence stabilized in sub-Saharan Africa, the actual number of people infected continues to grow because of ongoing new infections and increasing access to antiretroviral therapy.

**FIGURE 2.4** Percent of adults (15+) living with HIV who are female, 1990–2007<sup>5</sup>



rural areas. In five countries—Benin, Burkina Faso, Côte d’Ivoire, Malawi, and Zimbabwe—declines were significant only in urban areas.

In addition to HIV prevalence data, a number of countries have also tracked sexual behaviours among young people. Among the 35 high-prevalence countries, 19 countries conducted national surveys between 1990 and 2007 that provided sufficient comparative data to assess sexual behaviour trends. The percentage of both young women and men (ages 15–19) who became sexually active before their 15th birthday declined in seven countries, but increased in Haiti and Rwanda. The proportion of both young women and men (ages 15–24) who had more than one partner in the previous

12 months decreased in 10 countries and remained unchanged in two, but increased among young women in two countries and among young men in one.

Condom use has increased among young people. Among young men (ages 15–24) who had more than one partner in the previous 12 months, rates of condom use increased in 12 countries. Among their female counterparts, rates of condom use increased in eight countries. Although observed changes in behaviour are not statistically significant in every instance, overall trends show that reductions in risky behaviour have been occurring in several countries.<sup>6</sup>

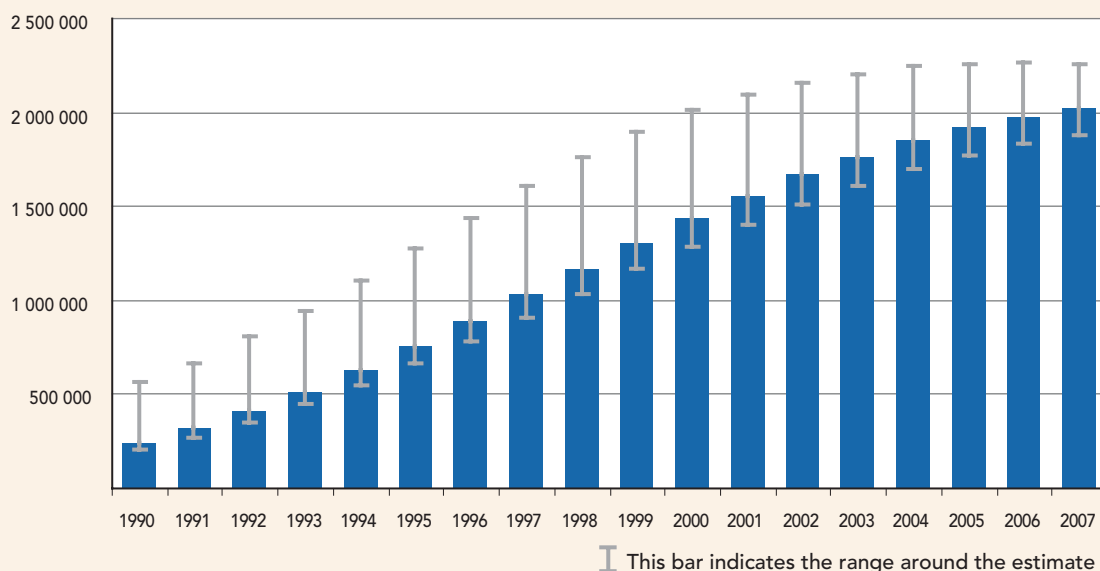
<sup>5</sup> The global proportion of women versus men who are infected has remained at approximately 50% since the late 1990s. In this figure of proportional rates, even though the proportion of women versus men has been increasing in each region, in most regions, the overall number of men infected is still far greater than the number of women.

<sup>6</sup> 24 out of the 35 countries had insufficient or no data on HIV prevalence and/or sexual behaviour trends, or both, among young people—including several countries with exceptionally high HIV prevalence in southern Africa.



FIGURE 2.5

Children living with HIV globally, 1990–2007



### HIV among children

Few direct HIV surveillance data are available for children. Antenatal clinic surveys typically capture data for pregnant girls and women 15 years or older; most national population-based surveys with HIV testing include only adults. HIV estimates for children are obtained through modelling that is based primarily on HIV prevalence in adult women (ages 15–49), fertility rates, and assumptions about the survival of HIV-positive children (Stover et al., 2006; Stover et al., in press). Such estimates show that the number of children living with HIV globally continues to increase steadily (Figure 2.5).

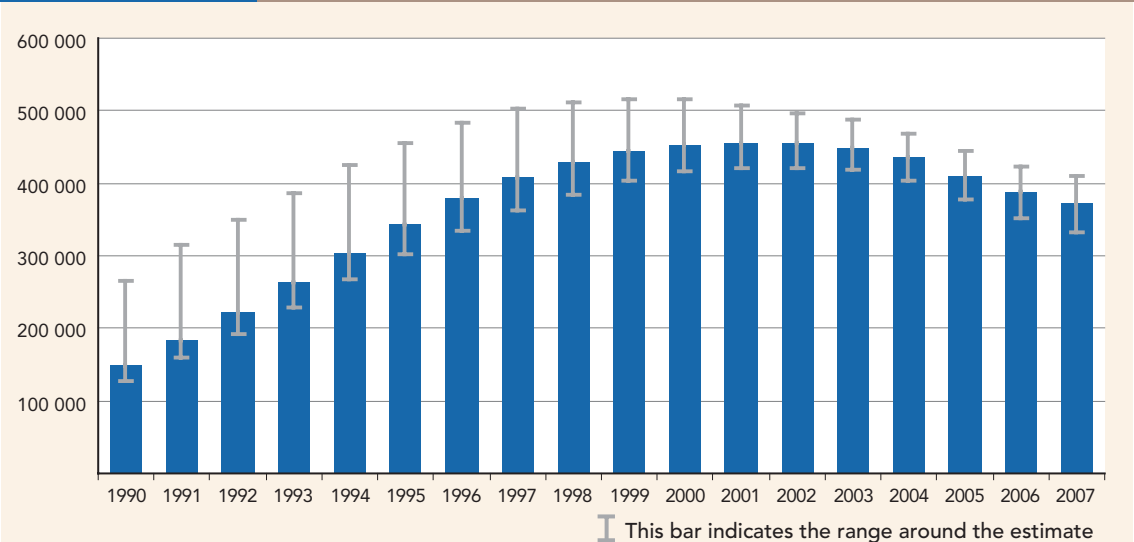
It is estimated that more than 90% of children living with HIV acquired the virus during pregnancy, birth or breastfeeding—forms of HIV transmission that can be prevented. A small fraction of HIV infections in children are caused by contaminated injections, the transfusion of infected blood or blood products, sexual abuse, sexual intercourse (although this is a significant mode of transmission among adolescents), or scarification (Kengeya-Kayondo et al., 1995; Mulder et al., 1996; Hauri, Armstrong & Hutin 2004; Kiwanuka et al., 2004; Schmid et al., 2004).<sup>7</sup>

As shown in Figure 2.6, new HIV infections in children appear to have peaked in 2000–2002. This is believed to be due mainly to the stabilization of HIV prevalence among women overall, and to increasing coverage of programmes for preventing mother-to-child transmission of HIV (see Chapter 4).

In 2007, an estimated 270 000 [250 000–290 000] HIV-infected children younger than 15 years died because of AIDS—more than 90% of them in sub-Saharan Africa. In the →

<sup>7</sup> The role of child sexual abuse as a source of HIV infection in children is poorly documented, but this mode of transmission is of particular concern in countries where both HIV and child sexual abuse are major public health problems.

**FIGURE 2.6** New HIV infections among children, 1990–2007



most heavily-affected countries, such as Botswana and Zimbabwe, HIV is the underlying reason for more than one third of all deaths among children under the age of five (Mason, 2006). Indeed, without antiretroviral treatment, the progression of HIV infection in children is particularly aggressive, and many children die at a young age (Taha et al., 2000; Newell et al., 2004; Brahmbhatt et al., 2006).

As Figure 2.7 illustrates, the total number of AIDS deaths in children peaked around 2003 and has decreased since. This decline mainly reflects the drop in new infections in children seen earlier (visible in Figure 2.6), as well as increased access to antiretroviral treatment.

**FIGURE 2.7** Child deaths due to AIDS, 1990–2007

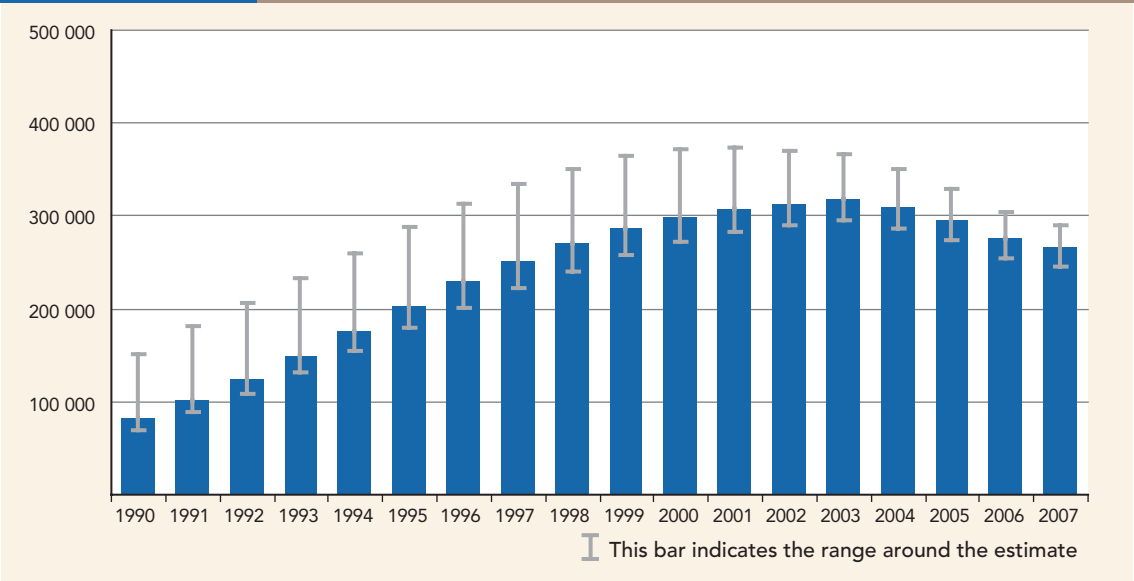
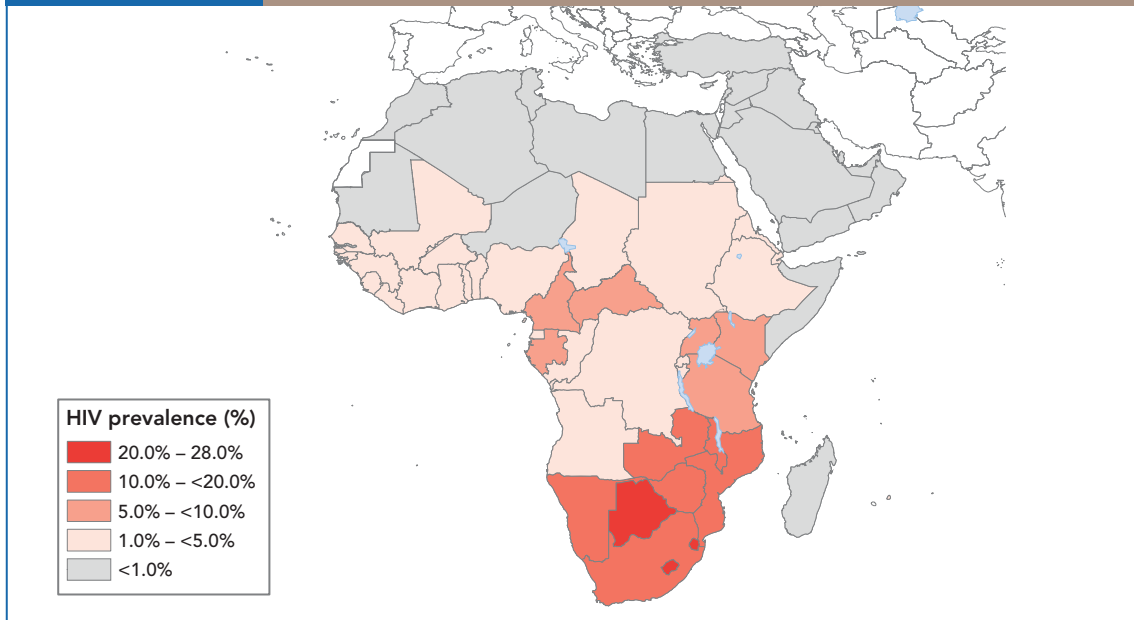


FIGURE 2.8

HIV prevalence (%) in adults (15–49) in Africa, 2007



## Sub-Saharan Africa

An estimated 1.9 million [1.6 million–2.1 million] people were newly infected with HIV in sub-Saharan Africa in 2007, bringing to 22 million [20.5 million–23.6 million] the number of people living with HIV. Two thirds (67%) of the global total of 33 million [30 million–36 million] people with HIV live in this region, and three quarters (75%) of all AIDS deaths in 2007 occurred there.

