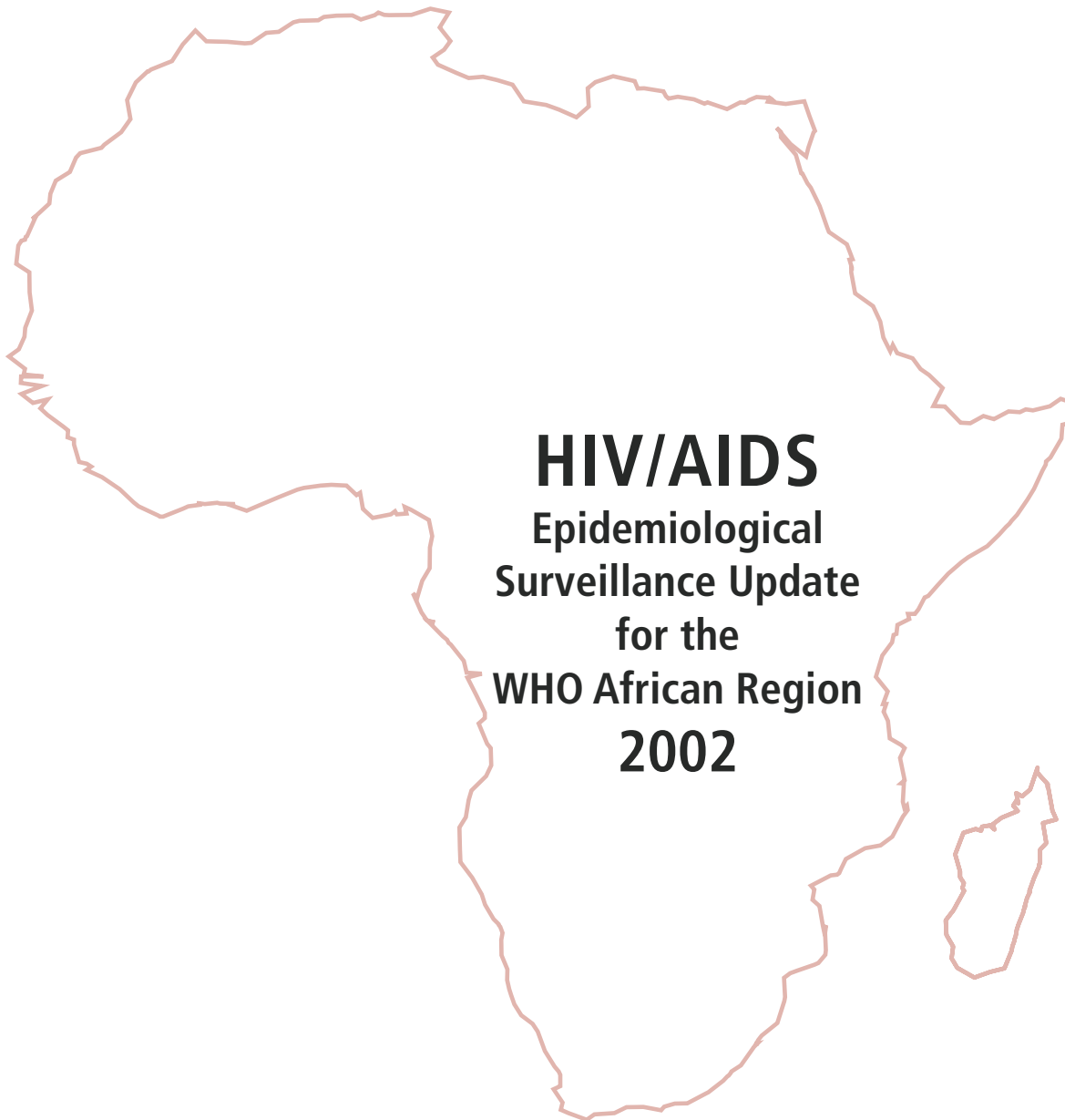




World Health Organization  
Regional Office for Africa  
Harare, Zimbabwe  
September 2003



World Health Organization  
Regional Office for Africa  
Harare, Zimbabwe  
September 2003

#### **WHO Library Cataloguing-in-Publication Data**

HIV/AIDS epidemiological surveillance update for the WHO African Region: 2002.

1 v. + 1 CD-ROM

1. HIV infections – epidemiology 2. Acquired immunodeficiency syndrome – epidemiology  
3. Epidemiologic surveillance 4. Data collection – methods I. World Health Organization. Regional Office for Africa.

ISBN 92 9023 100 9

(NLM classification: WC 503.4 HA1)

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**Acknowledgements**

The principal authors of this report were Emil Asamoah-Odei, Godwill Asiiimwe-Okiror and Ties Boerma, who were greatly assisted by Charles Adjovi, Jesus Garcia Calleja (HIV), Maria Guraiib (STI), Ye Htun (STI), Erica Kufa, Marjorie Opuni-Akuamo, and Cyril Pervilhac (behaviour). Valuable input was received from the WHO/AFRO Division for the Prevention and Control of Communicable Diseases Reference Group for the Report (M. Moeti, G. Gershy-Damet, O. Kaluwa, L. Manga, W. Nkhoma, I. Sow and T. Sukwa), the WHO/AFRO Publications Committee, the WHO/AFRO Technical Network on HIV/AIDS and STI Surveillance, and the Centers for Disease Control and Prevention Global AIDS Programme. The figures and tables in the report were produced with assistance from Michel Beusenbergh and the maps were produced with WHO's Health Mapper by Claire Preaud.

## Foreword

The greatest challenge to public health in the African Region of the World Health Organization (WHO) is HIV/AIDS. With more than two-thirds of global HIV infections, the Region is the most affected part of the world. Since the late nineties, HIV/AIDS has become the leading cause of adult death. In the worst affected countries, the HIV/AIDS epidemic is reversing the developmental gains of the past 50 years, including hard-won increases in child survival and life expectancy.

Despite some encouraging declines in prevalence in eastern Africa, there have been relatively few successes in reducing the severity of the epidemic across the Region as a whole. In southern Africa, the worst affected sub-region, prevalence appears to be stabilising at extraordinarily high levels, exceeding 30% in several countries.

Although the Region as a whole is severely affected by HIV/AIDS, there is considerable diversity in the epidemiological trends between sub-regions and countries, between rural and urban populations and in some cases between districts within countries. To strengthen their responses to the epidemic, countries in the Region need detailed information on the burden and trends of HIV/AIDS, sexually transmitted infections (STI) and sexual behaviours. This information is required for better planning, allocation of resources, implementation, monitoring and evaluation of HIV/AIDS/STI programmes.

Information in the Region is improving as a result of the efforts made by countries in implementing HIV sentinel surveillance systems. A number of countries are conducting population-based surveys, incorporating the monitoring of STI and sexual behaviours into surveillance systems, as well as monitoring groups at higher risk of HIV infection.

The WHO Regional Office for Africa (AFRO) places a high priority on improved HIV/AIDS epidemiological surveillance systems. The Regional Office will continue to provide technical leadership and support in this area. It is also committed to providing updates of the HIV/AIDS situation and surveillance practices in the countries of the Region every two years.

It is my expectation that readers will use this report as a tool for advocacy as well as a basis for strengthening and scaling up interventions for HIV/AIDS and STI prevention and care. And I hope that the information contained herein will guide the 46 Member States in improving surveillance and monitoring and evaluation systems.

**Dr. Ebrahim M. Samba**

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Brazzaville  
September 2003

## Preface

A detailed review of the HIV/AIDS situation and surveillance practices in the 46 countries of the WHO African Region was published in 2000<sup>1</sup>. The current report presents an update of the HIV/AIDS epidemic in the WHO African Region based predominantly on data from country surveillance reports produced for 2001 and 2002. Additional data included in the report are from population-based surveys and selected research studies.

The report does not provide HIV/AIDS estimates, but presents a synthesis and analysis of data generated by existing surveillance systems. The focus of the report is on the assessment of trends in HIV prevalence within countries and sub-regions. In addition, data are presented on the current situation and trends in sexually transmitted infections and sexual behaviour, which are both part of comprehensive HIV surveillance systems.

The report is comprised of two parts. Part I presents a comprehensive review of the most recent data in the WHO African Region as a whole. It also provides data by sub-region with the exception of the Indian Ocean sub-region where no data for the last two years were available. Part II is published separately and consists of country profiles that include brief descriptions of the most recent data and trends, with a focus on young people.

<sup>1</sup> HIV Surveillance Report for Africa, 2000: [http://www.afro.who.int/aids/surveillance/resources/hiv\\_surveillance\\_report\\_2000.pdf](http://www.afro.who.int/aids/surveillance/resources/hiv_surveillance_report_2000.pdf)

## List of abbreviations

AFRO	WHO African Regional Office
AIDS	Acquired Immune Deficiency Syndrome
BSS	Behavioural Surveillance Surveys
CDC	Centers for Disease Control and Prevention
DHS	Demographic and Health Survey
EPP	Epidemic Projection Package
HIV	Human Immunodeficiency Virus
HSV	Herpes Simplex Virus
MICS	Multiple Indicator Cluster Survey
RPR	Rapid Plasma Reagin
STI	Sexually Transmitted Infection
TPHA	Treponema Pallidum Haemagglutination Assay
UNAIDS	Joint United Nations Programme on AIDS
UNICEF	United Nations Children's Fund
UNGASS	United Nations General Assembly Special Session
WHO	World Health Organization
YAS	Young Adult Survey



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## Executive summary

To strengthen their responses to the epidemic, the 46 countries in the WHO African Region need detailed information on the burden and trends of HIV/AIDS, sexually transmitted infections (STI) and sexual behaviours. Information in the Region is improving as a result of the efforts made by countries in implementing HIV sentinel surveillance systems. Many countries have improved and expanded their antenatal care clinic-based surveillance systems and by mid 2003, HIV prevalence had been reported for over 600 sentinel antenatal care clinics attended by more than 200,000 women in 2002. More importantly, for most countries it is now possible to assess recent trends in HIV prevalence in sentinel antenatal care clinics.

Seven countries have implemented national population-based surveys with HIV data collection. Such surveys can provide important additional information on the status of the HIV/AIDS epidemic, provided the surveys are of high quality and have satisfactory response rates. Population-based surveys are not intended to replace a continuous sentinel surveillance system, but constitute a valuable addition primarily because they provide data on men, on non-pregnant women and on rural populations.

An increasing number of countries are now reporting on HIV prevalence among young pregnant women. There is a need to further standardise the reporting of HIV prevalence among young women aged 15-24 years attending antenatal care clinics in the same way that has been done for pregnant women aged 15-49 years.

About half of the countries report on the prevalence of sero-syphilis (a diagnosis of syphilis on the basis of a positive blood test) among women attending antenatal care clinics. There is also a large volume of data on STIs other than syphilis from special studies, but regular monitoring of the burden of such infections is not common or does not yield reliable data.

Many countries now also have data on key sexual behaviours (that is, behaviours that are associated with increased risk of becoming infected with HIV) among adults, young people and some populations at higher risk of HIV infection, and several countries are able to ascertain trends in behaviour over time. While there has been a marked increase in data collection through national and special population surveys, more information and analysis is needed to ascertain whether behavioural data are able to capture real trends in behaviour at the population level.

### Spread of HIV in 2002

For health planning and programming purposes, it is important to recognise the heterogeneity of the HIV/AIDS epidemic in sub-Saharan Africa. There are very large differences by sub-region, with the epidemic in southern Africa being much more severe than in other parts of Africa. In general, HIV prevalence in southern Africa is at least five times higher than in western Africa, with eastern and central Africa taking an intermediate position. There are also substantial differences within sub-regions and within countries. In most countries, with the possible exception of most of southern Africa, rural populations are much less likely to be infected with HIV than urban populations. The huge differences in HIV prevalence within the region have important consequences for assessment of the impact of the epidemic and for planning health interventions, such as antiretroviral treatment.

Many more women are infected than men, and this difference between the sexes is even larger among young people. Population-based surveys indicate that HIV prevalence among women may be as much as 1.5 times higher than that among men. This is partly due to the fact that women become infected at a much earlier age than men: at ages 15-24 years, at least 70% of infected persons are women.

### **Trends in HIV prevalence**

The trends in HIV prevalence reported by the same antenatal care clinics in recent years suggest that the growth of the epidemic levelled off in the late 1990s, but that there has been no decline. To take into account the improvement in available data concerning rural populations in several countries, HIV estimates may have to be adjusted downward in the near future. This should not be confused with a real decline in prevalence.

The trends in HIV prevalence clearly show that the large differences in HIV prevalence by sub-region are not caused by variation in the time at which the epidemic started, or the stage of the epidemic, but are actually widening with time. Trends by sub-region indicate a modest increase in HIV prevalence in southern and central Africa, a modest decrease in eastern Africa, and a mix of modest declines and gradual increases in western African countries. In eastern Africa, the course of the AIDS epidemic in Uganda has received substantial attention because of a significant decrease in HIV prevalence; various degrees of decline in HIV prevalence are also evident in parts of Burundi, Ethiopia, Kenya and Rwanda. In western Africa, Senegal is notable for its success in containing the epidemic at low levels; population-based surveys in Mali and Niger also show that HIV prevalence is at about the same level. Initial data from post-conflict countries, such as Sierra Leone, Democratic Republic of Congo and Angola, showed lower than expected HIV prevalence.

### **Next steps to strengthen surveillance systems**

Current HIV surveillance systems in the WHO African Region generate a wealth of data, but they should be expanded to better cover certain areas and populations. Surveillance systems in a few countries remain underdeveloped. And coverage of rural areas, young people and populations at higher risk of HIV infection stands to be improved in most countries.

Genuine second-generation surveillance, which is able to link trends in prevalence of HIV infection, STIs and behaviour, is still in its early stages in the Region. And while the monitoring of STIs has improved, in most countries, surveillance systems remain weak. Many countries now collect data on key sexual behaviours among adults, young people and some populations at higher risk of HIV infection, and several countries are able to ascertain trends in behaviour over time.



## 1 Introduction

With more than two-thirds of the total global number of human immunodeficiency virus (HIV) infections, the World Health Organization African Region (AFRO) is the Region of the world that is by far the worst-affected by HIV and acquired immunodeficiency syndrome (AIDS). At the end of 2002, it was estimated that about 29 million people in the Region were living with HIV; nearly 9% of adults aged 15-49 years are infected (UNAIDS and WHO, 2002). Three million people are estimated to have died from HIV/AIDS, in 2002. In the worst-affected countries, the HIV/AIDS epidemic is reversing the health and development gains of the past 50 years, including the hard-won improvements in child survival and life expectancy.

A detailed review of the HIV/AIDS situation and surveillance practices in the WHO African Region, including country profiles, was published in 2000<sup>2</sup>. The current report presents an update of the status of the HIV/AIDS epidemic in the WHO African Region, based predominantly on data from country surveillance reports produced for 2001 and 2002. Data from population-based surveys and selected research studies are also included. The focus is on the assessment of trends in HIV prevalence within countries and sub-regions. In addition, data are presented on the current situation and trends in STIs and sexual behaviour, which are both part of comprehensive HIV surveillance systems (also called "second generation" surveillance) (UNAIDS and WHO, 2000). Determinants and risk factors for HIV infection are not addressed in this report. The report limits itself to describing an epidemiological situation analysis, which is essential for the response, including HIV/AIDS treatment.

The results are presented in two parts. Part I presents a comprehensive review of the most recent data in the WHO African Region as a whole, and by sub-region. Part II is published separately and consists of country profiles that include brief descriptions of the recent data and trends, with a focus on young people. The report does not provide HIV/AIDS estimates, but presents a synthesis and analysis of data generated by the existing surveillance systems. National estimates of HIV prevalence and numbers of people HIV infected will be made by countries in close collaboration with UNAIDS and WHO at the end of 2003.

This analysis of the epidemiological situation based on the most recent data from all countries in the WHO African Region is intended to provide information for national Ministries of Health and all in-country stakeholders, United Nations agencies, and international development partners. The information contained in the reports will be useful as a technical support tool for advocacy, and will contribute to the planning of interventions for HIV/AIDS and the prevention and care of STIs, and presents an intermediate assessment of the status of surveillance systems in countries.