Sub-Saharan Africa's epidemics vary significantly from country to country in both scale and scope (Figure 2.8). Adult national HIV prevalence is below 2% in several countries of West and Central Africa, as well as in the horn of Africa, but in 2007 it exceeded 15% in seven southern African countries (Botswana, Lesotho, Namibia, South Africa, Swaziland, Zambia, and Zimbabwe), and was above 5% in seven other countries, mostly in Central and East Africa (Cameroon, the Central African Republic, Gabon, Malawi, Mozambique, Uganda, and the United Republic of Tanzania).

## Recent epidemiological trends

Most epidemics in sub-Saharan Africa appear to have stabilized, although often at very high levels, particularly in southern Africa. Additionally, in a growing number of countries, adult HIV prevalence appears to be falling. For the region as a whole, women are disproportionately affected in comparison with men, with especially stark differences between the sexes in HIV prevalence among young people (Figure 2.9 and Figure 2.10).

In southern Africa, reductions in HIV prevalence are especially striking in Zimbabwe, where HIV prevalence in pregnant women attending antenatal clinics fell from 26% in 2002 to 18% in 2006 (Ministry of Health and Child Welfare [Zimbabwe], 2007).<sup>8</sup> In Botswana, a drop in HIV prevalence among pregnant 15–19-year-olds (from 25% in 2001 to 18% in 2006) suggests that the rate of new infections could be slowing (Ministry of Health [Botswana], 2006). The epidemics in Malawi and Zambia also appear to have

<sup>8</sup> This development is discussed in detail in the 2006 and 2007 editions of the AIDS epidemic update, available at <http://www.unaids.org>



stabilized, amid some evidence of favourable behaviour changes (Heaton, Fowler & Palamuleni, 2006; Sandoy et al., 2007) and signs of declining HIV prevalence among women using antenatal services in some urban areas (Ministry of Health and Population [Malawi], 2005; Ministry of Health [Zambia], 2005; Michelo et al., 2006; National AIDS Commission [Malawi], 2007).

HIV data from antenatal clinics in South Africa suggest that the country's epidemic might be stabilizing (Department of Health [South Africa], 2007), but there is no evidence yet of major changes in HIV-related behaviour. The estimated 5.7 million [4.9 million–6.6 million]<sup>9</sup> South Africans living with HIV in 2007 make this the largest HIV epidemic in the world. Meanwhile, the 26% HIV prevalence found in adults in Swaziland in 2006 is the highest prevalence ever documented in a national population-based survey anywhere in the world (Central

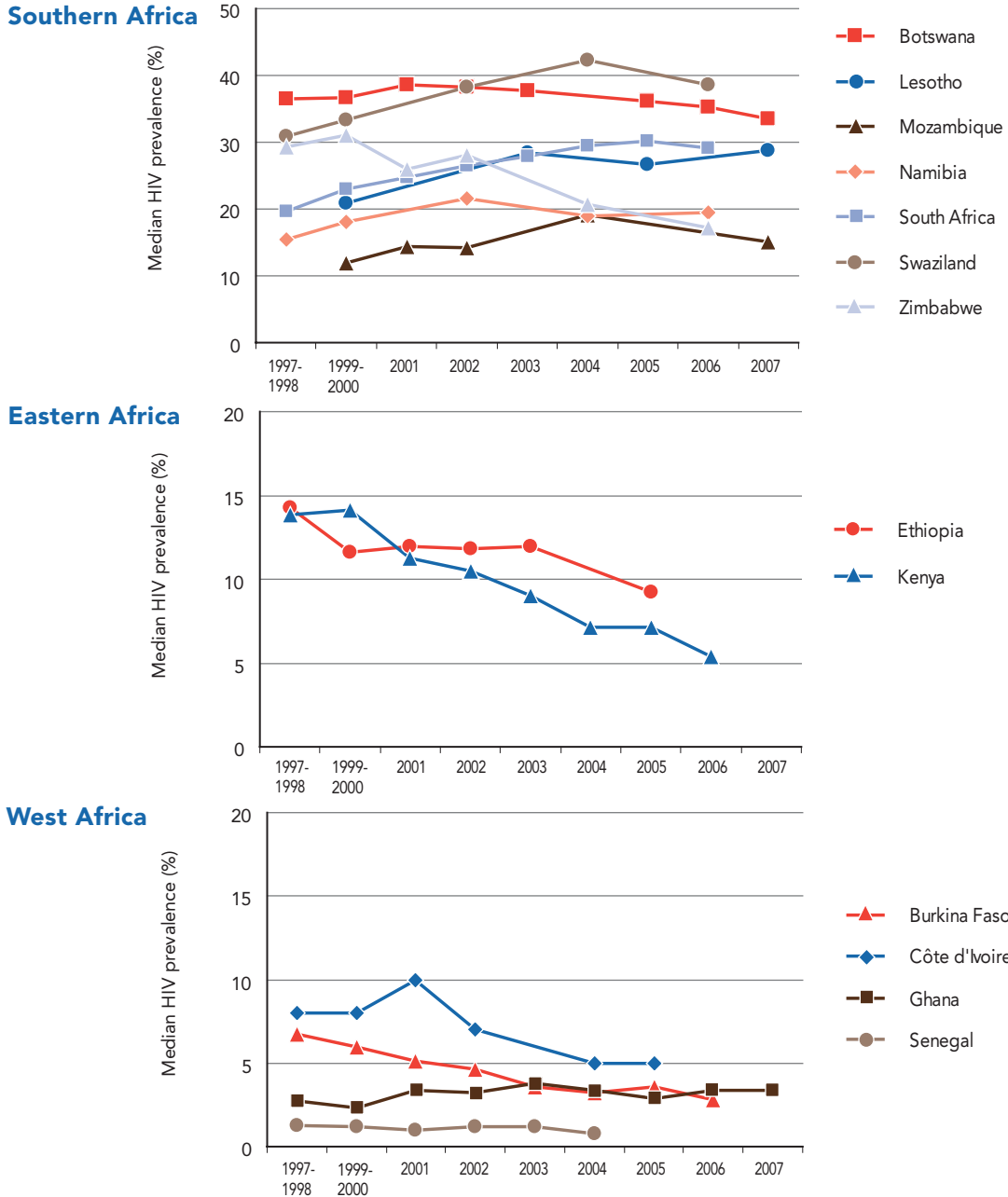
Statistical Office [Swaziland] & Macro International Inc., 2007).

In Lesotho and parts of Mozambique, HIV prevalence among pregnant women is increasing. In some of the provinces in the central and southern zones of the country, adult HIV prevalence has reached or exceeded 20%, while infections continue to increase among young people (ages 15–24) (Conselho Nacional de Combate ao HIV/SIDA, 2006).

HIV prevalences in the comparatively smaller epidemics in East Africa have either reached a plateau or are receding. After dropping dramatically in the 1990s (Asamoah-Odei, Garcia-Celleja & Boerma, 2004; Kirungi et al., 2006), adult national HIV prevalence in Uganda has stabilized at 5.4% [5.0%–6.1%]. However, there are signs of a possible resurgence in sexual risk-taking that could cause the epidemic to grow again. For example, the proportion of adult men and women who say they had sex with a

<sup>9</sup> All estimates of the total number of people living with HIV in a given country are for 2007.

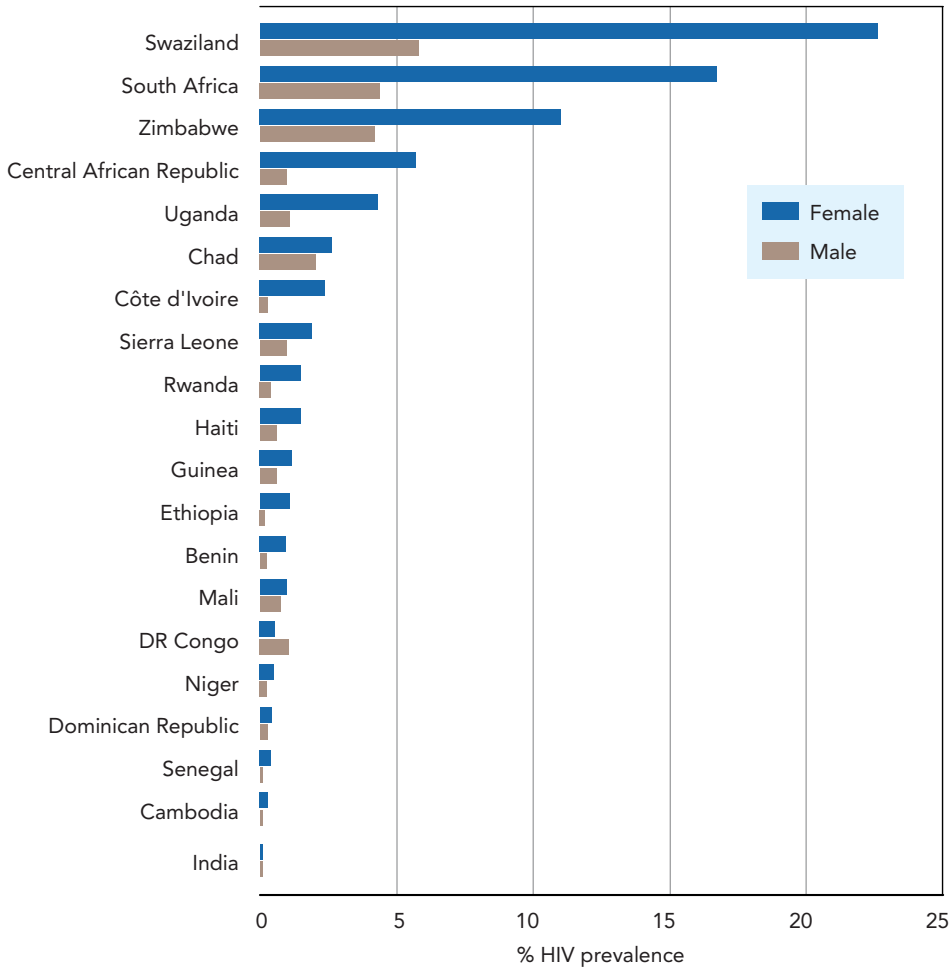
**FIGURE 2.9** HIV prevalence (%) among pregnant women attending antenatal clinics in sub-Saharan Africa, 1997–2007



Note: Analysis restricted to consistent surveillance sites for all countries except South Africa (by province) and Swaziland (by region).  
 Source: National surveillance reports and UNAIDS/WHO/UNICEF, Epidemiological Fact Sheets on HIV and AIDS. July 2008.