<sup>2</sup> HIV Surveillance Report for Africa, 2000: [http://www.afro.who.int/aids/surveillance/resources/hiv\\_surveillance\\_report\\_2000.pdf](http://www.afro.who.int/aids/surveillance/resources/hiv_surveillance_report_2000.pdf)



## 2 Tracking HIV in Africa: the systems

### Pregnant women: the key data source

In most countries, HIV surveillance systems rely primarily on monitoring prevalence among women attending antenatal care clinics. Anonymous blood specimens taken during routine antenatal care are screened for antibodies to HIV; HIV prevalence is equal to the percentage of women who are HIV-seropositive. The prevalence of HIV among pregnant women is a good indicator of the spread of the epidemic in the general population, as the level of HIV infection among pregnant women is similar to that in the general population of men and women aged 15-49 years (Zaba and Gregson, 1998). Virtually all countries in the WHO African Region have generalised HIV/AIDS epidemics, defined as epidemics in which HIV prevalence among women attending antenatal care clinics consistently exceeds 1%. Additional sources of data on the course of the epidemic are prevalence surveys in specific populations at higher risk of HIV infection (such as sex workers or mobile populations), routine screening of blood donors, and patients with sexually transmitted infections (STIs) or tuberculosis.

While monitoring of HIV prevalence among women attending antenatal care clinics has consistently been the main approach for surveillance, different approaches have been used to select the clinic sites. Most countries have chosen one or two sites in each of the majority of the nation's provinces or regions. Often one site is in the regional capital, the second site in a semi-urban area within the same region or province. The surveillance systems in Ethiopia, Ghana, Kenya, Nigeria, and Uganda are examples of this approach. The United Republic of Tanzania uses a similar system except that six of the country's twenty mainland regions have been selected for surveillance and four sites were established in each region. The surveillance system in Côte d'Ivoire also has one urban site in all regions, and in all regions smaller rural clinics are also included (usually three). While the urban site includes 300 pregnant women in a surveillance round, each of the rural sites aims for a sample size of 100. The combined data from each rural clinic in a region comprise a rural site including 300 women. Countries like Botswana, Lesotho and Swaziland have selected clinics located in a city or large town as well as nearby smaller health facilities in the same district to constitute a "sentinel site" (a site that is used as a proxy for all other sites).

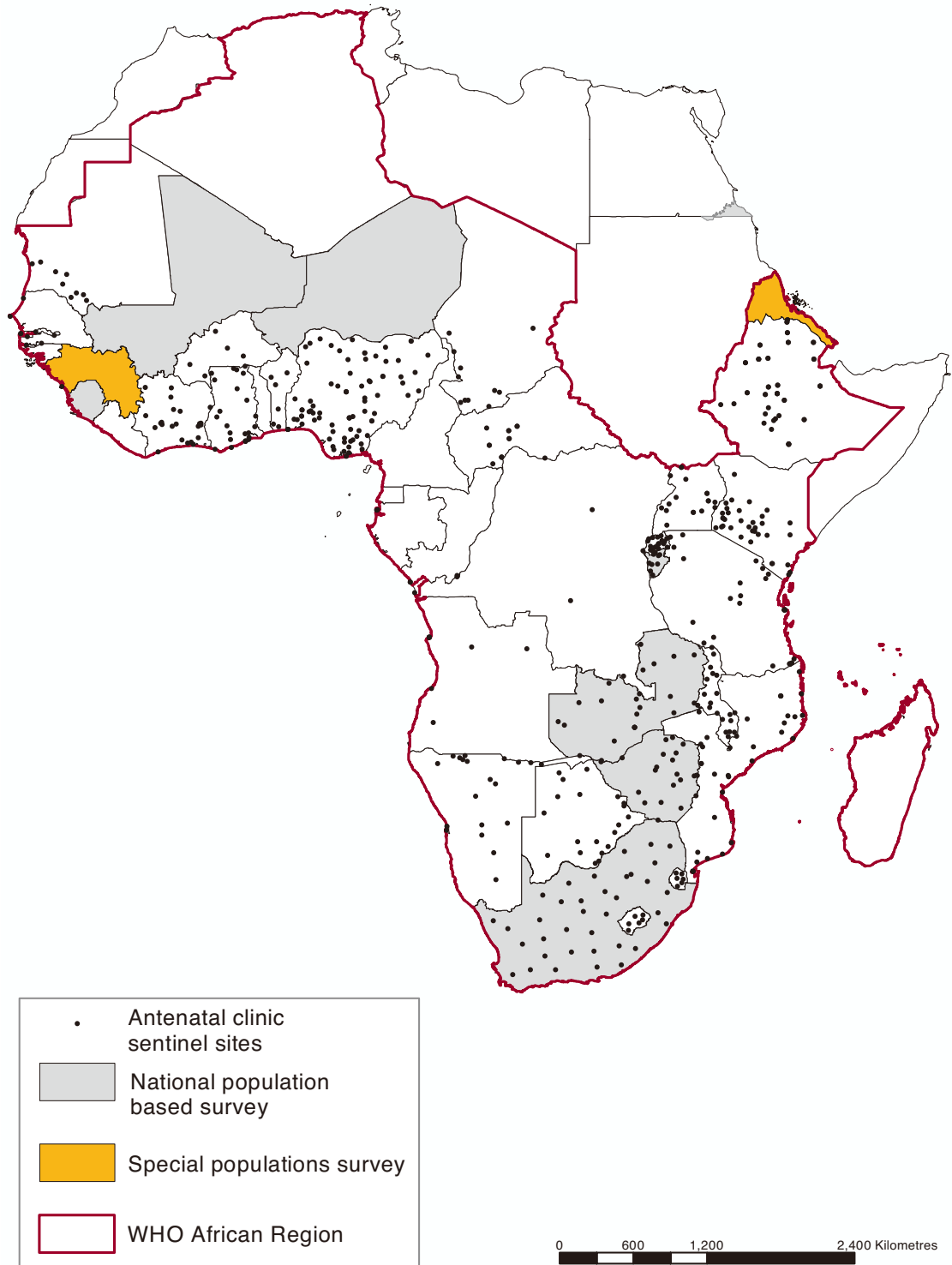
South Africa uses probability proportional to size sampling to select sentinel sites, with each public health facility in the province acting as a sampling unit and about 400 sites participating in each round of the survey. Each site enrolls a minimum of 40 pregnant women.

### Surveillance systems are improving

HIV surveillance in Africa has improved in recent years, notably in terms of coverage and reporting of prevalence among young women attending antenatal care clinics. During 2002, approximately 220,000 women attending antenatal care clinics were tested for HIV for the purpose of surveillance. These women were attendees of about 625 antenatal care clinics throughout the region, not including an additional 400 clinics in the Republic of South Africa where sites are selected according to statistical sampling (Figure 1).



Figure 1

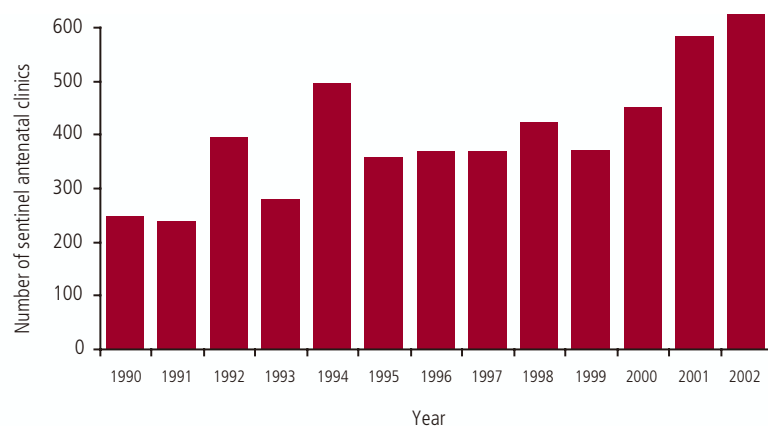
HIV surveillance activity in the WHO African Region<sup>a</sup>, 2001-2002

<sup>a</sup> In South Africa each dot represents about 40 antenatal clinics

Several countries increased the number of antenatal care clinics in the surveillance system to obtain better coverage of rural populations, since almost two-thirds of the population in the WHO African Region lives in rural areas. Until recently, most clinics were located in urban and semi-urban areas. The number of clinics participating in the surveillance programme in 2001 and 2002 was considerably higher than during the 1990s (Figure 2).

Figure 2

**Number of sentinel antenatal care clinics reporting HIV prevalence in the WHO African Region, 1990-2002**



Most countries with limited surveillance in recent years are those that have experienced political instability, such as Congo, the Democratic Republic of Congo, and Liberia.

A major development is the implementation of national population-based surveys which include HIV data collection. Such surveys had been conducted by several countries in eastern Africa in the late 1980s, but only Rwanda carried out a national survey in the 1990s. During 2001-2002, Burundi, Mali, Niger, Sierra Leone, South Africa, Zambia, and Zimbabwe conducted national surveys which included men and women of reproductive age. Zanzibar (United Republic of Tanzania) also conducted an HIV survey of its adult population.

Several countries are planning a national population-based survey in the coming years. The population-based surveys not only provide HIV prevalence data for all men and women but are also a unique opportunity to assess the extent to which the antenatal care clinic-based surveillance system provides accurate data on the prevalence of HIV. In addition, Eritrea, Guinea and Mali conducted national surveys among a range populations. Table 1 summarises the most recent HIV surveillance activities by country. All figures are unweighted. Several countries present the HIV prevalence among antenatal care clinics after weighting by population distribution according to urban-rural location of the clinics. The countries which show substantially lower HIV prevalence after weighting include Burundi (from 5.6% to 3.2%), Ethiopia (from 11.2% to 6.6%). In Kenya, the opposite is true: the weighting increased prevalence from 6.5% to 10.1%.

Table 1

## HIV surveillance activity in the WHO African Region, by country, from 2000

	Total population (thousands)	Urban population (%)	ANC coverage (%)	Year of last ANC round (from 2000)	No. of ANC sites	Year of last national HIV survey	HIV data available on young people
<b>Southern Africa</b>	<b>118,484</b>	<b>42</b>					
Angola	13,184	35	n.a.	2002	10	—	N
Botswana	1,770	49	97	2002	22	—	Y
Lesotho	1,800	29	88	2000	6	—	N
Malawi	11,871	15	90	2001	19	—	Y
Mozambique	18,537	33	71	2002	36	—	Y
Namibia	1,961	31	91	2002	21	—	Y
South Africa	44,759	58	94	2002	400	2002	Y
Swaziland	1,069	27	n.a.	2002	17	—	Y
Zambia	10,698	40	96	2002	24	2001/2	Y
Zimbabwe	12,835	36	93	2001	19	2001	Y
<b>Eastern Africa</b>	<b>180,646</b>	<b>22</b>					
Burundi	6,602	9	79	2001	7	2002	Y
Eritrea	3,991	19	49	—	—	2001	Y
Ethiopia	68,961	16	27	2001	34	—	Y
Kenya	31,540	34	76	2002	34	—	Y
Rwanda	8,272	6	92	2002	24	—	N
United Republic of Tanzania	36,276	33	93	2002	24	—	Y
Uganda	25,004	15	91	2001	17	—	N
<b>Central Africa</b>	<b>84,674</b>	<b>37</b>					
Cameroon	15,729	50	75	2000	27	—	Y
Central African Republic	3,819	42	67	2002	48	—	Y
Chad	8,348	24	42	2002	11	—	Y
Congo	3,633	66	n.a.	2002	5	—	Y
Democratic Republic of the Congo	51,201	31	n.a.	2002	4	—	N
Equatorial Guinea	481	49	37	—	—	—	N
Gabon	1,306	82	94	2002	2	—	N
Sao Tome and Principe	157	48	—	—	—	—	N
<b>Western Africa</b>	<b>269,478</b>	<b>43</b>					
Algeria	31,266	58	58	2000	5	—	N
Benin	6,558	43	80	2002	36	—	Y
Burkina Faso	12,624	17	61	2002	5	—	N
Cape Verde	454	64	99	—	—	—	N
Côte d'Ivoire	16,365	44	88	2002	28	—	Y
Gambia	1,388	31	na	2002	4	—	N
Ghana	20,471	36	88	2002	24	—	Y
Guinea	8,359	28	71	2001	5	2001	Y
Guinea-Bissau	1,449	32	62	—	—	—	N
Liberia	3,239	45	83	—	—	—	N
Mali	12,623	31	47	2002	9	2001	Y
Mauritania	2,807	59	48	2000	13	—	N
Niger	11,544	21	41	2000	5	2001	Y
Nigeria	120,911	45	64	2001	86	—	Y
Senegal	9,855	48	77	2002	11	—	Y
Sierra Leone	4,764	37	68	—	—	2002	N
Togo	4,801	34	82	2000	2	—	N
<b>Indian Ocean</b>	<b>18,953</b>	<b>31</b>					
Comoros	747	34	74	—	—	—	N
Madagascar	16,916	30	73	—	—	—	N
Mauritius	1,210	42	n.a.	—	—	—	N
Seychelles	80	65	n.a.	—	—	—	N
<b>WHO African Region</b>	<b>672,235</b>	<b>36</b>					

ANC, antenatal clinic; AFRO.

n.a., data not available; —, no survey carried out; Y, yes; N, no.

Source: Population data from United Nations Population Division, 2002; ANC coverage from UNICEF, 2002, and DHS surveys.

In recent years, several countries in the region have made progress in establishing second generation surveillance systems. Such systems not only include HIV surveillance tailored to the type of epidemic, but also make efforts to measure levels and trends in other STIs and in sexual risk behaviours.



### 3 HIV/AIDS in Africa: the current situation

The two major sources of data on the prevalence of HIV among the adult population in the WHO African Region are data from women attending antenatal care clinics and, in selected countries, population-based surveys including testing for HIV.

#### Pregnant women

Twenty-nine of the 46 countries in the WHO African Region were able to provide data on HIV prevalence among women attending antenatal care clinics during 2001-2002. Twenty countries had reported results for 2002 at the time of writing this report, a few additional countries were still in the process of analysis or report writing (Table 2).

There is large variation in HIV prevalence between countries. The median HIV prevalence for antenatal clinics ranges from <1% in Algeria and Mauritania to >30% in Botswana and Swaziland. HIV prevalence rates among pregnant women of 15-49 years of age in southern Africa are much higher than in other parts of Africa. More than one in five pregnant women are infected with HIV in most countries in southern Africa, while elsewhere in the region there are only a few countries where median HIV prevalence in antenatal care clinics exceeds 10%, even in urban areas.

#### HIV surveillance in antenatal care clinics: methodological notes

- The median HIV prevalence, which is defined as the middle value of the HIV prevalence rates reported in a series of antenatal care clinics, is a simple summary measure of HIV prevalence data gathered in antenatal care clinic-based surveillance systems.
- The median HIV prevalence among women attending antenatal care clinics is not equivalent to a national estimate of the prevalence among all pregnant women, as the selected antenatal care clinics of the surveillance system are not a representative sample of all antenatal care clinics in the country. Therefore, the median value of HIV prevalence for antenatal care clinics is presented for the capital city, other urban areas and rural areas, whenever possible.
- HIV prevalence among pregnant women varies between urban and rural antenatal care clinics. Rural clinics tend to report lower rates of HIV infection, although the magnitude of urban-rural variation differs from country to country. The extent to which the prevalence of HIV in antenatal care clinics classified as rural is representative of that for all rural pregnant women depends on the location of the clinics. Often such rural data are collected from small hospitals or large health centres in semi-urban locations, which are not representative of the rural population living in more remote areas. One may expect that HIV prevalence in the more remote rural areas, where in many countries the majority of the population lives, is lower than in these semi-urban sites.
- No attempt has been made to present national estimates for HIV prevalence in pregnant women by weighting the antenatal care clinic results according to the population size of each residence stratum (urban, semi-urban and rural) as UNAIDS and WHO are promoting the use of a model to make such estimates, using a software package called the Epidemic Projection Package (EPP).
- To assess trends in HIV prevalence among pregnant women, all trend analyses are limited to the same antenatal care clinics that have reported data over several years.
- Whenever available, HIV prevalence is given for pregnant women aged 15-24 years. If a country surveillance report presented data for women aged 15-19 and 20-24 years separately, data were combined and weighted to obtain estimates for the age group 15-24 years. Prevalence among pregnant women aged 15-19 years is a relatively unstable indicator of trends in HIV incidence and prevalence, and prevalence among pregnant women aged 15-24 years is therefore the preferred measure.

Table 2

**Median HIV prevalence<sup>a</sup> among women attending antenatal care clinics, by location of clinics and age, 2000-2002**

	Year	All locations				Capital city		Other urban locations		Rural locations			
		N	HIV prevalence (%)		N	HIV prevalence (%)		N	HIV prevalence (%)		N	HIV prevalence (%)	
			Age (years)			Age (years)			Age (years)			Age (years)	
		15-49	15-24	15-49	15-24	15-49	15-24	15-49	15-24	15-49	15-24		
<b>Southern Africa</b>													
Angola	2002	10	2.4	—	5	3.2	—	—	—	—	—	—	—
Botswana	2002	22	35.4	31.1	3	40.2	31.2	8	32.8	29.6	11	37.0	34.0
Lesotho	2000	6	20.9	—	1	42.2	—	2	22.5	—	3	19.0	—
Malawi	2001	19	16.9	17.2	1	28.5	—	10	18.6	20.2	8	11.3	9.2
Mozambique	2002	36	13.7	13.1	3	18.0	14.7	—	—	—	—	—	—
Namibia	2002	21	22.5	17.9	1	26.7	—	1	25.0	—	19	22.0	—
South Africa	2002	400	26.5	23.7	40	31.6	—	—	—	—	—	—	—
Swaziland	2002	17	38.6	39.4	1	41.2	—	—	40.6	40.6	—	35.9	37.1
Zambia	2002	24	20.4	18.8	4	26.9	20.9	8	27.7	21.8	12	9.9	8.4
Zimbabwe	2001	19	30.4	25.2	1	30.4	—	8	29.7	30.1	10	29.7	23.7
<b>Eastern Africa</b>													
Burundi	2001	7	5.6	—	1	16.0	5.9	3	8.7	9.8	2	1.6	1.9
Ethiopia	2001	34	11.2	12.1	4	16.2	—	24	12.0	—	6	1.7	—
Kenya	2002	34	6.5	9.8	6	14.2 <sup>b</sup>	—	—	14.3	12.0	—	6.3	8.6
Rwanda	2002	24	4.2	—	2	13.0	—	9	6.7	—	13	3.0	—
United Republic of Tanzania	2002	24	8.1	6.1	4	11.5	7.3	5	9.8	7.0	14	4.2	5.3
Uganda	2001	17	5.6	—	2	10.0	—	—	—	—	—	—	—
<b>Central Africa</b>													
Cameroon	2000	27	10.3	11.9	3	10.3	—	3	5.0	—	21	11.1	—
Central African Republic	2002	48	14.8	—	11	15.0	—	14	12.8	13.9	23	16.5	13.3
Chad	2002	11	5.3	5.3	1	7.5	7.3	6	4.7	—	4	5.5	4.8
Congo	2002	5	4.3	3.5	3	3.6	2.9	2	5.2	3.7	—	—	—
Democratic Republic of Congo	2002	4	3.6	—	1	2.9	—	3	3.7	—	—	—	—
Gabon	2002	—	—	—	2	9.0	—	—	—	—	—	—	—
<b>Western Africa</b>													
Algeria	2000	5	0.2	—	—	—	—	—	—	—	—	—	—
Benin	2002	36	1.9	1.7	3	2.3	—	—	2.5	—	—	1.4	—
Burkina Faso	2002	5	4.6	—	1	4.7	—	—	—	—	—	—	—
Côte d'Ivoire	2002	28	7.3	5.8	1	7.4	5.8	7	10.3	7.6	20	5.8	4.8
Gambia	2001	4	1.3	—	—	—	—	—	—	—	—	—	—
Ghana	2002	24	3.4	1.5	4	4.1	2.3	8	3.4	2.7	12	3.2	1.4
Guinea	2001	5	2.8	2.7	1	1.9	—	—	—	—	4	2.8	2.4
Mali	2002	9	3.4	3.2	3	3.4	2.6	6	3.5	2.4	—	—	—
Mauritania	2000	13	0.4	—	1	0.3	—	—	—	—	—	—	—
Niger	2000	6	2.3	—	1	2.0	—	4	2.2	—	1	5.5	—
Nigeria	2001	86	5.1	6.0	3	2.6 <sup>c</sup>	—	—	4.5	—	—	5.3	—
Senegal	2002	11	1.1	0.8	—	1.1	—	—	1.2	—	—	—	—
Togo	2000	—	—	—	—	—	—	—	—	—	2	2.2	—

—, no data available.

<sup>a</sup> HIV prevalence is measured as the percentage of women screened who were seropositive for HIV; the value used is the median of reporting sites.

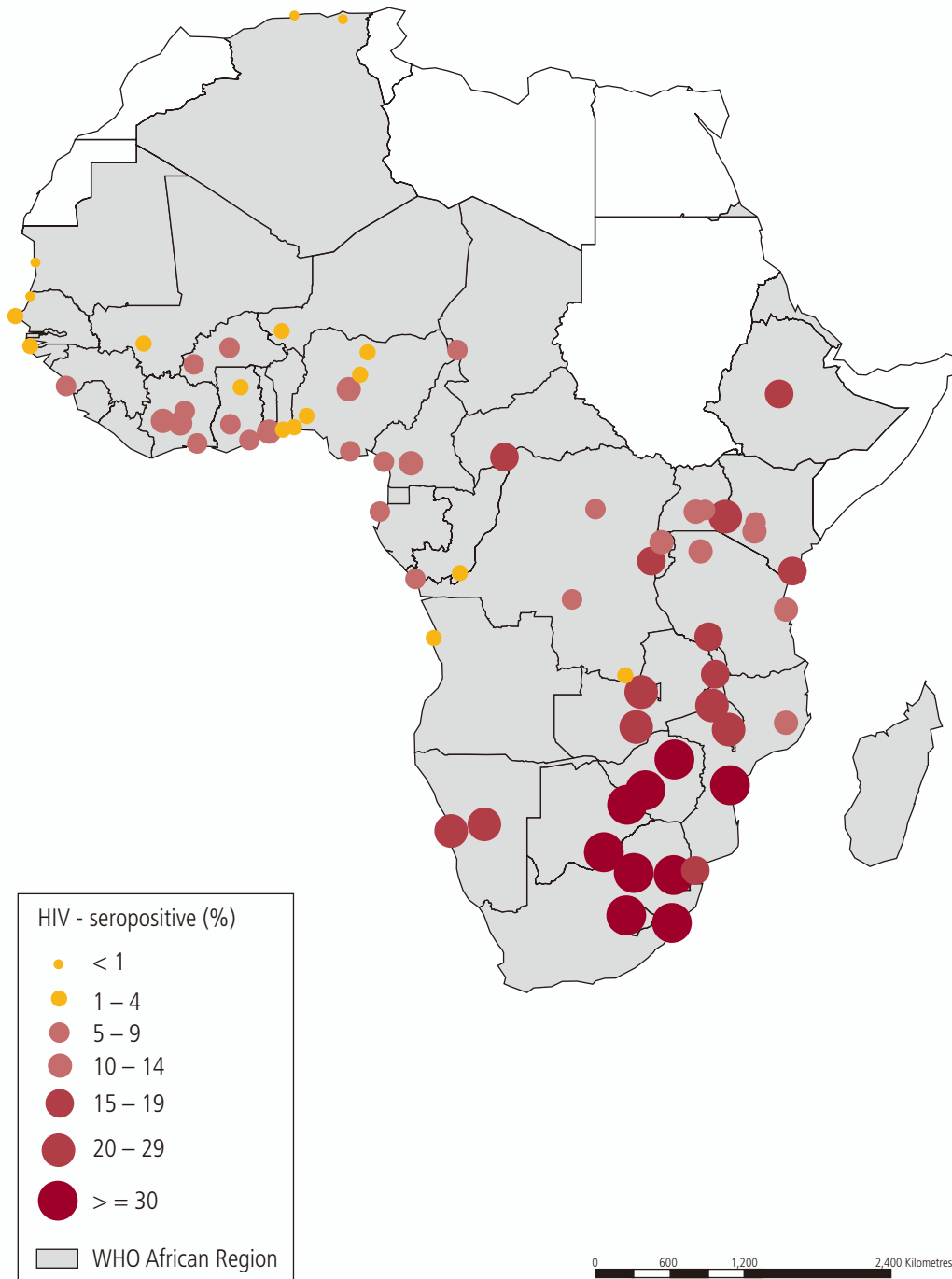
<sup>b</sup> HIV prevalence for Nairobi, 2001

<sup>c</sup> HIV prevalence for Lagos. HIV prevalence for Abuja is 11.0%.

There is wide variation in the prevalence of HIV infection among women attending antenatal care clinics in capital cities, major cities and large towns within the WHO African Region (Figure 3).

Figure 3

Median HIV prevalence among women attending antenatal care clinics in large cities in the WHO African Region, 2000-2002





In southern Africa, most antenatal care clinics in cities and large towns report levels of HIV prevalence of over 20%, with the exception of Maputo and Nampula (Mozambique), Luanda (Angola), and Mzuzu (Malawi). In eastern Africa, the prevalence of HIV reported in urban antenatal care clinics ranges from 10% to 17%, with only Jinja (Uganda) reporting <10%. Out of 33 cities and large towns in western and central Africa, the most recent data from pregnant women indicated that the prevalence of HIV exceeded 10% only in Abuja (Nigeria), Daloa and Yamoussoukro (Côte d'Ivoire), and Yaoundé (Cameroon), and Bangui (Central African Republic).

### **HIV prevalence among young pregnant women: a clue to understanding incidence**

The United Nations General Assembly Special Session (UNGASS) on HIV/AIDS declaration (2001) has set the goal of reducing the rate of new HIV infections in young people by 25% in 2005 in the most affected countries. HIV prevalence among young people aged 15-24 years is used as an indicator of the rate at which new infections occur. It has been recommended that the prevalence of HIV infection among young pregnant women aged 15-24 years attending antenatal care clinics in the capital city, other urban areas and rural areas, be used as an approximation of the incidence of HIV infection among young people (UNAIDS, 2002). An increasing number of countries are now reporting HIV prevalence by age. Table 2 presents recent data on HIV prevalence among young women attending antenatal care clinics by county; values range from <1% in Senegal to >30% in Botswana and Swaziland. The reporting of HIV prevalence among young pregnant women, however, is not as consistent as that for all age groups combined; disaggregation by geographic stratum (capital city, other urban and rural areas) and direct calculation of the median from clinic data are often not possible on the basis of the surveillance report.

### **Population-based surveys: gender differences**

Data on men and women of reproductive age are available from national population-based household surveys in seven countries of the WHO African Region. Mali and Zambia included HIV testing in a national Demographic and Health Survey (DHS), while special surveys on HIV/AIDS were conducted in Burundi, Niger, Sierra Leone and South Africa. In Guinea, a sample of the general adult population was included in an extensive survey of multiple populations at higher and lower risk of HIV infection. A national HIV/AIDS survey among young people aged 15-29 years was conducted in Zimbabwe.

In all surveys, HIV prevalence among women was considerably higher than among men (Table 3). Overall, women aged 15-49 years were 1.5 times (range of 1.4-1.7 in the five countries with data) more likely to be infected with HIV than men of the same age.

Among young people aged 15-24 years, the differences between the sexes were substantially larger, with women having 2.7 times (range of 2.0-4.3 for seven countries) higher infection rates than men in the six national surveys. The age pattern of HIV prevalence, (as illustrated with data from the Zambia survey, Figure 4), is an important reason for the overall differences between men and women. Women are infected at an earlier age than men (because they begin having sexual intercourse somewhat earlier and particularly because they tend to have sex with older partners) and, mainly because there are more persons in the younger age groups than in the older age groups, this results in a higher HIV prevalence. Unless otherwise stated, the term "sex" refers to heterosexual intercourse.

Table 3

## HIV prevalence in national population-based surveys, by age and sex

	Men				Women			
	Response rate <sup>a</sup> (%)	N	HIV prevalence (%)		Response rate (%)	N	HIV prevalence (%)	
			Age (years)				Age (years)	
			15–49	15–24			15–49	15–24
Burundi <sup>b</sup>	—	2161	3.0	1.6	—	2338	5.0	3.6
Guinea	—	1832	—	2.4	—	1888	—	2.7
Mali	76	2978	1.3	0.3	85	3854	2.0	1.3
Niger	—	2988	0.8	0.3	—	3062	1.1	0.8
Sierra Leone <sup>c</sup>	(68)	(2270)	(1.4)	—	—	—	—	—
South Africa <sup>d</sup>	58	2776	12.8	6.1	67	3555	17.7	12.0
Zambia	73	1734	12.9	3.0	79	2073	17.8	11.2
Zimbabwe	76	3893	—	5.0	73	4305	—	18.0

—, no data available.

<sup>a</sup> Response rate refers to percentage of eligible persons in selected households that had blood samples taken.

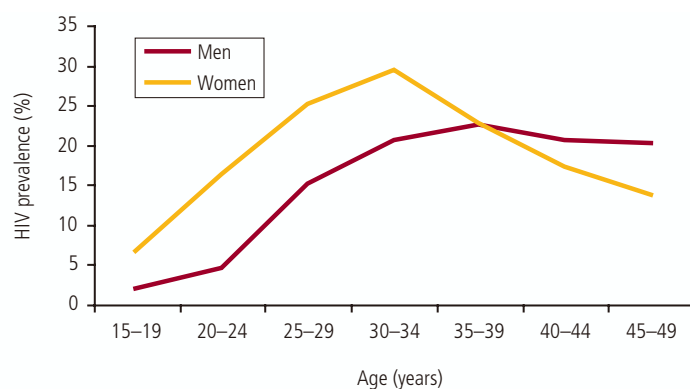
<sup>b</sup> National estimates for Burundi were derived from a report from the Ministère de la Santé Publique et Banque Mondiale (2002), using a population distribution of 10% urban, 5% semi urban and 85% rural.

<sup>c</sup> All figures for Sierra Leone are for both sexes combined. Non-response rate is underestimated as households that refused were replaced by other households.

<sup>d</sup> The response rate for South Africa includes the individual response rates only and not the household response rate, which was 71%.

Figure 4

## HIV prevalence in Zambia, by age and sex, national population-based survey, 2001-2002

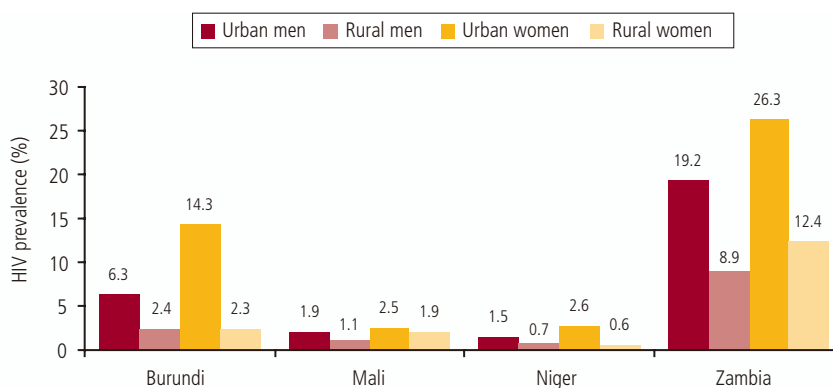


## The urban-rural divide

The population-based surveys are based on nationally representative samples and therefore present a more accurate picture of the HIV situation in rural populations than do data from antenatal care clinics. The prevalence of HIV infection in rural areas is less than half that in urban areas in Burundi, Niger and Zambia (Figure 5). The only exception to this is found in Mali where the urban-rural difference among men is slightly smaller. In Burundi, HIV prevalence among women living in rural areas is six times lower than that in women living in urban areas.

Figure 5

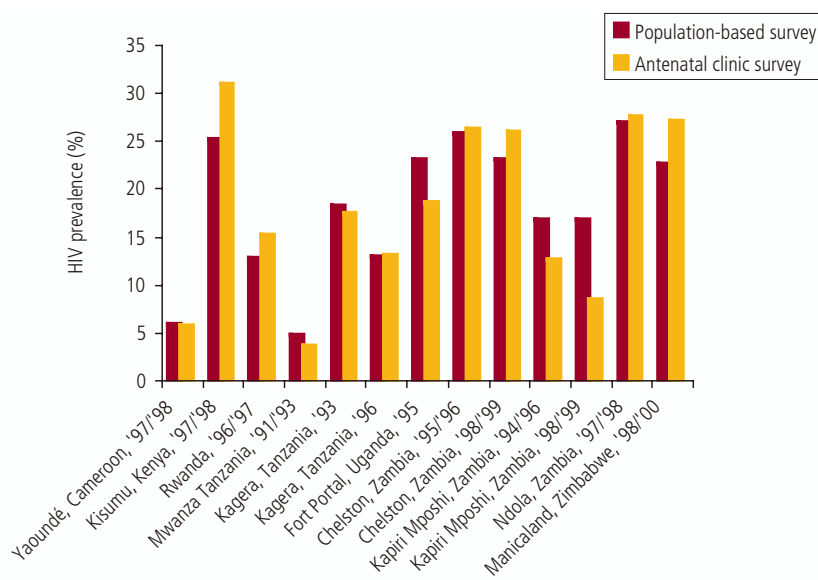
### HIV prevalence (%) among young men and women aged 15-49 years, selected national population-based surveys, by location 2001-2002



Population-based surveys are a valuable addition to surveillance systems, but should not simply be considered a gold standard (WHO and UNAIDS, 2003). First, surveys differ in methodologies, population sampling approaches, methods by which biological samples are collected, HIV-testing strategies, ways in which ethical issues are dealt with, and incentives for participation. These differences have to be taken into account when interpreting survey results. Second, non-response rates at the household level and at the individual level have a major influence on the interpretation of the results. Refusal and absence are the main reasons for non-response, and these are likely to have different associations with HIV prevalence. In most of the recent surveys in the region, non-response rates were in the order of 20% to 30%, but a much higher non-response rate was a problem in the survey in South Africa. Several surveys did not report detailed information on non-response, which is essential for the interpretation of the results. Men and urban residents have higher non-response rates than women and rural residents.