**FIGURE 2.10**

HIV prevalence (%) among 15–24 years old, by sex, selected countries, 2005–2007



Source: Demographic and Health Surveys and other national population-based surveys with HIV testing.

person who was not a spouse and did not live with the respondent has grown since 1995 (from 12% to 16% for women and 29% to 36% for men) (Kirungi et al., 2006; Ministry of Health [Uganda] & ORC Macro, 2006; Uganda Bureau of Statistics & Macro International Inc, 2007).

Most of the comparatively smaller HIV epidemics in West Africa are stable or are declining—as is the case for Burkina Faso, Côte d'Ivoire, and Mali. In Côte d'Ivoire, HIV prevalence among pregnant women in urban areas fell from 10% in 2001 to 6.9% in 2005

(Ministère de la Santé et de l'Hygiène Publique de la Côte d'Ivoire & CDC/RETRO-CI/MEASURE Evaluation, 2007). The largest epidemic in West Africa—in Nigeria, the continent's most populous country—appears to have stabilized at 3.1% [2.3%–3.8%], according to HIV infection trends among women attending antenatal clinics (Federal Ministry of Health [Nigeria], 2006).

### Main modes of HIV transmission

Heterosexual intercourse remains the epidemic's driving force in sub-Saharan Africa. The high rate of sexual transmission has also given rise to the world's largest population of children living with HIV. However, recent epidemiological evidence has revealed the region's epidemic to be more diverse than previously thought.

#### *Heterosexual intercourse related to serodiscordant couples*

According to Demographic and Health Surveys in five African countries (Burkina Faso, Cameroon, Ghana, Kenya, and the United Republic of Tanzania), two thirds of HIV-infected couples were serodiscordant, that is only one partner was infected. Condom use was found to be rare: in Burkina Faso, for example, almost 90% of the surveyed cohabiting couples said they did not use a condom the last time they had sex (de Walque, 2007). A separate, community-based study in Uganda has shown that, among serodiscordant heterosexual couples, the uninfected partner has an estimated 8% annual chance of contracting HIV (Wawer et al., 2005). Strikingly, in about 30%–40% of the serodiscordant couples surveyed, the infected partner was female. Indeed, it appears that more than half of the surveyed HIV-infected women who were married or cohabiting had been infected by someone other than their current partner (de Walque, 2007).

#### *Sex work*

Sex work is an important factor in many of West Africa's HIV epidemics. More than one third (35%) of female sex workers surveyed in 2006 in Mali were living with HIV (Ministère de la Santé du Mali, 2006), and infection levels exceeding 20% have been documented among sex workers in Senegal (Gomes do Espirito Santo & Etheredge, 2005) and Burkina Faso (Kintin et al., 2004). Sex work plays an important, but less central, role in HIV transmission in southern Africa, where exceptionally high background prevalence results in substantial HIV transmission during sexual intercourse unrelated to sex work.

#### *Injecting drug use*

Injecting drug use is a factor to some extent in several of the HIV epidemics in East and southern Africa, including Mauritius, where the use of contaminated injecting equipment is the main cause of HIV infection (Sulliman, Ameerberg & Dhannoo, 2004). In various studies, about half of the injecting drug users tested in the Kenyan cities of Mombasa (50%) (Ndeti, 2004) and Nairobi (53%) were HIV-positive (Odek-Ogunde, 2004).

#### *Sex between men*

Several recent studies suggest that unprotected anal sex between men is probably a more important factor in the epidemics in sub-Saharan Africa than is commonly thought. In Zambia, one in three (33%) surveyed men who have sex with men tested HIV-positive (Zulu, Bulawo & Zulu, 2006). In the Kenyan port city of Mombasa, 43% of men who said they had sex only with other men were found to be living with HIV (Sanders et al., 2007). HIV prevalence of 22% was found among the 463 men who have sex with men who participated in a study in Dakar, Senegal (Wade et al., 2005).

## The role of concurrent partnerships in HIV epidemics

The concept of concurrent partners has received increasing attention in the scientific literature and in the media. It has been argued that concurrent partnerships—in conjunction with high viral load during acute HIV infection and the low level of male circumcision—have contributed to the rapid spread and the high prevalence levels of HIV in southern Africa (Halperin & Epstein, 2007). Few epidemiological and mathematical modelling studies have investigated the prevalence of concurrency and its effect on the transmission of HIV and other sexually transmitted infections. Early modelling work concluded that, for the same number of partners per person, sexual partner networks that include concurrent partnerships lead to larger HIV epidemics than do networks without concurrent partnerships (Morris & Kretzschmar, 1997).

While researchers and prevention programme experts agree that having multiple sexual partners is an important risk factor in the transmission of HIV (Malamba et al., 1994; Wawer et al., 1994; McFarland, Mvere & Katzenstein, 1997; Chen et al., 2007; Mishra et al., 2007), the comparative impact of concurrent multiple relationships as opposed to serial multiple relationships in the spread of HIV is less clear. For example, a study in five cities in sub-Saharan Africa found no association between concurrency and HIV prevalence level (Lagarde et al., 2001), and a small study in Malawi also found no association between the density of sexual networks and HIV prevalence (Helleringer & Kohler, 2007). Multiple concurrent partnerships are often linked to mobility (including labour-related mobility), in that people may have different partners at their different residences; also, those staying behind may themselves have other partners (Lurie et al., 2003; Coffee, Lurie & Garnett, 2007).

Most authors define concurrency as “sexual relationships that overlap in time” (Garnett & Johnson, 1997; Lagarde et al., 2001; Adimora et al., 2003; Adimora et al., 2004; Carael et al., 2004; Helleringer & Kohler, 2007). However, others have considered multiple partnerships in a short time period to be a proxy measure of concurrency (Halperin & Epstein, 2007). Important issues for the epidemiological assessment of concurrent partnerships include the length of overlap of sexual relationships, how the number of partners is categorized (more than one, more than five, etc.), and the length of the period during which concurrency is assessed (the last month, last six months, last year, etc.). Also important for measurement in surveys are a host of behavioural and social factors ranging from local terminology to factors influencing recall and reporting bias for different types of sexual contacts.

Understanding sexual networks is crucial to understanding the HIV epidemic. Considerable work is needed to refine methods for measuring and comparing sexual norms, behaviours and networks in diverse cultural contexts and risk settings worldwide. Standard definitions and further collection and analysis of primary behavioural, network and context data are needed to understand and quantify the relationship between concurrency and the spread of HIV.





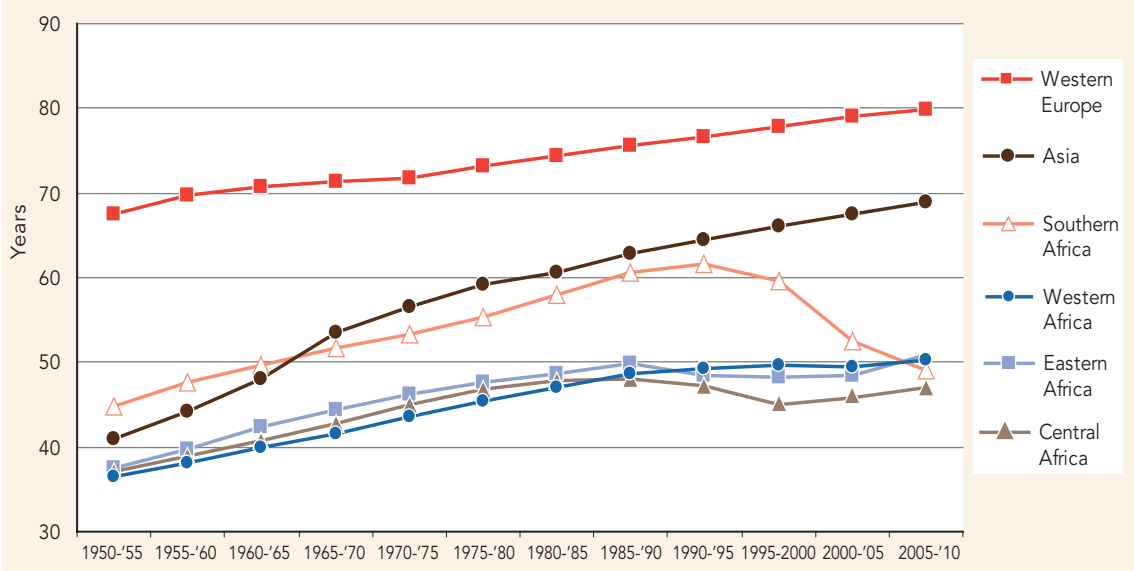
Prevention programmes should aim to reduce the occurrence of multiple sexual partnerships, whether or not they are concurrent, and to communicate the likely additional risk of concurrent sexual relationships—including those that are long term and socially accepted (see Chapter 4 pp. 117 and 119-121). In the countries in southern Africa where HIV prevalence is extremely high, the probability that one’s sexual partner is infected with HIV is around one in four to six, making it extremely risky to have unprotected sex with anyone whose HIV status is unknown. More effective interventions are needed to overcome the denial and misunderstandings of HIV risk in concurrent and age-disparate relationships that are impeding prevention in the region.

**The most significant demographic impact of HIV occurs in sub-Saharan Africa**

Ideally, the assessment of the epidemic’s demographic impact would be based on data from death certificates. However, such vital registration is poor in many of the countries most affected by the global AIDS epidemic. Even where death notification systems function relatively well (e.g. in South Africa), deaths due to AIDS are seldom documented as such.