Figure 6

### A comparison of estimates of HIV prevalence from population-based surveys (men and women combined) and surveys among women attending antenatal care clinics



In most countries, HIV prevalence as reported in population-based surveys tends to be somewhat lower than that observed among women attending antenatal care clinics. A major reason is that rural populations are better represented in population-based surveys than in antenatal care clinic-based surveillance systems. Direct comparison of HIV prevalence among women attending antenatal care clinics with HIV prevalence among both men and women combined in the same cluster of the population-based survey showed good correspondence of the two types of data (Figure 6). This implies that, in most cases, HIV prevalence among pregnant women can be used to approximate HIV prevalence levels and trends in the general population.

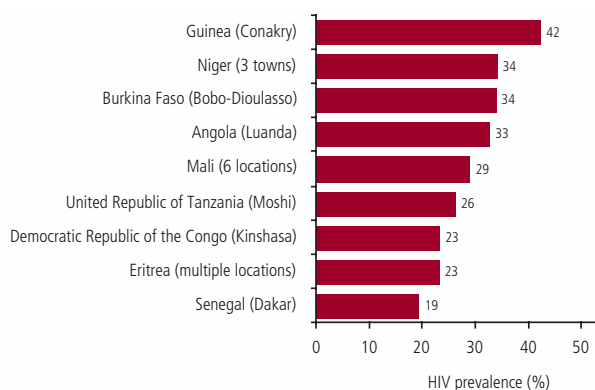
### Specific populations at higher risk of HIV infection

In most countries with generalised HIV epidemics, HIV surveillance among populations at higher risk of HIV infection is carried out infrequently. The risk of HIV infection is widespread and the focus of surveillance is on the general population and, increasingly, on young people. In countries with low levels of HIV prevalence, however, monitoring of the prevalence of HIV, STI and sexual behaviours in specific populations at higher risk of HIV infection is the cornerstone of HIV surveillance. Only a few countries have systems in place by which HIV prevalence among populations at higher risk of HIV infection can be regularly monitored.

A number of countries have collected data on HIV prevalence among urban female sex workers for 2001-2002 (Figure 7). The prevalence of infection with HIV ranges from 19% among female sex workers in Dakar, Senegal, to 42% in Conakry, Guinea. In other cities and towns, one-quarter to one-third of sex workers are infected with HIV. Some data on sex workers are reported as part of the national surveillance system. For example, HIV prevalence among sex workers in Luanda, Angola, was reported to be 33%, while prevalence ranged from 28% to 39% among sex workers in three towns in Niger. In other countries, research studies provide data on HIV prevalence among sex workers (Kapiga et al., 2002). A study carried out in Bobo-Dioulasso, Burkina Faso, identified six categories of sex workers (Nagot et al., 2002). True professionals, called the "roamers" and "seaters", often did not originate from Bobo-Dioulasso. The prevalence of infection with HIV was 29% and 56% in these women, respectively. Local women who were involved in the sex business included bar waitresses, local-brew sellers, students and petty traders. Such individuals would not identify themselves as sex workers, but the HIV prevalence rates reported in these groups of women ranged from 15% to 40%, and thus were considerably higher than those in the general population.

Figure 7

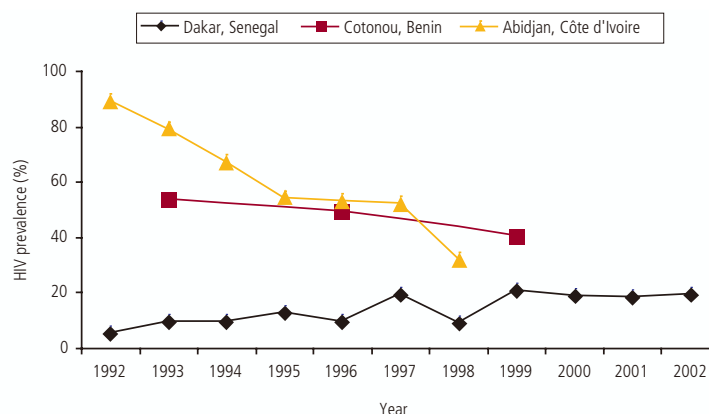
#### HIV prevalence among female sex workers in selected countries, 2001-2002



Only a few countries have an established system of regular HIV surveillance among sex workers. The best example is Senegal, where surveillance among female sex workers has been conducted in several urban areas on a regular basis since the late 1980s. HIV prevalence among sex workers in Dakar, Senegal, has remained at slightly less than 20% during recent years (Figure 8). In Abidjan, Côte d'Ivoire, and Cotonou, Benin, a decline in HIV prevalence was observed among sex workers during the 1990s (Ghys et al., 2002, Alary et al., 2002). In both Abidjan and Cotonou, there is evidence that increasing use of condoms contributed to this decline.

Figure 8

## Trends in HIV prevalence among female sex workers in selected cities, 1992-2002



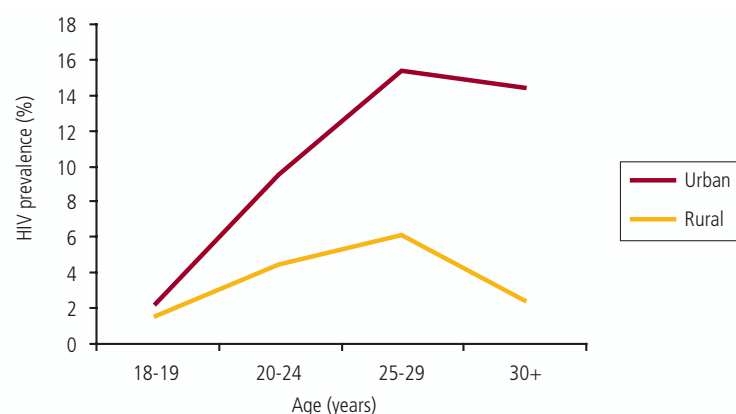
Several countries have carried out surveillance among other populations that are at a higher risk of HIV infection, such as STI clinic attendees. In 2001-2002, HIV prevalence among people attending STI clinics varied from <1% in Algeria, 11.5% in Nigeria and 23.7% in Uganda (Kampala), to 38.6% in Namibia, 50.2% in Swaziland and 65.2% in Lesotho. The number of countries that conduct HIV surveillance among STI clinic attendees has, decreased over time. While HIV prevalence among people attending STI clinics provides a general picture of the severity of the epidemic, its value for monitoring trends is limited (e.g. reported prevalence can vary considerably because the population is not well defined and because STI can occur in outbreaks).

Surveys of HIV prevalence in a number of sub-populations have been conducted in Eritrea, Guinea, and Mali. In Eritrea in 2001, HIV prevalence was found to be 22.8% among female bartenders, and 5.4 and 4.6% among women and men in the military, respectively, compared with 2.8% among antenatal care clinic attendees and 2.4% in the general adult population. In Guinea in 2001, HIV prevalence rates were reported to be 42.3% in sex workers in Conakry, 7.3% in truck drivers, 6.6% in military men and 4.6% in miners, compared with 2.8% in pregnant women. In Mali, 28.9% of female sex workers in six cities and towns were infected with HIV. The prevalence of infection with HIV was found to be 6.8% among female itinerant vendors, 5.5% among male taxi touts, and 3.5% among male truck drivers, compared with 2.5% and 1.9% among women and men, respectively, living in urban areas in the general population in the national DHS in 2001 (DHS 2002).

In Ethiopia, almost 72,000 army recruits were tested for HIV during 1999-2000 (Abebe et al., 2003). HIV prevalence was 7.2% and 3.8% in urban and rural recruits, respectively, and peaked at age 25-29 years (Figure 9). The prevalence of HIV was higher in army recruits living in urban areas than the prevalence estimated from antenatal care clinics.

Figure 9

## HIV prevalence among male army recruits in Ethiopia, by age and place of residence, 1999-2000



## Children

Children can be infected with HIV by transmission from mother to child, by health care injections, blood transfusion and sexual abuse. Mother-to-child transmission occurs at a rate of 25-35% of children of HIV-positive women, depending on a number of factors, such as viral load of the mother, breastfeeding practices and use of antiretroviral therapy. Most children infected by their mother die before the age of five years.

A recent national household survey with HIV testing in South Africa reported a high HIV prevalence of 5.6% among 2-14 year-olds (Shisana & Simbayi, 2002). There was no difference between boys and girls, and the authors considered unsafe injections to be a possible cause. However, other studies are needed to confirm these findings (Schmid et al., 2003). Hitherto, population-based studies in children in Africa have consistently found that the prevalence of HIV infection in children aged 5-14 years (an age group in which children are less likely to have acquired their infection from their mother) was generally much lower than the prevalence in adolescents, and adults of >15 years of age. If injections are a major mode of HIV transmission, one would expect HIV infection to be more common among children before the age of sexual debut.

The most reliable assessment of the role of transmission modes other than mother-to-child is made via studies that are limited to the children of HIV-negative mothers. A study of mother-child pairs in Côte d'Ivoire found that HIV-infected children either had received a blood transfusion or had a mother who was seropositive for HIV (Gayle et al., 1992), i.e. was positive for HIV according to a blood serum test. In Uganda it has been shown that seroconversions in children of women who are HIV-negative are rare: 0.12 seroconversions per 1000 person years (Mulder et al., 1996). A study in Côte d'Ivoire found that none of the children born to 274 HIV-negative mothers seroconverted over a period of up to 48 months after birth (Ekpini et al., 1997).

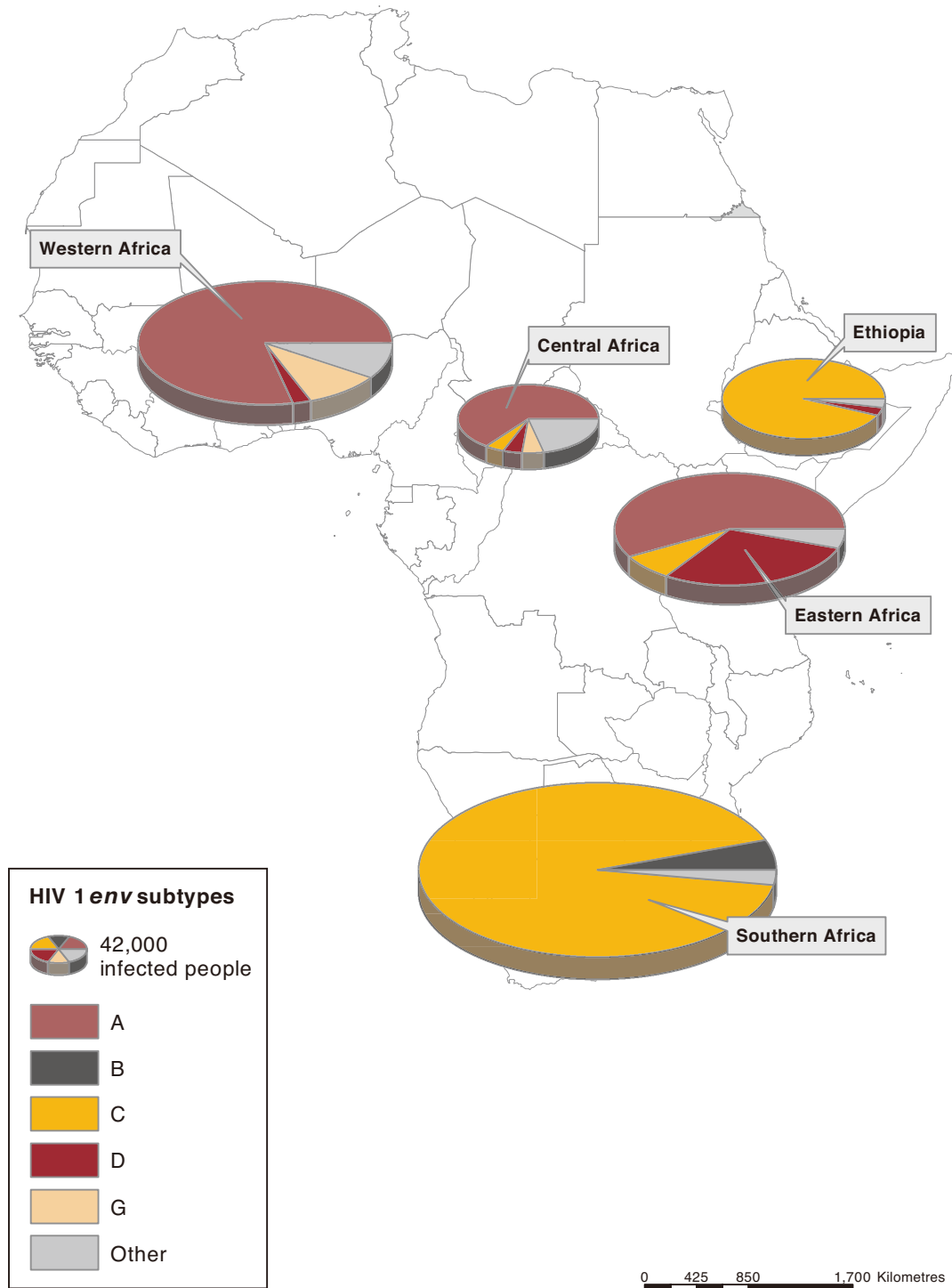
## HIV subtypes

The predominant HIV subtype in the WHO African Region is HIV-1, which accounts for >98% of all infections. HIV-2 is found primarily in western Africa. The highest prevalence of HIV-2 infection in the general population is found in Guinea-Bissau, where values of 3.8% (capital city) and 9.6% (outside the capital city) were reported among women attending antenatal care clinics in 1999. In Benin, Burkina Faso, Côte d'Ivoire, Gambia, Ghana and Senegal, the prevalence of HIV-2 infection among women attending antenatal care clinics in selected sites ranges from 0.2% to 2.4%. Cases of HIV-2 infection have also been reported outside of western Africa, in Angola and Mozambique.

HIV-2 is very similar to HIV-1 in many ways, but is less readily transmitted than HIV-1, both by sexual and by mother-to-child routes. Furthermore, after HIV-2 infection, progression to AIDS occurs more slowly than after infection with HIV-1. Repeated cross-sectional data available indicate that the prevalence of infection with HIV-2 has declined or at least remained stable over time. HIV-2 prevalence among police officers and women attending antenatal care clinics in Guinea-Bissau declined between 1990 and 1997 (Norrgrén et al., 2000). HIV-2 prevalence among female sex workers in Abidjan, Côte d'Ivoire, also declined from 3% in 1992 to 1% in 1998 (Ghys et al., 2002). The prevalence of dual infection with HIV-1 and HIV-2 also declined from 38% to 3% between 1992 and 1998.

There is a high degree of genetic variability in HIV-1 found in the WHO African Region (Osmanov et al., 2002). The most common HIV-1 subtypes, as distinguished by variation in the gene encoding the envelope protein, *env*, are C and A strains (Figure 10). In southern Africa, it has been estimated that 94.2% of new HIV-1 infections in 2000 were with *env* subtype C. In western and central Africa, subtype A strains constituted the majority of the new HIV-1 infections—79.9% and 61.6% respectively. In eastern Africa, excluding Ethiopia, 56.3% and 32.7% of new infections were with subtype A and subtype D respectively. In Ethiopia, subtype C strains are estimated to be the most common strains present in new HIV-1 infections (95%). In North Africa and Middle East, (including Algeria) the most common subtypes are A (44%) and B (40%).

Figure 10

Distribution<sup>a</sup> of HIV-1 *env* subtypes in the WHO African Region, 2000

<sup>a</sup> Size of circles is proportional to the number of infected people.

The genetic variability of HIV-1 raises challenges for the diagnosis and treatment of HIV/ AIDS as well for the development of prophylactic vaccines. Documentation and a better understanding of this variation in the WHO African Region and worldwide are essential steps in the strengthening the response to HIV/AIDS.

## 4 HIV/AIDS in Africa: changes over time

The most important and robust way of tracking the HIV epidemic over time is by following trends in HIV prevalence reported in the same sentinel surveillance sites. Sufficient data to assess trends for the period 1997-2002 were available from more than 300 antenatal care clinics in 19 countries, plus about 400 clinics from the surveillance system in South Africa. Data from these sentinel sites were only included in the analysis if at least one measurement in each of three two-year periods (1997-1998, 1999-2000 and 2001-2002) was available. Most antenatal care clinics are located in urban areas.