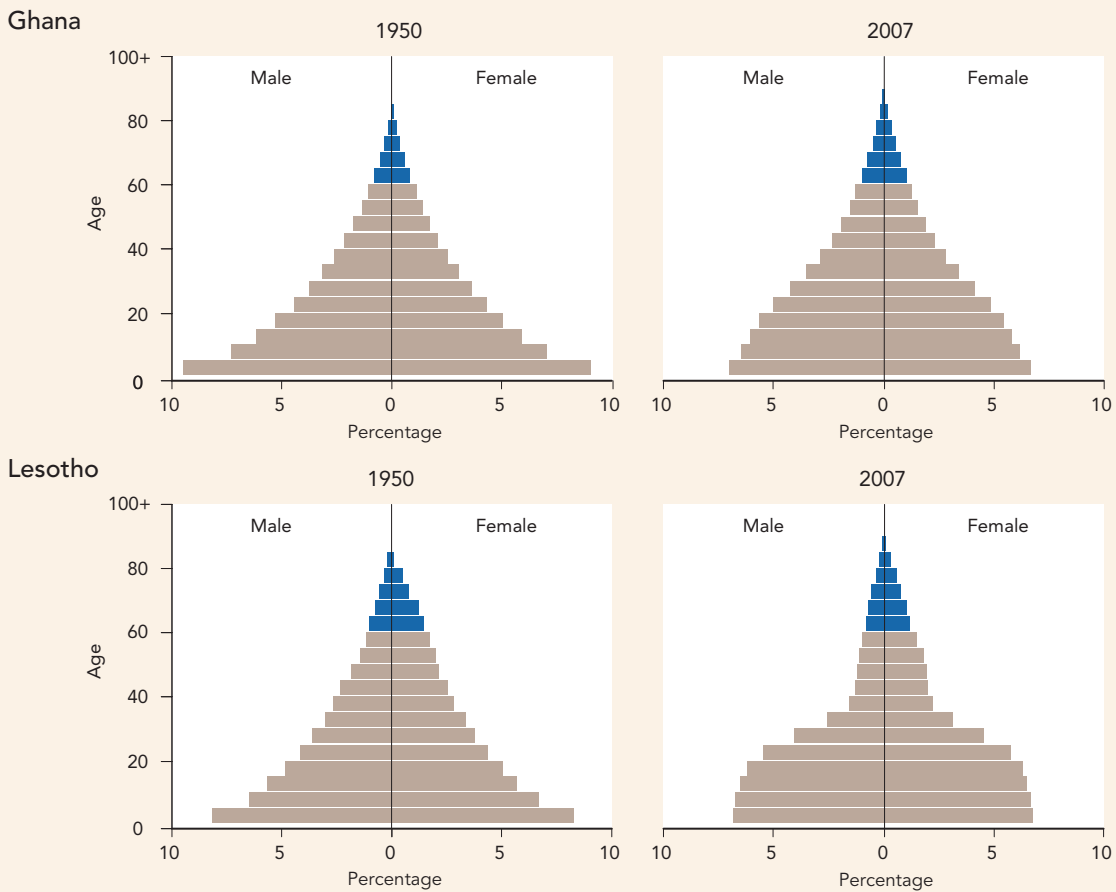
**FIGURE 2.11** Life expectancy at birth, selected regions, 1950–1955 to 2005–2010



Source: Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, World Population Prospects: The 2006 Revision, <http://esa.un.org/unpp>

In countries with high HIV prevalence, life expectancy at birth has fallen, sometimes dramatically. In southern Africa, average life expectancy at birth is estimated to have declined to levels last seen in the 1950s; it is now below 50 years for the subregion as a whole, as Figure 2.11 shows, and below 40 years in Zimbabwe (WHO, 2006). Steady gains in life expectancy experienced in East Africa since the early 1950s stalled in the late 1980s, although falling HIV prevalences in some East African countries are expected to lead to an increase in life expectancy in that subregion. By contrast, the comparatively smaller HIV epidemics in Western Europe and Asia have scarcely affected life expectancy trends in those regions.

**FIGURE 2.12** Changes in population structure: Ghana and Lesotho



Source: Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, World Population Prospects: The 2006 Revision, <http://esa.un.org/unpp>



In southern Africa, the combined effects of premature death and reduced fertility among HIV-positive women have lowered population growth rates and dramatically reshaped the population structure. In a high-prevalence country such as Lesotho, the groups most heavily affected by HIV are infants and young children, and the 30–50 age group. The latter normally constitute the core of countries' economically active and child-raising populations. By contrast, the population pyramid of Ghana, where HIV infection levels are much lower, reflects a more conventional structure in a low-income country (Figure 2.12).

In South Africa, total deaths (from all causes) increased by 87% between 1997 and 2005 (Statistics South Africa, 2005; Statistics South Africa, 2006). During this period, death rates more than tripled for women aged 20–39, and more than doubled for males aged 30–44, with at least 40% of deaths believed to be attributable to HIV (Dorrington et al., 2001; Bradshaw et al., 2004; Actuarial Society of South Africa, 2005; Medical Research Council, 2005; Anderson & Phillips, 2006). The rate of population growth in the country fell from 1.25% in 2001–2002 to slightly more than 0.97% in 2006–2007 (Statistics South Africa, 2007).

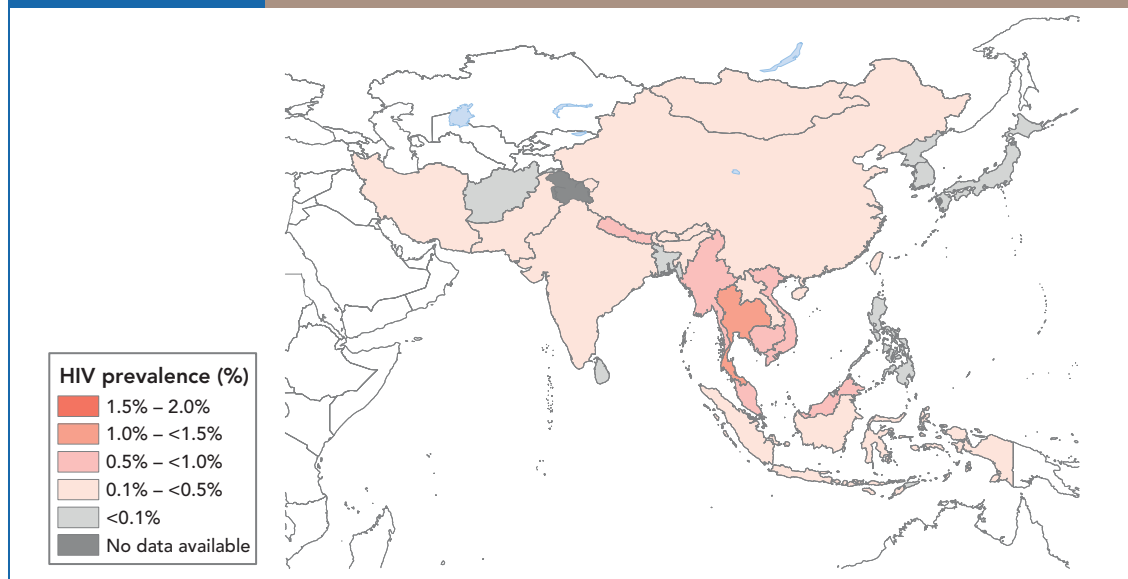
In eastern Zimbabwe, the demographic impact has been more acute than was anticipated in the early 1990s. Total fertility is now 8% lower than would be expected without an HIV epidemic, due to the effects of HIV infection on fertility, early mortality, and behaviour. In the worst affected areas (towns with HIV prevalence of 33% in 1998–2005), the population growth rate is now considerably lower than it would have been without an epidemic (1% instead of 2.9%) (Gregson et al., 2007). In northern Namibia, mortality rates tripled from 1991 to 2003, according to parish registers (Notkola, Timaeus & Siiskonen, 2004).

Meanwhile, the estimated number of maternal, paternal, and double orphans due to AIDS in Malawi, South Africa and the United Republic of Tanzania rose from 1.2 million in 2001 to 2.9 million in 2007. However, a recent study found no evidence of an increase in the prevalence of child-headed households in these three countries (Hosegood et al., 2007), which suggests that all but a small minority of orphaned children are being absorbed into kinship, community, and other support networks.

Outside sub-Saharan Africa, the demographic impact tends to be less severe because HIV prevalence is comparatively low. Nevertheless, in the Caribbean, AIDS is one of the leading causes of death in adults aged 15–44 (Caribbean Epidemiology Centre, PAHO & WHO, 2004).

FIGURE 2.13

HIV prevalence (%) in adults (15–49) in Asia, 2007



## Asia

In Asia, an estimated 5.0 million [4.1 million–6.2 million] people were living with HIV in 2007, including the 380 000 [200 000–650 000] people who were newly infected that year. Approximately 380 000 [270 000–490 000] died from AIDS-related illnesses. National HIV infection levels are highest in South-East Asia (Figure 2.13), where there are disparate epidemic trends.

### Recent epidemiological trends

The epidemics in Cambodia, Myanmar and Thailand all show declines in HIV prevalence, with national HIV prevalence in Cambodia falling from 2% in 1998 to an estimated 0.9% in 2006 (National Center for HIV/AIDS, Dermatology and STIs, 2007). However, epidemics in Indonesia (especially in its Papua province), Pakistan, and Viet Nam are growing rapidly. In Viet Nam, the estimated number of people living with HIV more than doubled between 2000 and 2005 (Ministry of Health

[Viet Nam], 2005). New HIV infections are also increasing steadily, although at a much slower pace, in populous countries such as Bangladesh and China.

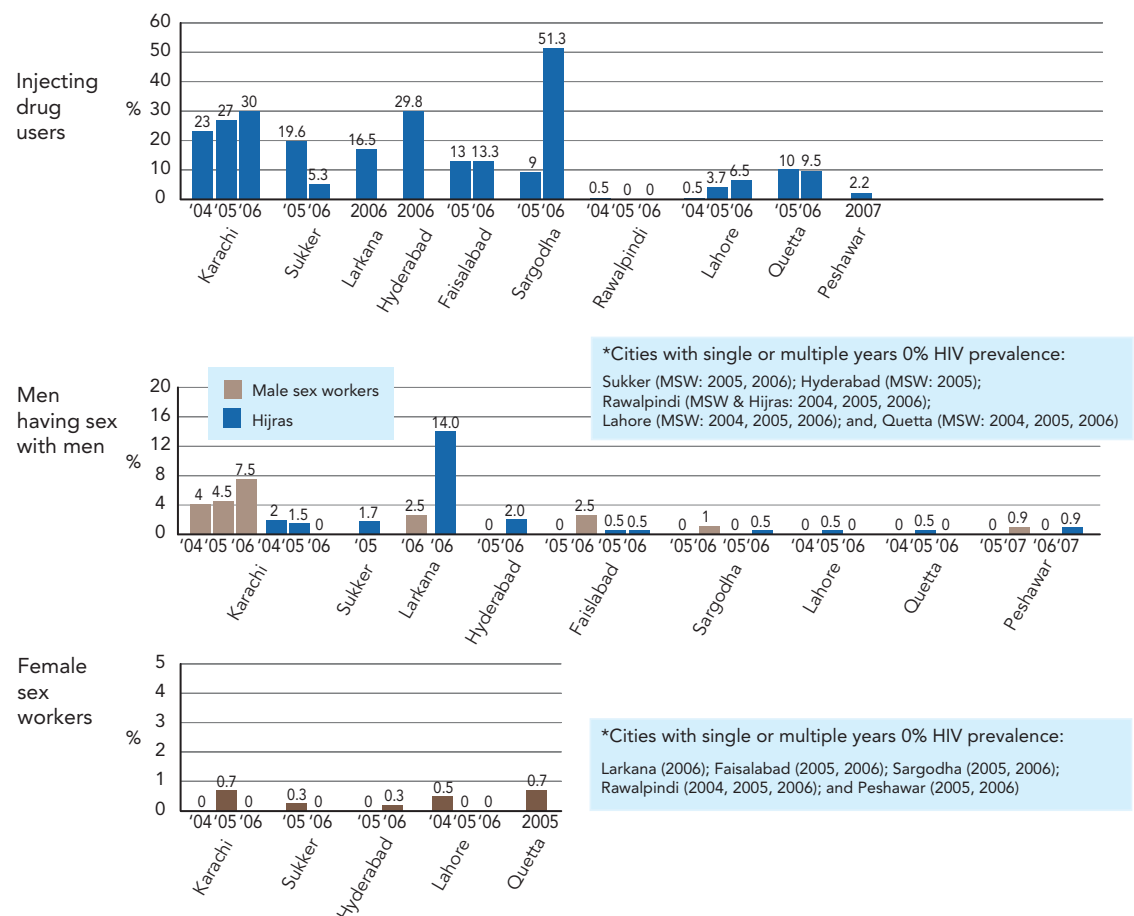
### Main modes of HIV transmission

The several modes of HIV transmission make Asia's epidemic one of the world's most diverse.