The median HIV prevalence in the seven countries in southern Africa with data for all three periods increased considerably, rising from 20.3% in 1997-1998 to 25.7% in 2001-2002 (Figure 11 and Table 4).

Table 4

**Trends in HIV prevalence among women attending antenatal care clinics in the WHO African Region, data from the same clinics<sup>a</sup>, 1997-2002**

	Number of antenatal clinics	Median HIV prevalence (%)		
		1997-1998	1999-2000	2001-2002
<b>Southern Africa</b>		<b>20.3</b>	<b>23.5</b>	<b>25.7</b>
Botswana	11	36.6	36.6	37.8
Malawi	19	18.5	22.8	16.6
Mozambique	20	—	11.9	14.3
Namibia	15	16.4	18.3	22.0
South Africa	400	19.9	23.5	25.7
Swaziland	8	30.2	33.4	38.2
Zambia	22	20.3	—	21.9
Zimbabwe	13	29.3	33.5	30.7
<b>Eastern Africa</b>		<b>13.7</b>	<b>11.6</b>	<b>11.4</b>
Burundi	6	9.9	7.1	4.6
Ethiopia	10	13.7	11.6	12.0
Kenya	20	13.7	15.3	11.4
United Republic of Tanzania	5	15.0	17.9	17.1
Uganda	9	10.8	9.6	7.4
<b>Central Africa</b>		—	—	—
Cameroon	4	7.8	10.1	—
Chad	7	—	4.2	6.9
<b>Western Africa</b>		—	<b>4.3</b>	<b>4.3</b>
Benin	6	4.0	4.3	3.8
Burkina Faso	5	6.8	6.0	4.8
Côte d'Ivoire	10	10.0	8.7	10.0
Ghana	20	2.6	2.2	3.3
Nigeria	67	—	4.3	5.0
Senegal	8	0.8	0.8	1.0

—, no data available

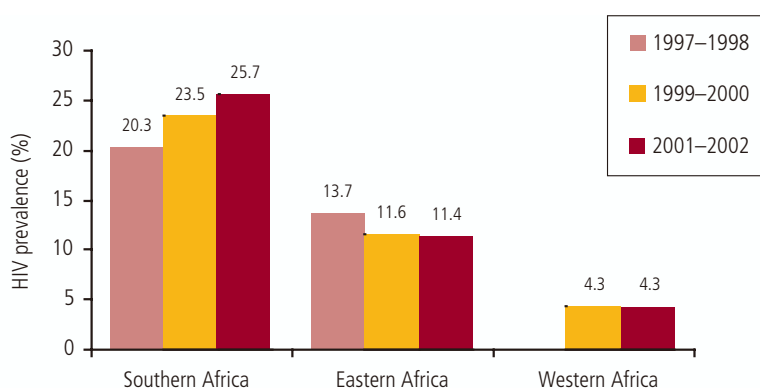
<sup>a</sup> Data were obtained from antenatal clinics able to provide at least one measurement in each of the three two-year periods. Median prevalence rates from selected sites for each of the periods were identified. Regional medians were calculated using median prevalence rates for countries.



On the other hand, data from the same antenatal care clinics in eastern Africa suggest that there has been a modest decline in HIV prevalence among women attending antenatal care clinics in several countries. There were no countries in central Africa that were able to provide data for all three two-year periods, while in west Africa, a mix of modest increases and declines occurred.

Figure 11

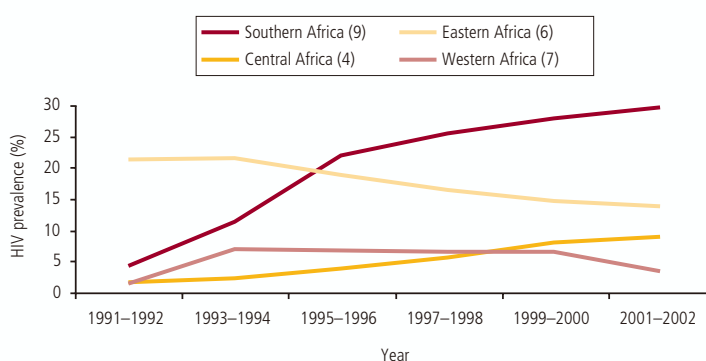
**Trends in country median HIV prevalence among women attending antenatal care clinics in three sub-regions, data from the same clinics, 1997-2002**



Data from antenatal care clinics in capital (or largest) cities are available for the longest periods of time. Figure 12 presents the trend in HIV prevalence in cities by sub-region for six two-year periods since the early 1990s.

Figure 12

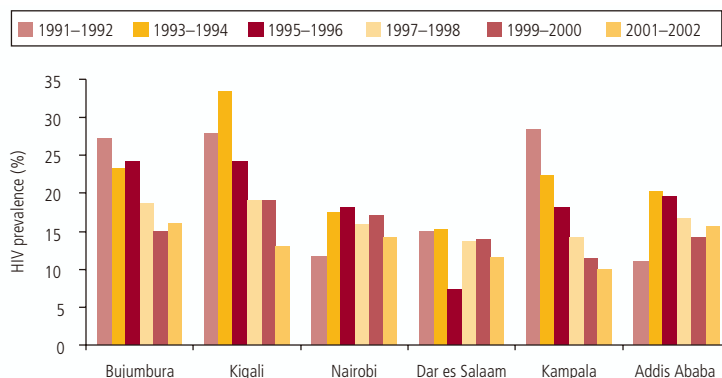
**Trends in median HIV prevalence among women attending antenatal care clinics in capital cities, by sub-region, 1991-2002**



In seven capital cities in southern Africa, including Gauteng province as an approximation for Johannesburg, there has been an increase in HIV prevalence throughout the last decade. HIV prevalence in southern African cities exceeded that in eastern African cities in the mid 1990s and is currently twice as high. The median HIV prevalence for eastern African cities has declined gradually during the last three two-year periods. This decline is most dramatic and consistent in Kampala, Uganda, but other cities in eastern Africa have also shown decreases in HIV prevalence (Figure 13), notably Bujumbura, Kigali and Addis Ababa, where HIV prevalence has been declining since the first half of the 1990s.

Figure 13

**Trends in median HIV prevalence among women attending antenatal care clinics in major cities in eastern Africa, data from the same clinics, 1991-2002**

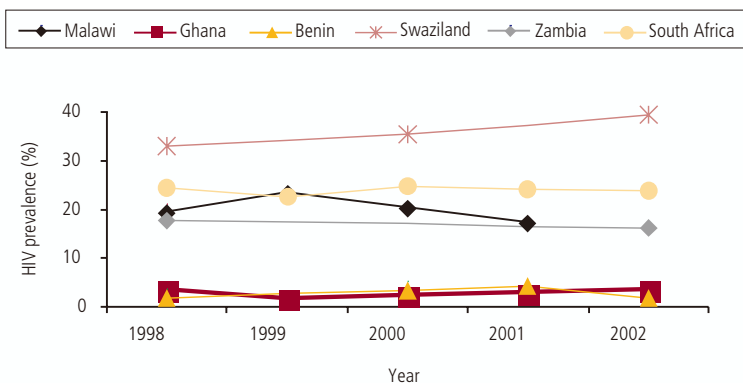


Data from four capital cities in central Africa suggest that HIV prevalence is increasing, but these data should be interpreted with caution, as surveillance has been irregular. In western Africa, the prevalence of HIV infections in seven capital or major cities has remained fairly constant during the mid and late 1990s, but recent data suggest that a modest decline is occurring in Abidjan, Cotonou, Lagos and Ouagadougou. Levels of HIV prevalence in Abidjan were among the highest recorded in western Africa throughout the 1990s. In 2002, Abidjan reported its lowest HIV prevalence among pregnant women since 1990 (7.4%).

In their surveillance reports, several countries have provided data on HIV prevalence among pregnant women according to age. Thus an assessment can be made of the trends in HIV prevalence among women aged 15-24 years, which can be interpreted as a proxy indicator of HIV incidence in the general population of young people. Figure 14 presents a summary of HIV trends among young women attending antenatal care clinics in six countries during 1998-2002. The six countries show wide diversity in levels of HIV prevalence and there is little evidence for a decline.

Figure 14

**Trends in median HIV prevalence among young women aged 15-24 attending antenatal care clinics in selected countries, 1998-2002**



Studies in specific antenatal care clinics and in the general population however have shown significant declines in HIV prevalence. For instance, in the inner city of Addis Ababa, HIV prevalence among pregnant women aged 15-24 years declined from 24% in 1995 to 15% in 2001 (Tsegaye et al., 2002). In rural Masaka, Uganda, the longest running community cohort study in Africa showed a significant decline in HIV prevalence and incidence during the 1990s (Mbulaiteye et al., 2002). HIV prevalence fell most significantly among women aged 13-19 years (from 2.8% in 1990 to 0.9% in 1999) and 20-24 years (from 19.3 to 10.1%). In men, the largest changes were observed in the age groups 20-24 years (6.5% to 2.2%) and 25-29 years (15.2% to 10.9%).



## 5 Sexually transmitted infections: current situation and trends

Surveillance systems for STIs in the WHO African Region are primarily focused on collecting incidence and prevalence data through passive case reporting and routine screening systems; very few countries have an institutionalised and well-functioning STI surveillance system. Most information on the spread of STIs is generated by prevalence and incidence studies that have been conducted in specific populations to carry out research or develop STI control programmes, e.g. the Rakai and Masaka studies in rural Uganda (Kamali et al., 2003; Wawer et al., 1999), the Mwanza Region trial in the United Republic of Tanzania (Grosskurth et al. 1995), and the Carletonville mining area work in South Africa (Auvert et al. 2001).

WHO and partner organizations have promoted the tracking of epidemics of STIs in the Region as part of second-generation HIV surveillance programmes. The incidence of STIs is not only a useful marker of unprotected sexual intercourse, but the prevalence is also an important co-factor for HIV transmission. An increasing number of countries have reported on syphilis sero-prevalence among pregnant women attending for antenatal care at the sentinel sites. A few countries have implemented community-based STI prevalence surveys using non-invasive laboratory techniques, such as the integrated STI and behavioural sentinel surveillance survey in Mali (CDC and Programme National de Lutte contre le SIDA/IST 2001), and syphilis testing in the Demographic and Health Survey in Zambia (Central Statistical Office Zambia et al., 2003).

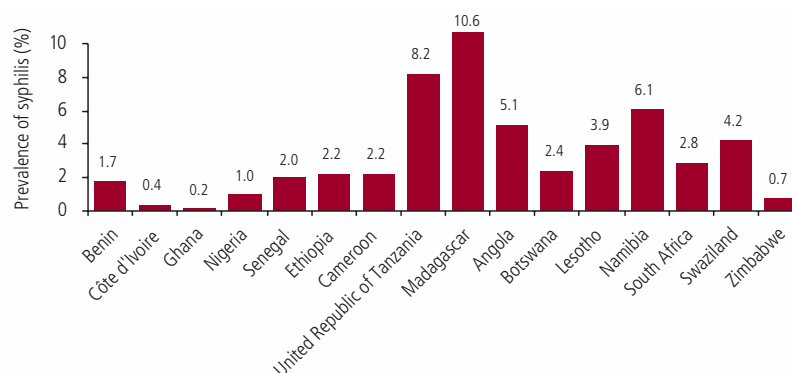
### Sexually transmitted infections: methodological notes

- Syphilis sero-prevalence (i.e. the prevalence of syphilis as diagnosed by serological test) is based on a screening test called Rapid Plasma Reagin (RPR); a positive result is followed by a confirmatory test, such as *Treponema pallidum* haemagglutination assay (TPHA). In antenatal care clinic-based surveillance programmes, however, several countries report syphilis sero-prevalence based on the RPR test only, without a confirmatory test. As a false positive RPR test result is not uncommon, syphilis sero-prevalence is therefore overestimated.
- There is no simple serological test for most STIs. For instance, monitoring for the prevalence of gonorrhoea is based mostly on a laboratory test on genital discharge. There are also urine tests based on, for example, the ligase or polymerase chain reaction (LCR or PCR), but such tests are expensive and require a well-functioning cold chain and specific laboratory resources.
- Herpes simplex virus type 2 (HSV-2) infection can be diagnosed serologically by an antibody test. A positive result is evidence for a past or current HSV-2 infection.
- The declining prevalence of bacterial (treatable) STIs could either be due to implementation of effective passive or active case-finding and treatment of bacterial infections or to a decline in high-risk sexual behaviours in the general population.
- Most data on STIs are derived from local prevalence studies in specific populations. The ad hoc and local nature of most of these studies limits the ability to assess the current situation and trends in prevalence and incidence of such infections at the national level. However, a careful interpretation of epidemiological data from these studies can provide valuable information on the burden of STIs in the Region.

Seventeen countries in the African Region provided results of syphilis testing of women attending antenatal care clinics in their most recent HIV surveillance reports. It is very likely that other countries have also collected such data, as syphilis testing is the most common entry point for anonymous, unlinked HIV testing of residual blood. However, many countries have not yet systematised the collection of results on syphilis or do not report those in HIV surveillance reports. The proportion of women with positive results on syphilis testing ranged from <1% in Ghana, Côte d'Ivoire and Zimbabwe to >8% in the United Republic of Tanzania (Figure 15).

Figure 15

**Prevalence of syphilis among women attending antenatal care clinics at selected sites, by country, 2000-2002**

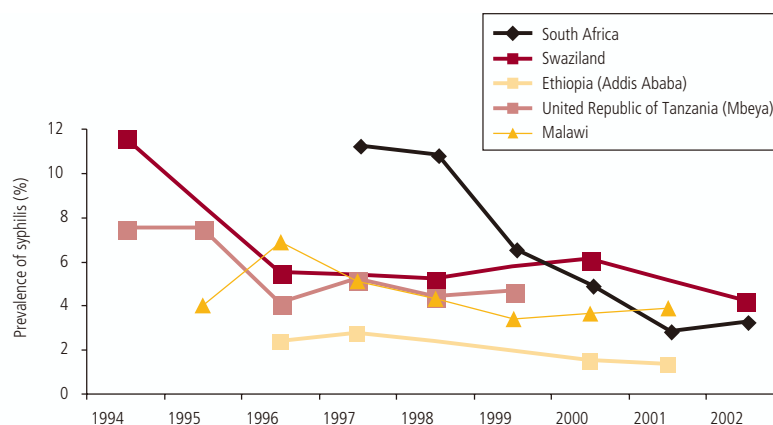


Differences in testing strategies need to be taken into account (see Box: *Sexually transmitted infections: methodological notes*), but sero-syphilis appears to be less common among pregnant women in western Africa than elsewhere in the Region.

Several countries have reported trends in the sero-prevalence of syphilis for all antenatal care clinics combined or for specific sites. For instance, declines in syphilis sero-prevalence have been observed in South Africa, Ethiopia (Addis Ababa), the United Republic of Tanzania (Mbeya Region) and Swaziland (Figure 16).

Figure 16

**Trends in prevalence of syphilis among women attending antenatal care clinics at selected sites, by country, 1994-2002**



Even though such declines may provide evidence of a decrease in unprotected sexual intercourse, there does not seem to be a simple, direct association with trends in HIV prevalence. An important reason for a reduction in syphilis sero-prevalence could be improved treatment practices, while possible changes in testing strategies also have to be taken into account.

Some studies have reported decreases in HIV prevalence that are accompanied by declines in the prevalence of other STIs. For instance, among sex workers in Abidjan, Côte d'Ivoire, between 1991 and 1998, significant declines were observed in prevalence rates of HIV (from 89% to 32%), gonorrhoea (from 33% to 11%), genital ulcers (from 21% to 4%) and syphilis (from 21% to 2%). Similar declines have been reported for sex workers in Cotonou, Benin (Alary et al., 2002). Among truck company workers who participated in a cohort study in Mombasa, Kenya, there was a significant decrease in the frequency of heterosexual intercourse with high-risk partners, but no change in condom use. The change in heterosexual risk behaviour was accompanied by a significant decrease in the incidence of gonorrhoea, non-gonococcal urethritis, and genital ulcer disease (Jackson et al., 1997).

Some countries provide data on trends in multiple STIs among special groups, such as women attending antenatal care clinics. In Botswana, the prevalence of gonorrhoea and syphilis declined from 12% to 3%, and from 10% to 2%, respectively, between 1993 and 2002, but chlamydia infection rates increased from 7% to 11%, chlamydia thus becoming the most common STI.