#### *Injecting drug use*

Injecting drug use is a major risk factor in the epidemics of several Asian countries. Slightly fewer than half the people living with HIV in China in 2006 are believed to have been infected through use of contaminated injecting equipment (Lu et al., 2006; Ministry of Health [China], 2006). High infection levels have been detected among injecting drug users in the north-eastern part of India and in several large cities outside the north-east, including in Tamil Nadu, where 24% of drug users were believed to

**FIGURE 2.14** HIV prevalence among injecting drug users, men having sex with men, and female sex workers in Pakistan, 2004–2007\*



Source: Ministry of Health Pakistan. HIV Second Generation Surveillance in Pakistan, National Report Rounds I and II.

be infected in 2006 (National Institute of Health and Family Welfare & National AIDS Control Organisation, 2007). Use of contaminated injecting equipment (as well as unprotected sex between injecting drug users and their regular partners) is also the driving force of the epidemic in Viet Nam (Tuang et al., 2007), and in Malaysia, where more than two thirds of HIV infections to date have been among injecting drug users (Reid, Kamarulzaman & Sran, 2007).

*Overlap of sex work and injecting drug use*

An increasing number of women are injecting drugs in China, and substantial proportions of them (about 56% in some cities) also sell sex (Choi, Cheung & Chen, 2006; Liu et al., 2006). Many male injecting drug users also buy sex, and often do not use condoms (Hesketh et al., 2006). For example, in a 2005–2006 survey in Viet Nam, between 20% and 40% of injecting drug users (depending on the area surveyed) said that

they had bought sex in the previous 12 months, and up to 60% said that they regularly had sex with a steady partner. Between 16% and 36% said that they consistently used condoms with regular partners (Ministry of Health [Viet Nam], 2006). The overlap of injecting drug use and sex work is also a potentially worrisome phenomenon in India and Pakistan (Chandrasekaran et al., 2006; Ministry of Health [Pakistan], 2006). An example of the complexity of transmission dynamics is presented for Pakistan in Figure 2.14.

Figure 2.15 projects the long-term effects of the intersection between injecting drug use and sex work in Jakarta, Indonesia—a metropolis in which an estimated 40 000 people inject drugs (Commission on AIDS in Asia, 2008). Although the epidemic was initially powered by HIV transmission among injecting drug users, about 15 years later, injecting drug users no longer comprise the majority of people infected with HIV. Indonesia’s fast-growing epidemic is spreading quickly into sex-work networks (Statistics Indonesia & Ministry of Health

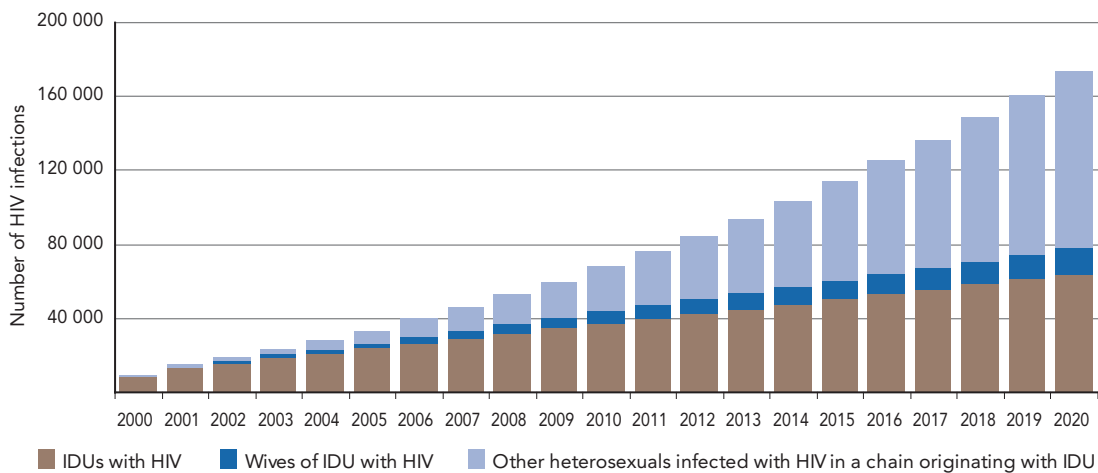
[Indonesia], 2006; Ministry of Health [Indonesia] & Statistics Indonesia, 2007).

The most recent HIV outbreak has been in Afghanistan, where narcotics are now also being injected (opium traditionally was either inhaled or ingested orally) (UNODC, 2005). In Kabul, 3% of injecting drug users surveyed were HIV-positive, although this number may well rise because half of the survey participants said they had shared needles or syringes (Todd et al., 2007).

**Sex work**

Unprotected sex (commercial and otherwise) is the most important risk factor for the spread of HIV in several parts of Asia. Sex-trafficked women and girls face especially high risks of HIV infection. HIV prevalence of 38% has been found among sex-trafficked females who have been repatriated to Nepal, while up to a half of the women and girls trafficked to Mumbai, India, who have been tested were HIV-positive (Silverman et al., 2006; Silverman et al., 2007). In India’s Karnataka State, HIV prevalence of

**FIGURE 2.15** Projected total number of HIV infections in various population groups, 2000–2020, in Jakarta, Indonesia



Source: Asian Epidemic Model projections using Jakarta data.

16% has been found among home-based sex workers, 26% among their street-based peers, and 47% among those working in brothels (Ramesh et al., 2006).

Some countries with epidemics driven by sex work have experienced declines in infections, due in part to an increase in the use of condoms during paid sex. For example, Cambodia's decline in HIV prevalence occurred at the same time that consistent condom use during commercial sex rose from 53% in 1997 to 96% in 2003 in Battambang, Kampong Cham, Phnom Penh, Siem Reap, and Sihanoukville (Gorbach et al., 2006). HIV prevalence among sex workers dropped significantly—from 46% in 1998 to 21% in 2003—among brothel-based sex workers, and from 44% to 8% over the same period among sex workers older than 20 (Ministry of Health [Cambodia], 2006). Similar trends have been observed in Thailand and Tamil Nadu (in southern India), over the past decade.

The serious epidemic under way in Indonesia's Papua province is somewhat anomalous in Asia, in that HIV transmission appears to be occurring mainly due to both unprotected sex with a regular partner and paid sex. In a province-wide population-based survey in 2006, adult HIV prevalence was 2.4% (2.9% among men and 1.9% among women). Given that only 14% of men who buy sex say that they use condoms with sex workers (Ministry of Health [Indonesia] & Statistics Indonesia, 2007), it is not surprising that high HIV infection levels (14%–16%) have been found among sex workers in parts of the province (National AIDS Commission [Indonesia], 2006).

#### *Heterosexual intercourse*

Although paid sex has become safer in Cambodia, the spouses and regular partners

of people infected during commercial sex now account for a growing percentage of new infections (National Centre for HIV/AIDS, Dermatology and STIs, 2004). Similarly, Thailand's epidemic has diminished but has also become more heterogeneous (Over et al., 2007), and HIV is increasingly affecting people traditionally considered to be at lower risk of infection. About 43% of new infections in 2005 were among women, most of whom were infected by husbands or partners who had had unprotected sex or had used contaminated injecting equipment (WHO, 2007). In India, a significant proportion of women with HIV have probably been infected by regular partners who paid for sex (Lancet, 2006).

#### *Sex between men*

As in most other regions in the world, unprotected anal sex between men is a potentially significant but under-researched factor in the HIV epidemics in Asia. In Bangkok, HIV prevalence among men who have sex with men rose from 17% in 2003 to 28% in 2005 (van Griensven et al., 2006), and it is estimated that as many as one in five (21%) new HIV infections in Thailand in 2005 were attributable to unprotected sex between men (Gouws et al., 2006). In China's younger epidemic, it has been estimated that up to 7% of HIV infections might be attributable to unprotected sex between men (Lu et al., 2006).

Male sex workers face a particularly high risk of HIV infection. In Viet Nam, one in three (33%) male sex workers recruited from more than 70 sites in Ho Chi Minh City tested HIV-positive (Nguyen et al., in press). Studies earlier this decade documented high HIV infection levels among transgender sex workers in Jakarta, Indonesia, and Phnom Penh, Cambodia, in 2003 (Girault et al., 2004; Pisani et al., 2004).

**FIGURE 2.16** HIV prevalence (%) in adults (15–49) in Eastern Europe and Central Asia, 2007

## Eastern Europe and Central Asia

The estimated number of people living with HIV in Eastern Europe and Central Asia rose to 1.5 million [1.1 million–1.9 million] in 2007; almost 90% of those infected live in either the Russian Federation (69%) or Ukraine (29%). It is estimated that 110 000 [67 000–180 000] people in this region became infected with HIV in 2007, while some 58 000 [41 000–88 000] died of AIDS.

### Recent epidemiological trends

The HIV epidemic in the Russian Federation (already the largest in this region) continues to grow, although apparently at a slower pace than in Ukraine, where annual new HIV diagnoses have more than doubled since 2001 (UNAIDS Reference Group on Estimates, Modelling and Projections, 2006; EuroHIV, 2007a). The annual numbers of newly reported HIV diagnoses are also rising in Azerbaijan, Georgia, Kazakhstan, Kyrgyzstan, the Republic of Moldova, Tajikistan, and Uzbekistan (which now has the largest epidemic in Central Asia).

### Main modes of HIV transmission

Each of the HIV epidemics in this region is concentrated largely among injecting drug users, sex workers, and their various sexual partners.

#### *Injecting drug use*

Of the new HIV cases reported in this region in 2006 for which information is available on the mode of transmission, about 62% were attributed to injecting drug use.<sup>10</sup> In the Russian Federation, HIV prevalence among injecting drug users ranges from 3% in Volgograd to more than 70% in Biysk (Pasteur Scientific and Research Institute of Epidemiology, 2005). Prevalence is also high among injecting drug users in Ukraine; among surveyed injecting drug users in national diagnostic studies prevalence increased from 11% in 2001 to 17% in 2006 (EuroHIV, 2007a); also, local HIV prevalence as high as 63% has been found (Ministry of Health [Ukraine], 2007). High infection levels have been detected among injecting drug users in Tashkent, Uzbekistan (30%, 2003–2004) (Sanchez et al.,

<sup>10</sup> Officially documented HIV cases represent only those persons who have been in direct contact with a country's HIV reporting system. The actual number of people infected with HIV is considerable higher.



2006; EuroHIV, 2007a); in Zlobin, Belarus (52%) (EuroHIV, 2007a); and in Kazakhstan (Ministry of Health [Kazakhstan] et al., 2005).<sup>11</sup>

### *The overlap of sex work and injecting drug use*

The overlap of sex work and injecting drug use features prominently in the region's epidemics. For example, 39% of female sex workers in the Samara oblast, Russian Federation (Population Services International, 2007), 37% in a St Petersburg study (Benotsch et al., 2004), and up to 30% of sex workers participating in other studies (Rhodes et al., 2004) said that they had injected drugs. Nowhere in this region have HIV epidemics reached a stage where they are likely to evolve independently of HIV transmission among injecting drug users and sex workers.