In Madagascar, where the prevalence of HIV was <1% in the late 1990s, STI surveillance is an essential early warning system for the HIV/AIDS epidemic. Studies among sex workers, and adults in the general population, have all shown that infections with syphilis, gonorrhoea, chlamydia and trichomonas are common and indicate the potential for the spread of HIV via unprotected intercourse (Behets et al., 2001, Leutscher et al., 2003).

Recent studies show that herpes simplex virus type 2 infection is extremely common in sub-Saharan Africa and is an important co-factor in the transmission of HIV. Herpes simplex virus type 2 infection rates increase rapidly with age, from almost none in women in their late teens, and in men in their early twenties. Even in the general population, herpes simplex virus type 2 infection rates of >50% are common in women in their mid twenties and men in their thirties (Auvert et al., 2001, Weiss et al., 2001, Orroth et al., 2003).



## 6 Monitoring sexual behaviour

During the past decade, and particularly in recent years, considerable progress has been made and efforts invested in the collection of behavioural data. Although work is ongoing to improve the measurement of patterns of sexual behaviour, there is broad agreement on the kinds of questions and indicators that should be used to monitor trends in sexual behaviour. National population-based surveys, such as the Demographic Health Surveys (DHS) and UNICEF Multiple Indicator Cluster Surveys (MICS), now almost always include an AIDS module containing questions on sexual behaviour.

### Behavioural surveillance: methodological notes

–Key indicators to monitor adult sexual risk behaviour focus on (UNAIDS, 2000):

- Higher-risk sex in last year (defined as sex with a non-marital non-cohabiting sexual partner)
- Condom use at last time had sex with a higher-risk partner within the last year
- Median age at first time had sex among young people aged 15-24 years
- Premarital sex among young people aged 15-24 years and condom use at last time had premarital sex
- Young people's condom use with non-regular partners (UNGASS: a composite of different indicators)

–Self-reported sexual behaviour data have a number of limitations. Respondents, young people and especially young women, may under-report sexual activity. As an AIDS epidemic matures and the level of AIDS awareness increases as a result of public health education, survey respondents may be more likely to give socially desirable answers (such as having used a condom), and less likely to disclose less socially acceptable behaviour, such as premarital sexual activity and multiple sexual partners.

–Behavioural studies are, in general, descriptive and their results cannot directly infer causality between declines in higher-risk sexual behaviour and declines in HIV prevalence, although consistent results may suggest a positive association between the two.

–Comparison of sexual behaviour indicators between countries needs to be done with considerable caution, as systematic reporting biases may occur. The reported differences in the levels of higher-risk sexual behaviour between countries may not reflect true differences.

The results from these surveys indicate that sexual activity for both men and women in most countries starts between ages 16 and 18 years, even though marriage commonly occurs several years later (Figure 17 and Table 5). Sexual activity before age 15 is a rare event (2-3% of the Regional population), and is more common among women than men.



Table 5

**Selected indicators of sexual behaviour among all adults and young people, from selected Demographic and Health Surveys, 1997-2002**

Country (year of survey)	Higher-risk sex in the last year (%)		Condom use at last higher-risk sex (%)		Median age at first sex (years)		Premarital sex in last year (%)		Condom use at last premarital sex (%)	
	All adults (15–49 years old)				Young people (15–24 years old)					
	M	W	M	W	M	W	M	W	M	W
Benin (2001)	—	—	—	—	—	—	53	42	—	—
Burkina Faso (1999)	31	8	57	39	19.5	17.5	34	24	55	44
Cameroon (1998)	61	28	29	15	17.5	16.5	58	52	32	17
Côte d' Ivoire (1998)	59	32	49	21	17.1	16.5	61	56	—	—
Ethiopia (2000)	17	5	30	14	22.1	19.0	16	2	30	24
Gabon (2000)	67	42	48	33	16.9	16.2	76	64	—	—
Ghana (1998)	—	—	—	—	20.5	18.1	24	31	40	22
Guinea (1999)	51	13	33	17	17.4	16.7	52	27	33	20
Kenya (1998)	47	22	44	16	17.1	17.9	56	32	43	15
Madagascar (1997)	—	—	—	—	—	17.0	—	38	—	3
Malawi (2000)	33	9	39	29	16.5	17.0	49	27	36	32
Mali (2001)	10	2	33	14	—	—	37	30	—	—
Mozambique (1997)	—	—	—	—	16.0	16.3	61	43	13	6
Niger (1998)	17	2	32	11	—	—	21	5	32	10
Nigeria (1999)	—	—	—	—	19.4	18.1	31	28	38	21
Rwanda (2000)	12	6	51	15	20.4	20.8	9	4	55	25
Senegal (1997)	—	—	—	—	—	19.2	—	9	—	—
South Africa (1998)	—	—	—	16	—	17.8	—	53	—	20
United Republic of Tanzania (1999)	51	27	34	22	16.8	17.1	57	39	31	19
Togo (1998)	49	23	38	19	18.1	16.7	46	53	42	22
Uganda (2000–2001)	28	14	59	38	18.3	17.3	31	27	58	50
Zambia (2001–2002)	—	—	44	33	17.0	17.0	53	32	41	32
Zimbabwe (1999)	41	14	70	43	19.0	18.8	34	15	69	39

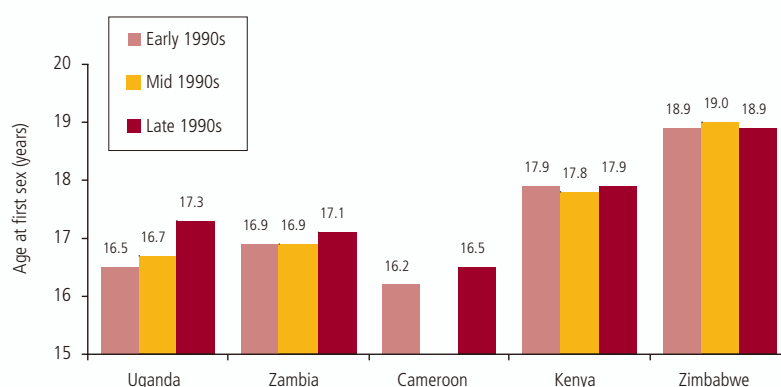
— no data available, M, Men; W, Women

During the years of premarital sexual activity, condom use is low. Also, data from several countries indicate that later in adulthood, multiple partnerships are fairly common, particularly among men, married or not. Although condom use during sexual intercourse with higher-risk partners (defined as non-married, non-cohabiting partners) has increased based on a few trends data available (Figure 19), it remains low, and consistent use even lower. At all ages, women are less likely than men to have access to or to use condoms. The exchange of sex for money, gifts, or favours varies widely by countries, and between urban and rural areas within countries, with no specific patterns. However, the practice seems to be quite prevalent in many countries among sexually active young people, and is more common among youth than adults.

Several countries now have multiple national surveys that provide data on indicators of adolescent sexual behaviour and condom use. Trends are best assessed using the same methodology over time. Overall, there are modest changes in age at first having intercourse, with only a few countries, such as Uganda, showing an increase (Figure 17).

Figure 17

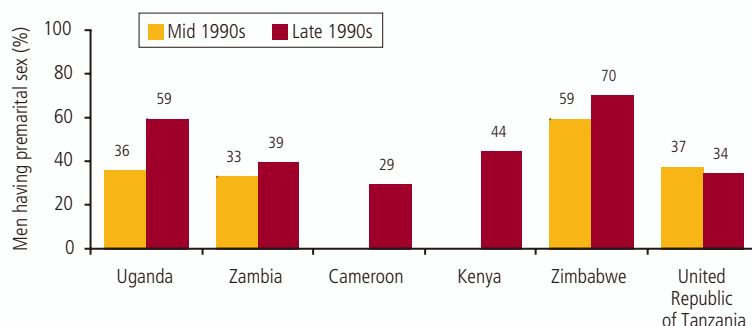
**Median age at first sexual intercourse among young women aged 15-24 years in selected countries with surveys in multiple years**



The proportion of young men reporting premarital intercourse varies greatly between countries; large variation is also possible within the same country over time, as illustrated in Figure 18.

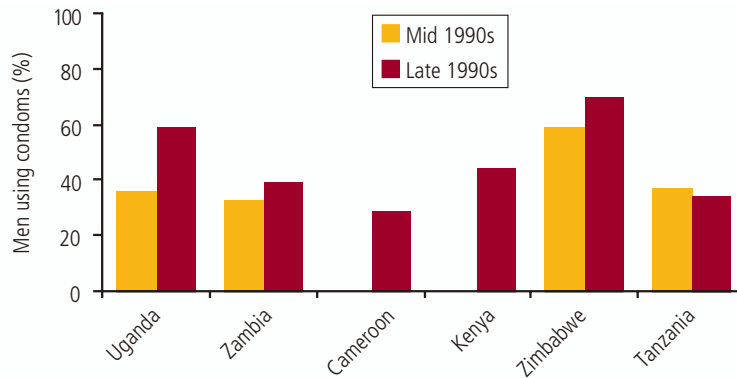
Figure 18

**Never married young men aged 15-24 years who had sex in the past year in selected countries**



Condom use has increased in most countries; most recently, >50% of men in some countries reported having used a condom at last intercourse with a non-marital partner who did not live with them (Figure 19).

Figure 19

**Condom use by men at last sexual intercourse with a non-regular partner in selected countries**

Behavioural surveillance surveys (BSS) are conducted in many countries. These surveys focus on specific populations, such as mobile populations, sex workers, young people and female traders. Most countries are still at the stage of establishing a baseline survey to assess current behaviours as a baseline for future assessment. Senegal has a concentrated HIV epidemic (i.e. HIV prevalence is >5% in at least one population at higher risk of HIV infection but <1% in the general population) and developed a behavioural surveillance system that included both populations at higher risk of HIV infection, e.g. sex workers, and populations at lower risk of HIV infection, e.g. young people. Regular surveys among sex workers in Senegal during the 1990s showed an increase in condom use with both regular and new clients, with condoms being used by 95% of sex workers in 1998.

## 7 Mortality and morbidity from HIV/AIDS: the rising toll

The impact of the HIV/AIDS epidemic on adult and child mortality and morbidity is becoming increasingly clear. During the 1990s, research studies in Uganda and the United Republic of Tanzania provided the first clear evidence of the impact of HIV/AIDS on adult mortality at the community level (Boerma et al., 1998). In these countries, HIV/AIDS became the leading cause of death among adults aged 15-49 years. HIV/AIDS caused 30-50% of adult deaths, and HIV-infected persons had at least a ten-fold higher relative risk of mortality than HIV-negative persons. In a cohort study of the natural history of HIV/AIDS in Masaka, Uganda, in which adults with known dates of HIV seroconversion were followed for more than a decade; the median survival time was just over nine years (Morgan et al., 2002).

More recently, the most dramatic evidence of the impact of the HIV/AIDS epidemic on mortality comes from southern Africa. Until the early 1990s, several countries in southern Africa reported some of the lowest mortality rates on the continent. The devastating extent of the AIDS epidemic in this sub-region will alter this situation drastically. Adult mortality estimates from the 1994 and 1999 DHS surveys show that in Malawi and Zimbabwe the mortality rate has doubled and, in some age groups, more than tripled, notably in young adults, an observation which indicates that AIDS is the principal cause of this increase (Figure 20a, b and c).

Figure 20a

Relative increase in age-specific mortality rates in Zambia, 1995-1999 to 1990-1994

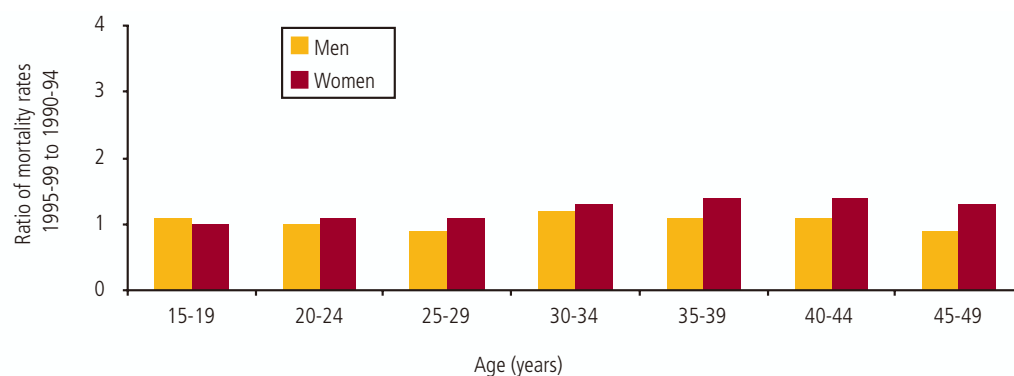


Figure 20b

Relative increase in age-specific mortality rates in Malawi, 1995-1999 to 1990-1994

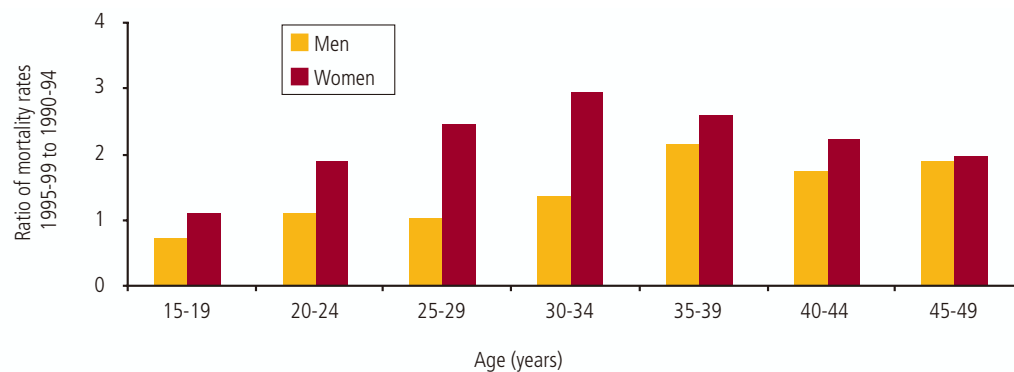
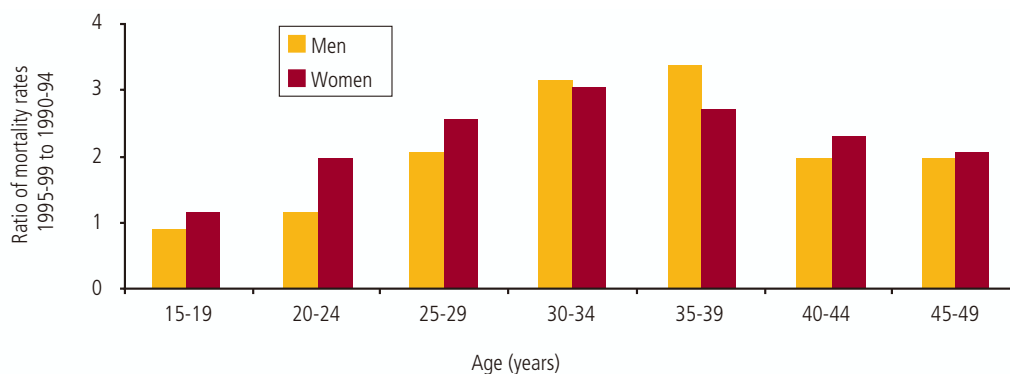


Figure 20c

## Relative increase in age-specific mortality rates in Zimbabwe, 1995-1999 to 1990-1994



The increase in mortality in Zambia is much smaller than in Malawi and Zimbabwe. Overall, the rate of adult mortality in Zambia rose by 15% between 1992-1996 and 1997-2001. An explanation for the much smaller increase in Zambia compared to that in neighbouring countries with similar epidemics is that adult mortality in Zambia may have already been elevated by HIV-associated mortality in the early 1990s. HIV/AIDS is undoubtedly also a significant contributor to the reversal of decades of gains in child survival during the 1990s. For instance, in Zimbabwe, mortality of children aged <5 years increased from 77 to 102 deaths per 1000 live births between 1990-1994 and 1995-1999 respectively.