### *Heterosexual intercourse*

As the epidemics in this region evolve, the proportion of women infected with HIV is growing. About 40% of newly registered HIV cases in Eastern Europe and Central Asia in 2006 were among women (EuroHIV, 2007a). Exceptionally high HIV prevalence was reported among pregnant women in several regions of central and eastern Ukraine. Three large, densely populated regions reported HIV prevalence among pregnant women exceeding 1% including Odess oblast, Kiev oblast and Mykolaev oblast (Ministry of Health [Ukraine], 2008). Most of these women were probably infected during sex with a partner who had been infected through use of contaminated drug injecting equipment (Scherbinska, 2006; EuroHIV, 2007a). In the region overall, it is estimated that some 35% of HIV-positive women were infected through use of contaminated injecting drug equipment, and about 50% acquired the virus during unprotected sex with drug-injecting partners (EuroHIV, 2006a).

### *Sex between men*

In 2006, less than 1% of newly registered HIV cases (where the mode of transmission was

known) were attributed to unprotected sex between men (EuroHIV, 2007a); this is probably an underestimate of the role of this mode of HIV transmission. In the Russian Federation, HIV prevalence found in this population group has varied from 0.9% in Moscow (Smolskaya et al., 2004; Smolskaya, 2006) to 9% in Nizhni Novgorod in 2006 (Ladnaya, 2007). Of men who have sex with men who participated in a study in Tashkent, Uzbekistan, 11% tested HIV-positive in 2005 (Ministry of Health [Uzbekistan], 2007), as did 5% of their peers in a study in Georgia (EuroHIV, 2006b).

## Caribbean

An estimated 230 000 [210 000–270 000] people were living with HIV in the Caribbean in 2007 (about three quarters of them in the Dominican Republic and Haiti), while an estimated 20 000 [16 000–25 000] people were newly infected with HIV in this region, and some 14 000 [11 000–16 000] people died of AIDS.

### Recent epidemiological trends

HIV surveillance systems are still inadequate in several Caribbean countries, but available information indicates that most of the epidemics in the region appear to have stabilized, while a few have declined in urban areas. The latter trend is especially evident in the Dominican Republic and Haiti.

### Main modes of HIV transmission

The main mode of HIV transmission in the Caribbean is unprotected heterosexual intercourse, paid or otherwise. However, sex between men, although generally denied by society, is also a significant factor in several national epidemics.

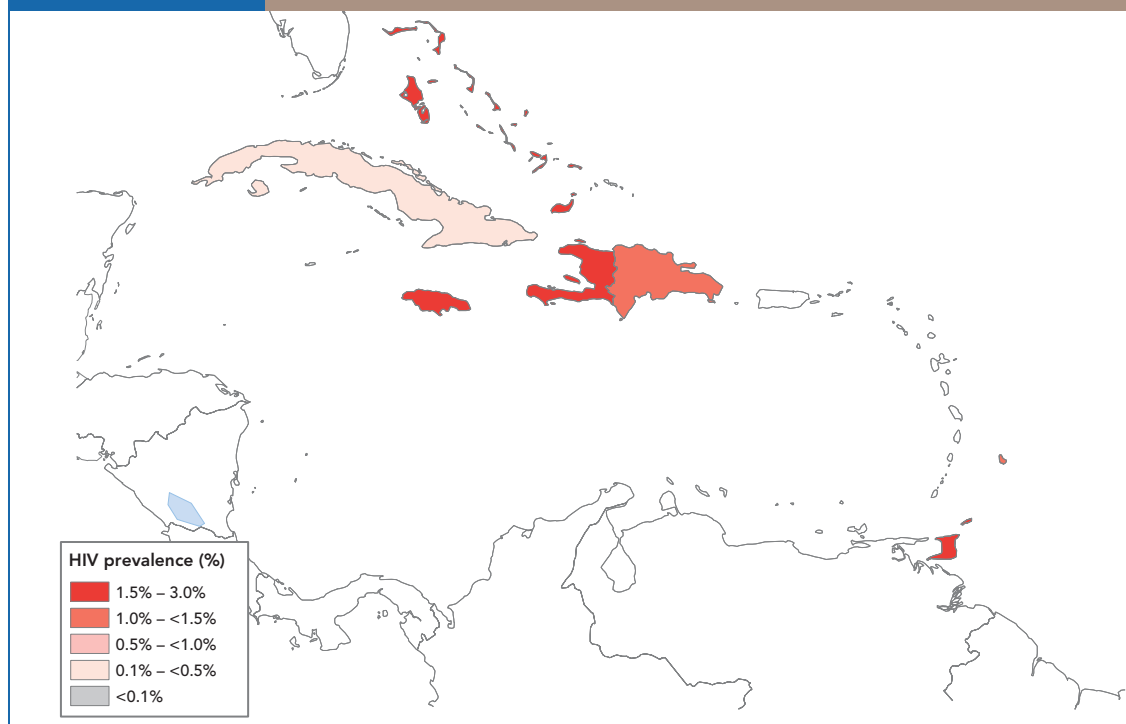
### *Heterosexual intercourse*

In Haiti, which has the biggest epidemic in the Caribbean, HIV prevalence among pregnant

<sup>11</sup> Not all countries in this region apply the same definition of "injecting drug users" or of "men who have sex with men". As a result, prevalence data such as these are not necessarily comparable between different countries.

FIGURE 2.17

HIV prevalence (%) in adults (15–49) in the Caribbean, 2007



women attending antenatal clinics declined from 5.9% in 1996 to 3.1% in 2004 (Gaillard et al., 2006), and has subsequently remained stable (Ministère de la Santé Publique et de la Population, 2007). Although positive behaviour changes appear to be at least partly responsible for the decline (Cayemittes et al., 2006; Gaillard et al., 2006; Hallett et al., 2006), significant levels of high-risk behaviour have been documented in Haiti's rural areas and among young people (Cayemittes et al., 2006; Centre d'Evaluation et de Recherche Appliquée et Family Health International, 2006; Gaillard et al., 2006).

#### Sex work

As HIV prevalence has declined in the Dominican Republic, surveys have indicated that more sex workers are protecting themselves (and their clients) against HIV infection, especially in the main urban and tourist centres (Kerrigan et al., 2006). Among female sex workers, HIV

prevalence of 9% has been documented in Jamaica and 31% in Guyana (Secretaría de Estado de Salud Pública y Asistencia Social de Republica Dominicana, 2005; Allen et al., 2006; Gebre et al., 2006; Gupta et al., 2006; Pan American Health Organization, 2007).

#### Sex between men

As many as one in eight (12%) reported HIV infections in the region occurred through unprotected sex between men (Caribbean Commission on Health and Development, 2005; Inciardi et al., 2005). Unprotected sex between men is the main mode of HIV transmission in Cuba, where men account for more than 80% of all reported HIV cases (Programa Nacional de Prevención y control de las ITS/VIH/Sida, 2006), and in Dominica, where almost three quarters (71% of the 319 HIV infections reported to date) have been in

men (Ministry of Health and Social Security [Dominica], 2007). Studies have found HIV prevalence of 20% among men who have sex with men in Trinidad and Tobago (Lee et al., 2006), 21% in Guyana's Region 4 (Ministry of Health [Guyana], 2005), and 11% in the Dominican Republic (Toro-Alfonso & Varas-Díaz, 2008).<sup>12</sup>

## Latin America

New HIV infections in 2007 totalled an estimated 140 000 [88 000–190 000], bringing to 1.7 million [1.5 million–2.1 million] the number of people living with HIV in this region. An estimated 63 000 [49 000–98 000] people died of AIDS last year.

### Recent epidemiological trends

The overall levels of HIV infections in Latin America have changed little in the past decade.

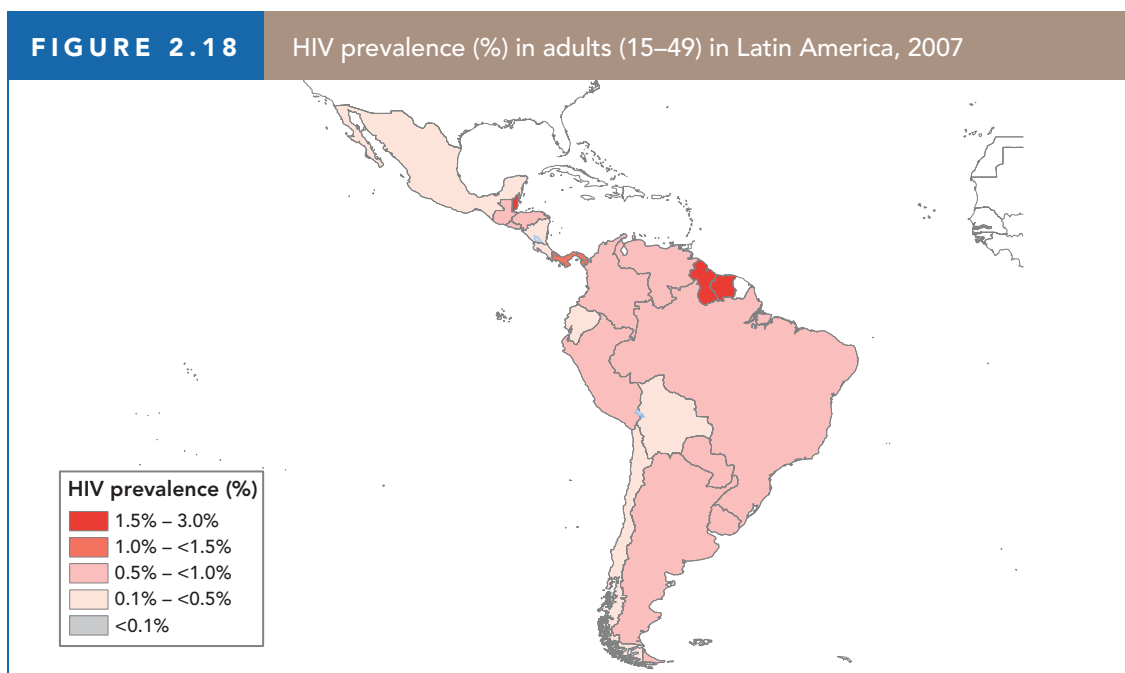
### Main modes of HIV transmission

HIV transmission in this region is occurring primarily among men who have sex with men, sex workers, and (to a lesser extent) injecting drug users.

#### Sex between men

High HIV prevalence has been documented among men who have sex with men in several countries:

- 18%–22% in Peru, in studies conducted between 1996 and 2002 (Ministerio de Salud de Peru, 2006; Sanchez et al., 2007);
- 14% in Buenos Aires, Argentina, in 2000–2001 (Pando et al., 2006);
- 22% in Montevideo, Uruguay (Montano et al., 2005);
- 15% in four Bolivian cities and in Quito, Ecuador (Montano et al., 2005); and
- 10%–25% in some cities in Colombia (Mejía et al., 2006; Ministerio de la Protección Social de Colombia & ONUSIDA Grupo Tematico, 2006).



<sup>12</sup> Because the level and nature of HIV risk behaviours of men who have sex with men sometimes differ from study to study, direct comparisons between HIV prevalence data such as these are not necessarily valid.



Research has uncovered hidden epidemics of HIV among men who have sex with men in several Central American countries, including Belize, Costa Rica, El Salvador, Guatemala, Mexico, Nicaragua, and Panama (Magis et al., 2006; Soto et al., 2007). More than half (57%) of the HIV diagnoses to date in Mexico have been attributed to unprotected sex between men (Bravo-Garcia, Magis-Rodriguez & Saavedra, 2006). Between one quarter and one third of men who have sex with men in those countries (except for Panama) also have sex with women—and between 30% and 40% of those men said that they had had unprotected sex with both men and women in the previous month (Soto et al., 2007).

### *Sex work*

Across South America, levels of HIV infection among female sex workers tend to be much lower than those among men who have sex with men (Bautista et al., 2006a). HIV prevalence among female sex workers has been found to be 10% in Honduras, 4% in Guatemala, and 3% in El Salvador (Soto et al., 2007). However, there is recent evidence of a steep decline in HIV prevalence among female sex workers in Honduras, where condom promotion efforts were stepped up in recent years. (Secretaría de Salud de

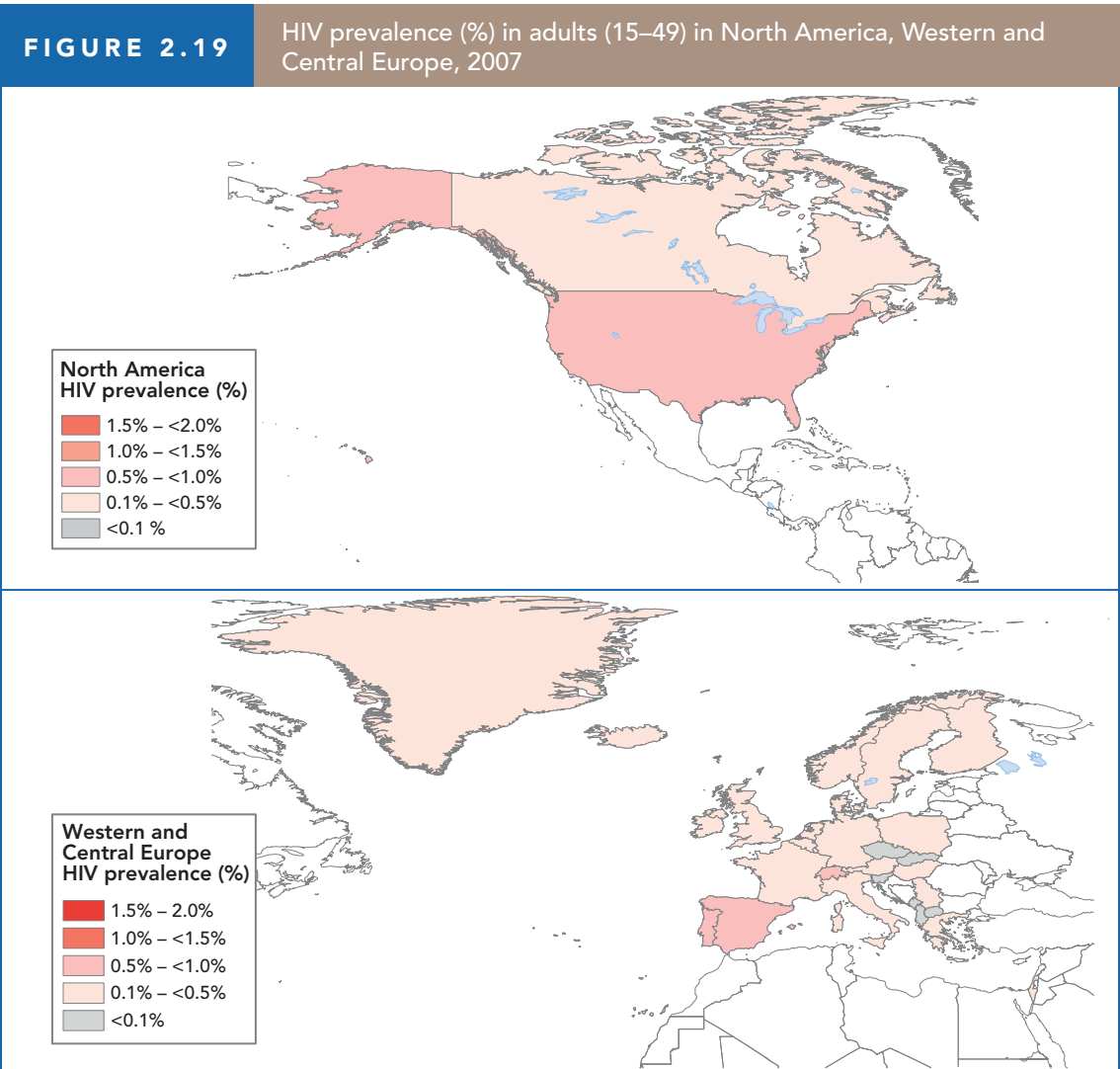
Honduras et al., 2007a; Secretaría de Salud de Honduras et al., 2007b).

### *Injecting drug use*

HIV transmission as a result of injecting drug use still features in several of South America's epidemics. Regionally, this mode of transmission appears to be accounting for a smaller number of new infections than was the case previously. In Argentina, injecting drug use accounted for only about 5% of new HIV infections in Buenos Aires between 2003 and 2005 (Cohen, 2006), and HIV infection levels in injecting drug users have declined in some Brazilian cities (Fonseca et al., 2006; Okie, 2006; Rossi et al., 2006). Notable HIV transmission has been occurring among injecting drug users in the capitals of Paraguay (12% HIV-positive in various surveys) and Uruguay (19% HIV-positive) (IDES et al., 2005; National AIDS Program [Paraguay], 2006).

### *Heterosexual intercourse*

Increasing numbers of women are becoming infected in several countries in the region, including Argentina, Brazil, Peru, and Uruguay (Ministerio de Salud de Peru, 2005; National AIDS Programme [Argentina], 2005; Cohen, 2006; Martínez et al., 2006; Dourado et



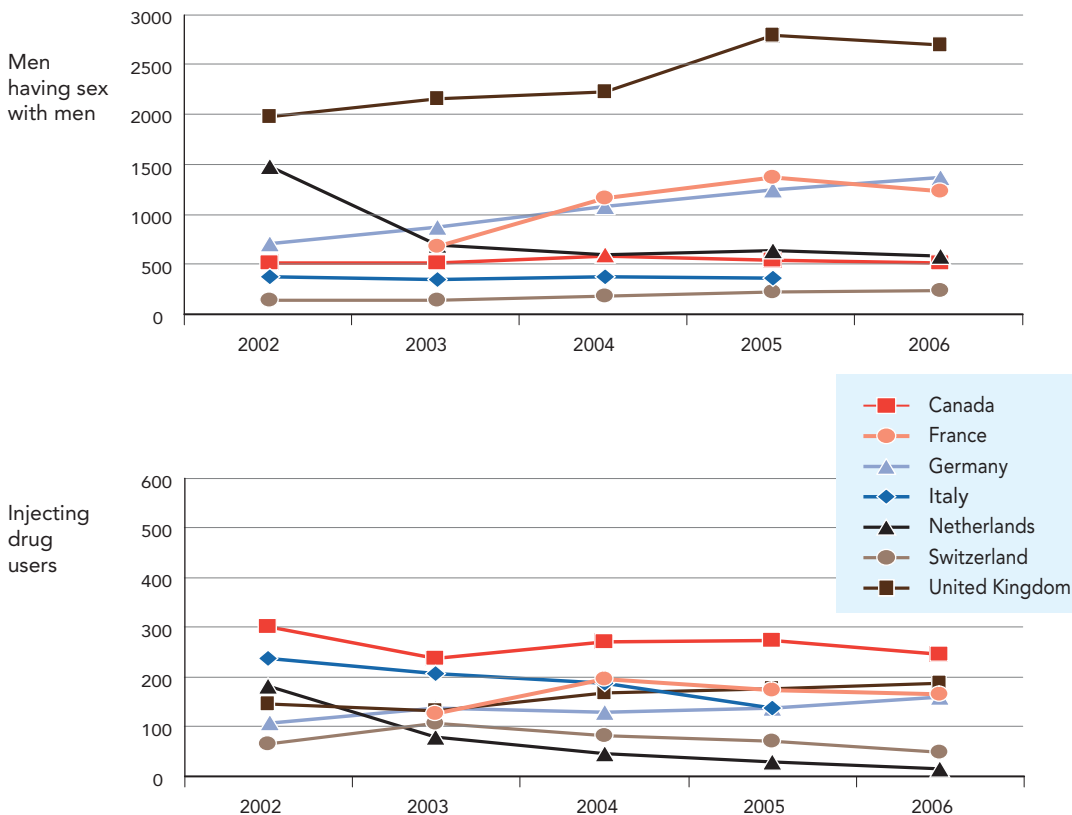
al., 2007). In Uruguay, for example, unprotected sex (mostly heterosexual) is believed to account for approximately two thirds of newly reported HIV cases (Montano et al., 2005). Most of the women are being infected by male sexual partners who acquired HIV during unprotected sex with another man or through use of contaminated drug injecting equipment (Ministerio de Salud de Peru, 2005; Cohen, 2006; Silva & Barone, 2006).

### North America, Western and Central Europe

The United States of America accounted for an estimated 1.2 million [690 000–1.9 million] of the 2.0 million [1.4 million–2.8 million] people living with HIV in North America, and in Western and Central Europe in 2007. Overall in those regions, 81 000 [30 000–170 000] people were newly infected with HIV in 2007. Comparatively few people—31 000 in a range of 16 000–67 000—died of AIDS last year.

**FIGURE 2.20**

HIV infections newly diagnosed in injecting drug users and men who have sex with men, by country, and year of report, 2002–2006



Sources: (1) Public Health Agency of Canada. HIV and AIDS in Canada. Selected Surveillance Tables to June 30, 2007. Surveillance and Risk Assessment Division, Centre for Infectious Disease Prevention and Control, Public Health Agency of Canada, 2007. (2) Epidemiologisches Bulletin (5. Oktober 2007/ Sonderausgabe B aktuelle daten und informationen zu infektionskrankheiten und public health). (3) The UK Collaborative Group for HIV and STI Surveillance. Testing Times. HIV and other Sexually Transmitted Infections in the United Kingdom: 2007. London: Health Protection Agency, Centre for Infections. November 2007. (4) EuroHIV. HIV/AIDS Surveillance in Europe. End-year report 2006. Saint-Maurice: Institut de veille sanitaire, 2007. No. 75. (5) EuroHIV. HIV/AIDS Surveillance in Europe. Mid-year report 2007. Saint-Maurice: Institut de Veille Sanitaire, 2007. No. 76.

**Recent epidemiological trends**

In North America, annual numbers of new HIV diagnoses have remained relatively stable over recent years, but access to life-prolonging anti-retroviral therapy has led to an increase in the estimated number of people living with HIV (Public Health Agency of Canada, 2006; US Centers for Disease Control and Prevention, 2007).<sup>13</sup> In Western Europe, new HIV diagnoses are increasing, as is the total number of people living with HIV (the latter also because of wide access to antiretroviral treatment).

**Main modes of HIV transmission**

These high-income countries have diverse epidemics, although their epidemiological profiles have diverged as the epidemic has evolved. In general, injecting drug use is accounting for a smaller share of new HIV infections than before.

*Sex between men*

Unprotected sex between men is still the main mode of HIV transmission in both

<sup>13</sup> This analysis is based mainly on reported HIV diagnoses. A significant limitation of using annual HIV diagnoses to monitor the HIV epidemic is that this yardstick does not represent the total incidence (because it may include infections that occurred several years earlier) and it only captures those people that have been tested for HIV. As a result, HIV trends based on reported HIV cases can be skewed by changes in the HIV testing intake or by changes in patterns of reporting. As far as possible, this analysis alerts readers to instances where such changes have occurred.