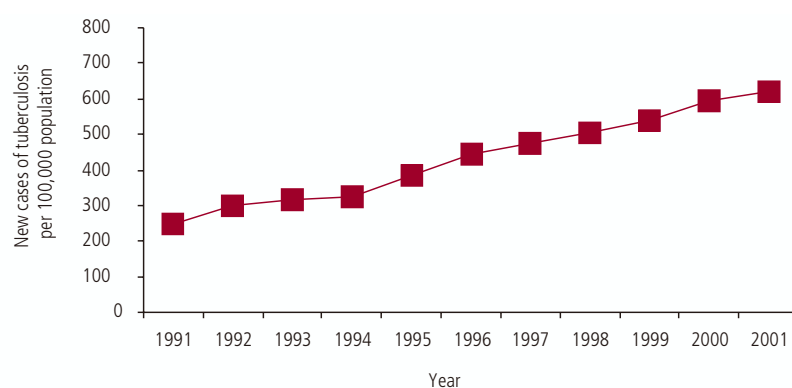
The impact of AIDS on adult and child mortality in western Africa is likely to be considerably smaller than in southern Africa, as the epidemic in western Africa is much less severe and because mortality levels prior to the AIDS epidemic were higher. In eastern Africa, various studies have reported substantial increases in adult mortality. In Addis Ababa, Ethiopia, an examination of burial records shows a three- to five-fold increase in adult mortality at ages 25-39 years (Sanders et al., 2003). In a rural area of the United Republic of Tanzania, mortality rates among HIV-infected adults were 15 times higher than those among HIV-negative adults, and HIV/AIDS was associated with nearly half of deaths at ages 15-44 years (Urassa et al., 2001). Nearly one-quarter of the babies born to HIV-infected mothers died before their second birthday, a rate which was 2.5 times higher than that among children of HIV-negative mothers.

Several countries report large increases in hospital admissions and deaths among adults aged 15-49 years, e.g. the Namibia surveillance system reported that AIDS became the leading cause of hospital admission and death among adults during the 1990s. In Kenyatta National Hospital in Nairobi, Kenya, in 1997, 40% of adult medical patients were infected with HIV (Arthur et al., 2000). Time trends suggest that fewer clinical AIDS patients are presenting for hospital care, implying a rising community burden of chronic HIV/AIDS disease. Evidence from rural areas of the United Republic of Tanzania indicates that almost half of the adults who died of AIDS were not admitted to hospital at any time during their illness (Ngalula et al., 2002). HIV/AIDS is now well-established as the primary cause of hospital admission among adults in most of the region. Studies of the costs of treatment in Kenya and the United Republic of Tanzania have indicated that cost patterns for inpatient care are similar irrespective of HIV status or a diagnosis of clinical AIDS, probably reflecting the limited provision of care beyond basic clinical services (Guinness et al., 2002, Ngalula et al. 2002). Length of stay rather than differing treatment regimes thus appears to be the main driving force with regard to cost.

Tuberculosis incidence rates in the WHO African Region are estimated to be 290 per 100,000 population per year; 31% of all new tuberculosis cases in adults aged 15-49 years in 2000 were found to be attributable to HIV infection (Corbett et al., 2003). Dramatic increases in pulmonary tuberculosis notification rates were observed in several countries, e.g. in Botswana the pulmonary tuberculosis notification rate increased 2.5 times during the past decade (Figure 21).

Figure 21

Annual trend in new cases of tuberculosis in Botswana, 1991-2001

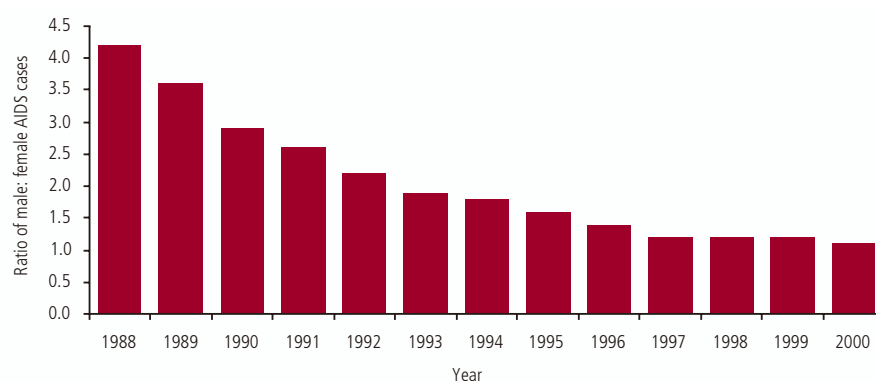


In the United Republic of Tanzania, about 60% of the increase in the notification rates of pulmonary tuberculosis during 1991-1993 and 1996-1998 was associated with HIV infection (Range et al., 2001).

AIDS cases are seriously under-reported in all countries and it is difficult to assess trends over time as the amount of under-reporting may vary from year to year. It is possible, however, to consider some aspects of AIDS case reporting, such as the male to female ratio. Figure 22 shows how the male to female AIDS case ratio in Côte d'Ivoire changed over time, as the epidemic became more widespread after being initially concentrated among sex workers and their male clients. In the era of antiretroviral therapy, there is a new impetus to improve AIDS case definitions and case reporting.

Figure 22

Ratio of male to female AIDS cases in Côte d'Ivoire, 1988-2000





## 8 The HIV/AIDS situation by sub-region: variation in the epidemic

Detailed information on HIV/AIDS by country can be found in Part II, which includes country profiles of the current situation with regard to HIV, STIs and behaviour in all countries in the WHO African Region. This section provides an overview of the HIV/AIDS situation in southern Africa, eastern Africa, central Africa and western Africa. No summary is provided for the Indian Ocean sub-region, as little data for the last two years were available.

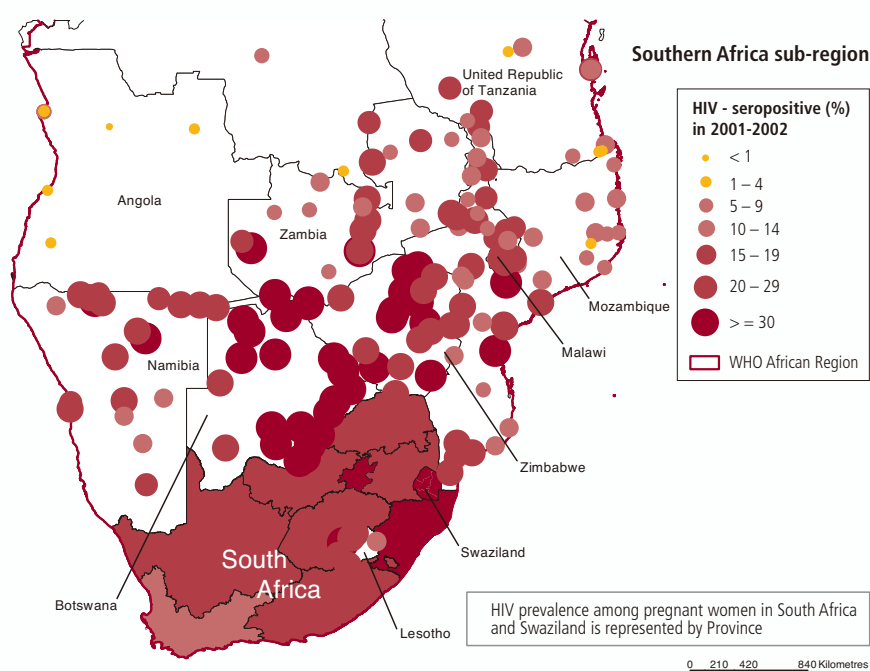
### Southern Africa

By 2002, the population of ten countries in southern Africa was just over 118 million people, including nearly 45 million people living in South Africa (United Nations, 2002). A fairly large proportion of the population (42%) in Southern Africa lives in urban areas (Table 1). Antenatal care clinic-based surveillance is the backbone of the HIV epidemic-tracking system; nine out of ten pregnant women attend antenatal care clinics. The surveillance systems of several countries have been expanding in recent years; those in Botswana, Mozambique, Namibia, South Africa, Swaziland, and Zimbabwe have now achieved good coverage of urban and semi-urban populations and are also expanding to cover rural populations. The surveillance system in South Africa is unique because it has been using data from about 400 clinics throughout its nine provinces, and because these clinics are selected on the basis of size, using probability proportional to size sampling. In all other countries, the selection of clinics is not guided by statistical methods. Three countries in southern Africa have recently completed national population-based surveys with HIV testing: South Africa, Zambia and Zimbabwe.

Southern Africa is by all measures the sub-region of Africa that is most affected by HIV/AIDS. In 2002, more than one in five pregnant women tested were infected with HIV, and several countries reported the prevalence of HIV infections in antenatal care clinics to be >25% (Figure 23).

Figure 23

**HIV prevalence among women attending antenatal care clinics in southern Africa, data reported by clinic site or city, 2001-2002**

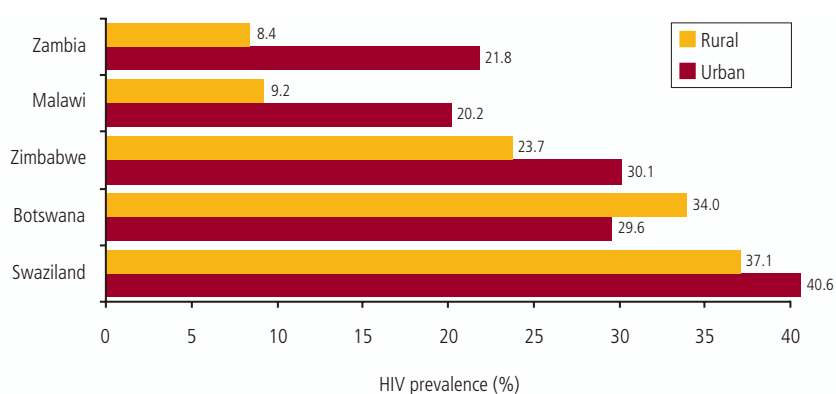




Eight countries reported HIV prevalence for young pregnant women. In 2002, in all of these countries, >10% of pregnant women aged 15-24 years were infected with HIV. Prevalence of HIV infections in the rural antenatal care clinics was only slightly lower than the urban sites in Swaziland, Botswana and Zimbabwe, while larger differences were found in Malawi and Zambia (Figure 24).

Figure 24

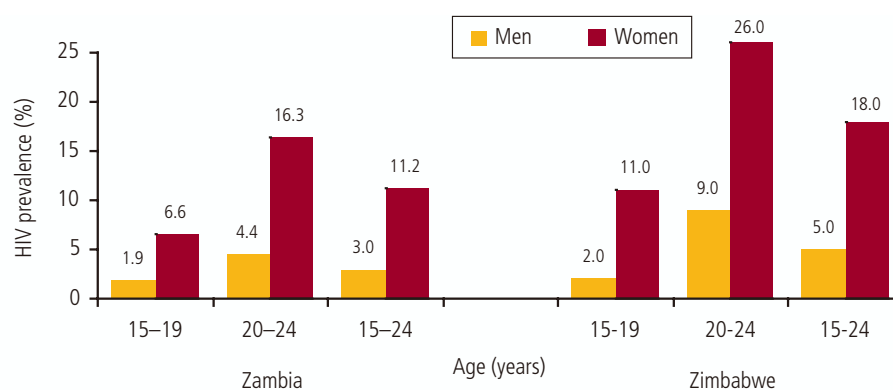
**Median HIV prevalence among young women aged 15-24 years attending antenatal care clinics in southern Africa, by location, selected countries, 2001-2002**



The population-based surveys provide data on HIV prevalence among all women and among men. Prevalence was 1.3 times higher among women than among men in the age group 15-49 years in Zambia. Among young people, the differences between the sexes are even larger. In both Zimbabwe and Zambia, HIV prevalence among women aged 15-24 years was about 3.5 times higher than that in men of the same age group (Figure 25). In other words, nearly 80% of all people of 15-24 years of age who are infected with HIV in these countries are women.

Figure 25

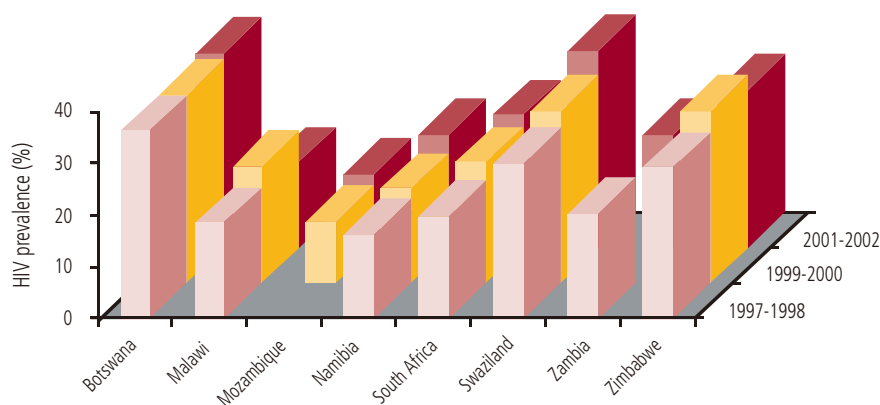
**HIV prevalence among young men and women aged 15-24 years in national population-based surveys, Zambia and Zimbabwe, 2001-2002**



Overall, the epidemic in southern Africa appears to be stabilizing at very high levels of HIV prevalence. Comparison of data for 1997-1998, 1999-2000 and 2001-2002 from the same antenatal care clinic sites, in eight countries, provides little evidence of a decline in prevalence (Figure 26). This trend analysis is based on information from more than 100 antenatal care clinics in the different countries, plus the national system with 400 clinics in South Africa. A small decrease in HIV prevalence in the most recent period is observed in Malawi and Zimbabwe; all other countries have minor increases in prevalence or no change.

Figure 26

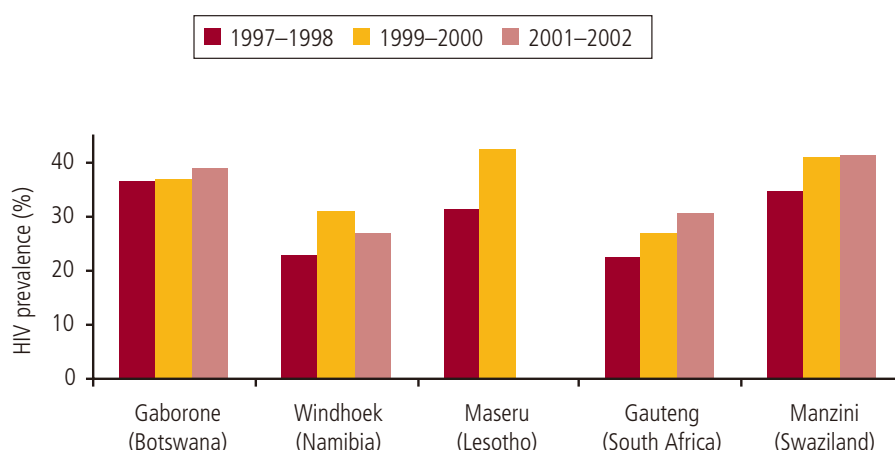
Trends in median HIV prevalence among women attending antenatal care clinics in southern Africa, data from the same clinics, by country, 1997-2002



Although HIV prevalence in antenatal care clinics located in major urban areas and capital cities may not be representative of the whole country, these data do provide an indication of the severity and trend of the epidemic. HIV prevalence in these urban populations was very high in almost all countries. In Maseru (Lesotho), Gaborone, Francistown and Selebi Phikwe (Botswana), and Manzini region (Swaziland), more than 40% of pregnant women were reported to be infected with HIV. Prevalence exceeded 30% in Gauteng province, which includes Johannesburg (South Africa), and Harare, (Zimbabwe), followed closely by Blantyre (Malawi), Lusaka (Zambia) and Windhoek (Namibia). In Maputo (Mozambique), 18% of pregnant women were seropositive. The five clinics in Luanda (Angola) had a median HIV prevalence of nearly 9%. The trends in the cities present little evidence of favourable changes. Overall, HIV prevalence remained very high or increased slightly in most cities between 1997-1998 and 2001-2002 (Figure 27).

Figure 27

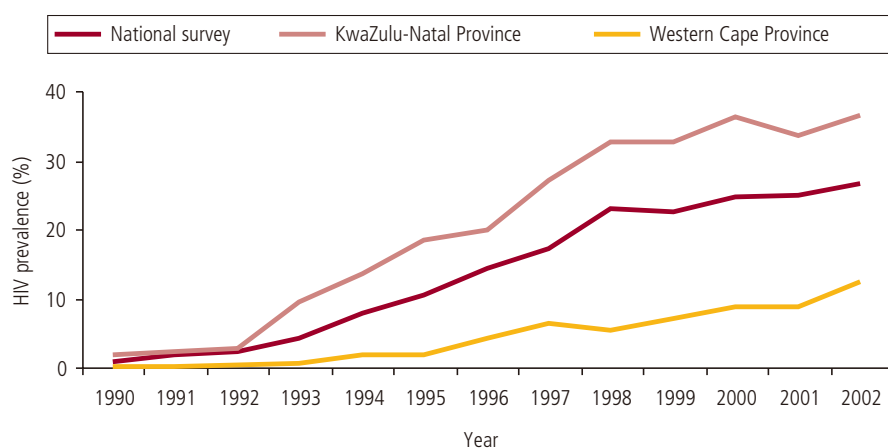
Trends in median HIV prevalence among women attending antenatal care clinics in capital cities in southern Africa, 1997-2002



HIV prevalence among pregnant women aged 15-49 years in *South Africa* continued to increase, reaching 26.5% in 2002. Growth of the epidemic was rapid between 1990 and 1997, but has been more gradual since 1998 (Figure 28).