Canada and the United States—40% of new HIV diagnoses in Canada in 2006 and 53% in the USA in 2005 (Public Health Agency of Canada, 2007; US Centers for Disease Control and Prevention, 2007). Men who have sex with men continue to be the population group most at risk of acquiring HIV within most Western European countries. Indeed, the number of new HIV diagnoses attributed to unprotected sex between men has increased sharply in recent years in Western Europe, and appears to be associated with reported increases in higher-risk unprotected sex between men in several countries (Dodds et al., 2004; Balthasar, Jeannin & Dubois-Arber 2005; Moreau-Gruet, Dubois-Arber & Jeannin, 2006; Hamouda et al., 2007). In Germany, for example, the number of new HIV diagnoses among men who have sex with men rose by 96% (to 1370) between 2002 and 2006 (Robert Koch Institut, 2007).

#### *Heterosexual intercourse*

About one third (32%) of newly diagnosed HIV infections and AIDS cases in the United States in 2005 were attributable to high-risk heterosexual intercourse (US Centers for Disease Control and Prevention, 2007), as were 33% of new HIV infections in Canada in 2006. However, in Canada, a substantial proportion of those infections were in people born in countries with high HIV prevalence (mainly sub-Saharan Africa and the Caribbean) (Boulos et al., 2006; Public Health Agency of Canada, 2007). A similar situation was seen in Western Europe, where unprotected heterosexual intercourse accounted for the largest share (42%) of new HIV diagnoses in Western Europe in 2006 (compared with the 29% that were attributed to unprotected sex between men). Unprotected heterosexual intercourse is the main reported mode of transmission in most countries of Central Europe, except for Estonia, Latvia, Lithuania, and Poland, where the main mode is injecting drug use, and Croatia, the Czech Republic, Hungary, and

Slovenia, where it is unprotected sex between men (Hamers, 2006; Rosinska, 2006; Brucková et al., 2007; EuroHIV, 2007a).

#### *Injecting drug use*

Transmission by multiple use of contaminated injecting equipment accounts for 18% of new HIV diagnoses in the United States (2005) and 19% in Canada (2006) (Public Health Agency of Canada, 2007; US Centers for Disease Control and Prevention, 2007). In Western Europe, a diminishing proportion of HIV diagnoses (6%) are related to the use of contaminated injecting equipment in 2006 (EuroHIV, 2007b). In Denmark and the Netherlands, the number of new HIV diagnoses among injecting drug users fell by 72% and by 91%, respectively in 2002–2006 (EuroHIV, 2007b). In Central Europe, too, newly reported HIV diagnoses in injecting drug users have decreased (EuroHIV, 2007b).

## Middle East and North Africa

The limited HIV information available for the Middle East and North Africa indicates that approximately 380 000 [280 000–510 000] people were living with HIV in 2007, including the 40 000 [20 000–66 000] people who were newly infected with the virus last year.

#### **Recent epidemiological trends**

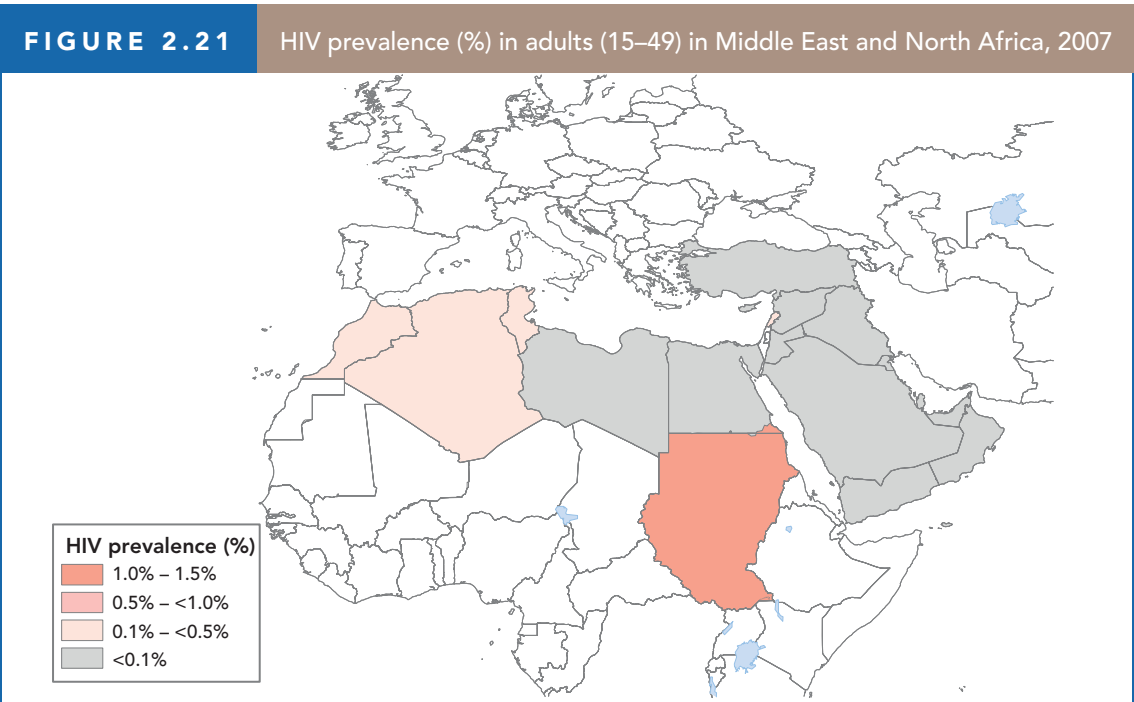
With the exception of the Sudan, the epidemics in this region are comparatively small.

#### **Primary sources of HIV transmission**

Varying combinations of risk factors are associated with the epidemic; chief among them are unprotected paid sex and the use of contaminated drug injecting equipment (Obermeyer, 2006).

#### *Injecting drug use*

The Islamic Republic of Iran is home to a serious drug-related epidemic, with HIV prevalence of



between 15% and 23% documented among male injecting drug users who make use of drop-in or drug-treatment services in Tehran (Zamani et al., 2005; Zamani et al., 2006). Exposure to contaminated drug injecting equipment is also the main route of HIV transmission in the Libyan Arab Jamahiriya and Tunisia, and it features in the epidemics of Algeria, Morocco, and the Syrian Arab Republic (Kilani et al., 2003; Ministry of Health and Medical Education [Iran], 2005; Mimouni & Remaoun, 2006; Obermeyer, 2006).

*Overlap of injecting drug use and sex work*

A combination of injecting drug use and sex work may be facilitating the spread of HIV in Algeria, Egypt, Lebanon, and the Syrian Arab Republic, where one third or more of surveyed injecting drug users said that they recently either

bought or sold sex. In the Syrian Arab Republic, more than half (53%) of the drug users interviewed in one study said they sold sex, and 40% of those users said they never used condoms (Ministry of Health [Syria] et al., 2007).

*Heterosexual intercourse*

Unprotected heterosexual intercourse is the main factor in Sudan’s epidemic—the most extensive in the region—with national adult HIV prevalence estimated at 1.4% [1.0%–2.0%] in 2007. In several other countries, increasing numbers of women are being diagnosed with HIV, most of them infected by husbands or boyfriends who had acquired HIV through injecting drug use or paid sex. In Morocco, for example, one third (33%) of women diagnosed with AIDS were married (Ministère de la Santé [Maroc], 2007).



### Sex between men

Although socially stigmatized and officially censured throughout the region, unprotected sex between men is probably a factor in several of the region's epidemics. A recent study in Egypt, for example, found that 6.2% of men who have sex with men were infected with HIV (Ministry of Health [Egypt] et al., 2006), while 9% prevalence was found among their counterparts in Khartoum State, Sudan (Elrashied, 2006).

## Oceania

Overall, an estimated 74 000 [66 000–93 000] people were living with HIV in Oceania in 2007, about 13 000 [12 000–15 000] of whom were newly infected in the same year.

### Recent epidemiological trends

Most of the region's epidemics are small, except in Papua New Guinea, where the annual number of new HIV diagnoses more than

doubled between 2002 and 2006, when 4017 new HIV cases were reported (National AIDS Council Secretariat [Papua New Guinea], 2007).

### Primary sources of HIV transmission

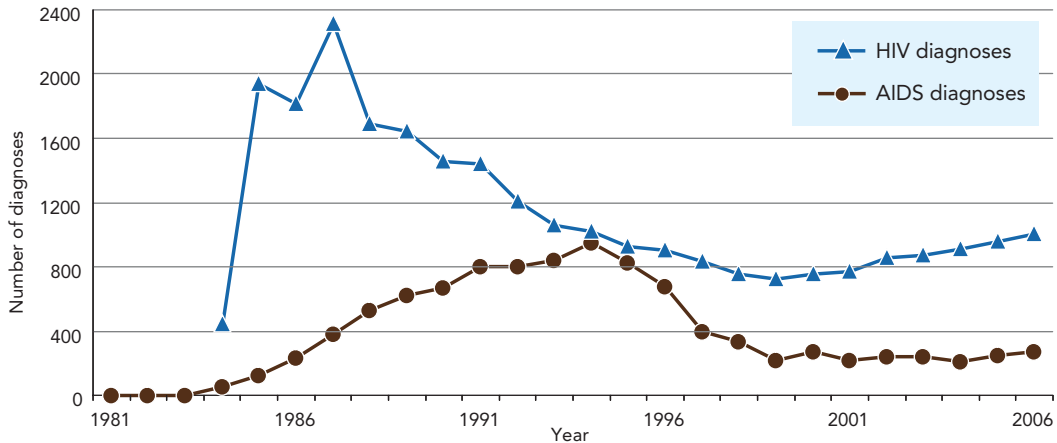
#### *Heterosexual intercourse*

Unprotected heterosexual intercourse is the main mode of HIV transmission in Papua New Guinea (National HIV/AIDS Support Project, 2006; National AIDS Council Secretariat [Papua New Guinea] & National HIV/AIDS Support Project, 2007), and unprotected paid sex in particular appears to be a central factor. In one recent survey, 60%–70% of truck drivers and military personnel, and 33% of port workers, said they had bought sex in the previous year (National AIDS Council Secretariat [Papua New Guinea] & National HIV/AIDS Support Project, 2007). Community-based studies in 10 provinces have shown that about 40% of participants were infected with at least one sexually transmitted infection (Institute of Medical Research, 2007).

**FIGURE 2.22** HIV prevalence (%) in adults (15–49) in Oceania, 2007



**FIGURE 2.23** Annual diagnoses of HIV infections and AIDS in Australia, 1981–2006



Source: National Centre in HIV Epidemiology and Clinical Research, 2007. Data available at [http://www.nchechr.unsw.edu.au/NCHECRweb.nsf/resources/SurvRep07/\\$file/ASR2007.PDF](http://www.nchechr.unsw.edu.au/NCHECRweb.nsf/resources/SurvRep07/$file/ASR2007.PDF)

*Sex between men*

Unprotected sex between men is the primary cause of HIV infection in Australia (National Centre in HIV Epidemiology and Clinical Research, 2007a) and New Zealand (Ministry of Health [New Zealand], 2007). After declining sharply in the 1990s, new HIV diagnoses in Australia have increased, from the 763 reported in 2000 to 998 reported in 2006 (Figure 2.23). There is evidence that the prevalence of unprotected sex between men has

increased or remained at high levels in recent years in several cities including Adelaide, Brisbane, Canberra, Perth (National Centre in HIV Epidemiology and Clinical Research, 2007b), and Sydney (Prestage et al., 2006). Unprotected sex between men also could be a factor in Papua New Guinea’s epidemic. When surveyed, more than one in ten (12%) young men said they had had sex with men, and condom use was rare (Maibani-Michie & Yeka, 2005).