Figure 28

**Trends in median HIV prevalence among women attending antenatal care clinics in South Africa, national and in selected provinces, 1990-2002**



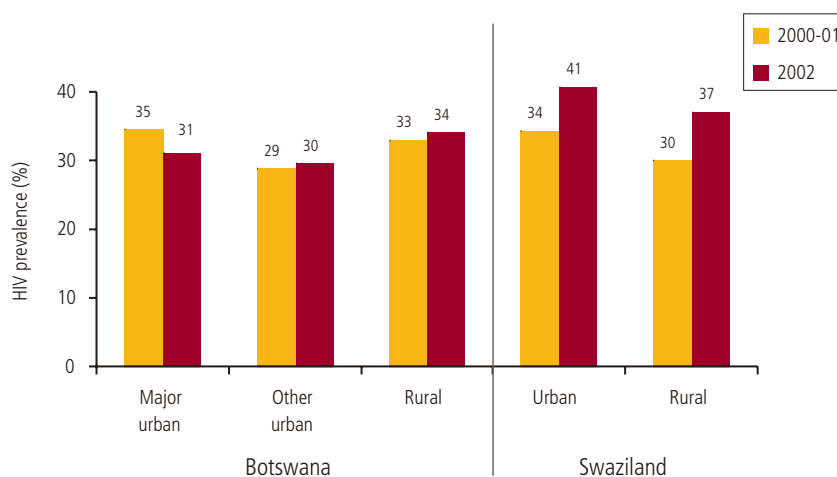
The difference between the province with the highest HIV prevalence (KwaZulu-Natal) and the province with the lowest prevalence (Western Cape) is large (three-fold), but decreased slightly during 2002. The South Africa national population-based survey in 2002, which had high levels of non-response because of absence or refusal, reported somewhat lower estimates for national HIV prevalence. However, the estimate of the total number of people infected was similar to previous estimates based on the antenatal care clinic surveillance data, due to the large number of children infected with HIV. The latter finding was unexpected and needs further study before any conclusions can be drawn.

The trends in the data from antenatal care clinics in South Africa are very consistent, by province and by age. HIV prevalence among young women aged 15-24 years has remained constant at about 24% since 1997, but in recent years, there has been a very modest decline in HIV prevalence among women aged 15-19 years. This may indicate a small decrease in the incidence of HIV infection among young women, but it may also be associated with other changes, such as fertility behaviour, e.g. use of condoms for contraception.

The HIV epidemic has grown to devastating proportions in four countries with smaller populations: *Botswana*, *Lesotho*, *Namibia* and *Swaziland*. The combined population of these countries in 2001 was about six million people. In Botswana and Swaziland, which both have extensive surveillance systems, HIV prevalence in both urban and rural sites was found to be well over 30% in 2002. HIV prevalence reported by antenatal care clinics in Namibia rose to 22.5% in 2002. Lesotho did not conduct surveillance surveys in 2001 and 2002, but reported a prevalence of HIV infections of just over 20% in most antenatal care clinics in 2000. HIV prevalence among young pregnant women aged 15-24 years has reached extremely high levels. There are no signs of a possible decline in HIV incidence in Botswana and Swaziland (Figure 29).

Figure 29

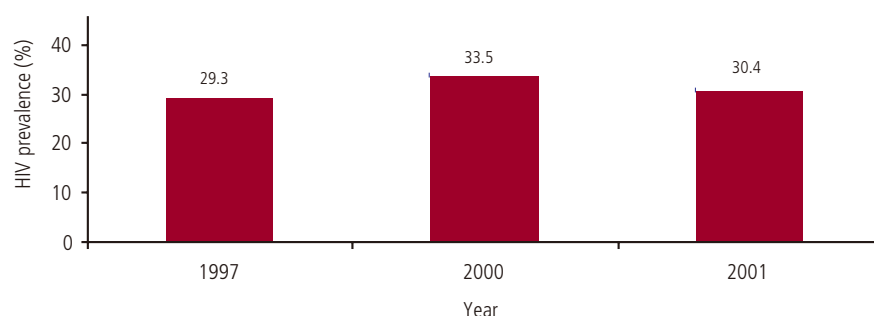
**Median HIV prevalence among young women aged 15-24 years attending antenatal care clinics in Botswana and Swaziland, by location**



The 19 antenatal care clinics in *Zimbabwe* had a median HIV prevalence of just over 30% in 2001, both in all women, and in young women aged 15-24 years. Following the same 13 antenatal care clinics over time indicates that HIV prevalence in 2001 was at the same level as in 1997 (Figure 30). In the Young Adult Survey (YAS) in 2001, a household survey, HIV prevalence among young women and men aged 15-24 years was 18% and 5% respectively (Ministry of Health Care and Child Welfare, Zimbabwe, 2002). The much lower prevalence of HIV infection found among women in the household survey compared to women in antenatal care clinics can be explained by better coverage of rural areas and by inclusion in the survey of young, non-pregnant women who are likely to be less sexually active. Notable is the almost four-fold difference in HIV prevalence between young women and young men.

Figure 30

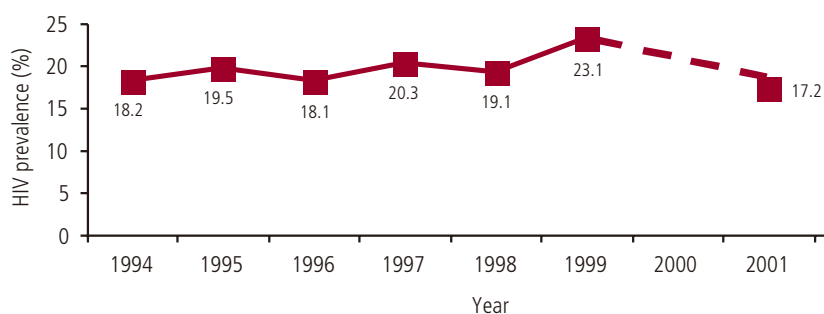
**Trends in median HIV prevalence among women attending antenatal care clinics in Zimbabwe, data from the same 13 clinics, 1997-2001**



The prevalence of HIV infection in *Malawi* and *Zambia* is lower than in the more southern countries in the Region. In 2001, the 19 antenatal care clinics in Malawi reported the lowest HIV prevalence since 1994, both among young women and all women; the results of the 2003 survey should confirm whether this is a real decline (Figure 31). Zambia conducted a national population-based survey in 2001-2002; about three-quarters of the respondents agreed to be tested for HIV. Overall, 15.6% of respondents aged 15-49 years were infected, and prevalence was about one and a half times higher in women than in men. The findings of the survey were consistent with the antenatal care clinic-based surveillance data for 2002 (Table 2).

Figure 31

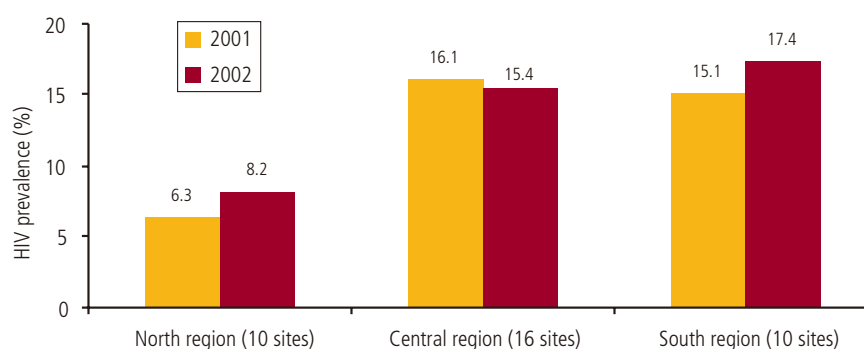
**Trends in median HIV prevalence among young women aged 15-24 years attending antenatal care clinics in Malawi, data from the same 19 clinics, 1994-2001**



*Mozambique* and *Angola* have the lowest HIV prevalence rates in southern Africa. Mozambique has developed an extensive surveillance system, which reported in 2002 that about one in seven pregnant women were infected with HIV. The lowest levels of prevalence are found in the northern part of the country, but prevalence is increasing (Figure 32). Angola is developing a surveillance system, with ten clinics participating in 2002. Prevalence was <5% in most sites, but one-third of sex workers in the capital city, Luanda, were infected.

Figure 32

**Median HIV prevalence among women attending antenatal care clinics in Mozambique, by region, 2001-2002**



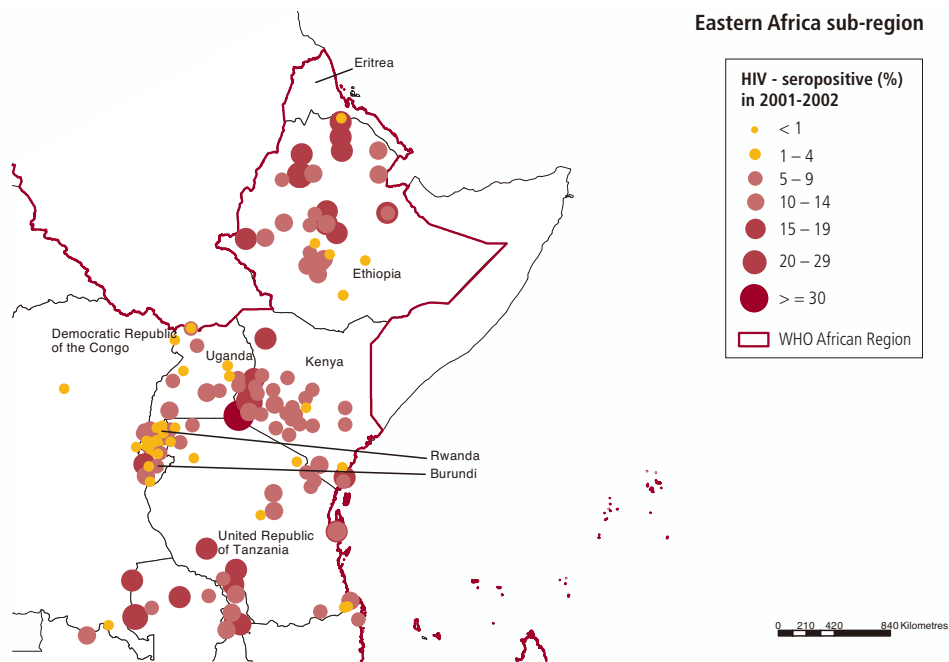
## Eastern Africa

By 2002, the population of the seven countries in eastern Africa was just over 180 million people, including almost 69 million people living in Ethiopia (United Nations, 2002). The population is predominantly rural: only 22% of people live in urban areas (Table 1). Antenatal care clinic-based surveillance is the backbone of the HIV/AIDS epidemic tracking system. In most countries, the majority of pregnant women attend antenatal care clinics. In Ethiopia and Eritrea, however, antenatal care clinic attendance is below 50%, which may affect how representative the antenatal care clinic-based surveillance data are. In several countries, HIV surveillance systems have been expanding: Ethiopia, Kenya, the United Republic of Tanzania, and have improved coverage of urban, semi-urban and rural populations. Burundi, and Zanzibar (United Republic of Tanzania), have recently completed national population-based surveys with HIV testing. Eritrea conducted a national survey of selected populations at different levels of risk, e.g. students, pregnant women, mobile populations, and sex workers. Ethiopia has conducted HIV testing of army recruits.

Eastern Africa has the oldest HIV/AIDS epidemic in Africa. By 2002, the prevalence of HIV infections in most urban antenatal care clinics was between 10% and 15%, while prevalence in rural sites was <10% (Figure 33).

Figure 33

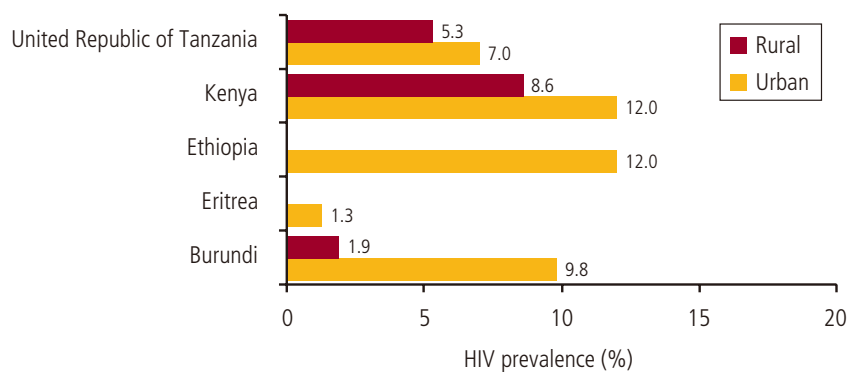
**HIV prevalence among women attending antenatal care clinics in eastern Africa, data reported by clinic site or city, 2001-2002**



Five of the seven countries in eastern Africa reported HIV prevalence for young pregnant women. HIV prevalence was >10% in Ethiopia (where 12% of all women attending 34 antenatal care clinics were infected with HIV), urban Kenya and Bujumbura, Burundi (Figure 34).

Figure 34

**Median HIV prevalence among young women aged 15-24 years attending antenatal care clinics in eastern Africa, by location and country, 2001-2002**

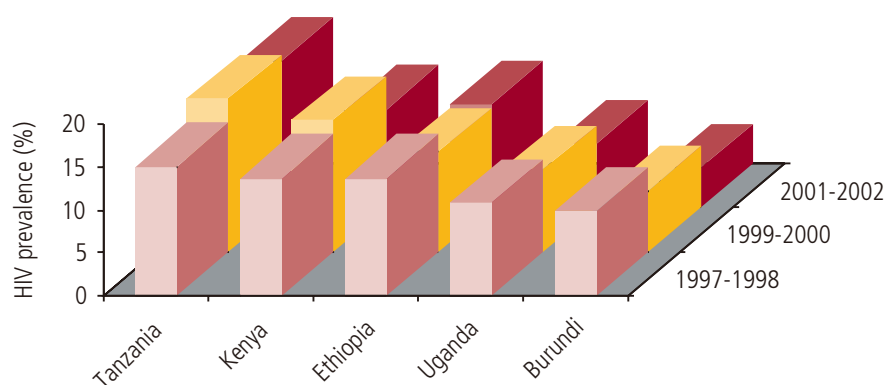


Several countries have documented large urban–rural differences in HIV prevalence. For instance, the population-based survey in Burundi showed five-fold differences in HIV prevalence between women living in urban areas and in rural areas. The results were consistent with those obtained from surveillance of antenatal care clinics.

Overall, the epidemic in eastern Africa appears to be declining slowly. Comparison of the same antenatal care clinic sites with data for 1997-1998, 1999-2000 and 2001-2002 in five countries (Burundi, 6 clinics; Ethiopia, 10 clinics; Kenya, 20 clinics; and Uganda, 9 clinics) showed modest to more substantial declines in HIV prevalence (Figure 35). Data from the United Republic of Tanzania did not exhibit such a trend, but the relevant information could only be obtained from five clinics, as most of the clinics participating in the surveillance system were changed in 2002.

Figure 35

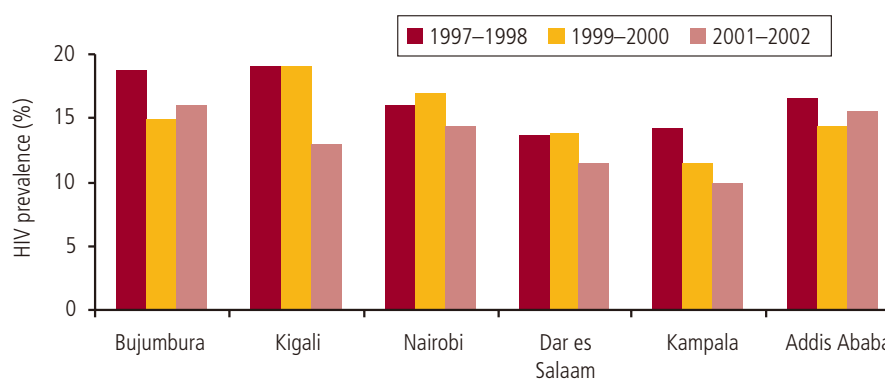
**Trends in median HIV prevalence among women attending antenatal care clinics in eastern Africa, data from the same clinics, by country, 1997-2002**



Although HIV prevalence in antenatal care clinics located in major urban areas and capital cities may not be representative of the country as a whole, these data do provide some indication of the severity and trend of the epidemic. In general, HIV prevalence decreased in six capitals with data for 1997-1998, 1999-2000, and 2001-2002. Prevalence ranged from 10% in Kampala to 16% in Bujumbura and Addis Ababa in the most recent period (Figure 36).

Figure 36

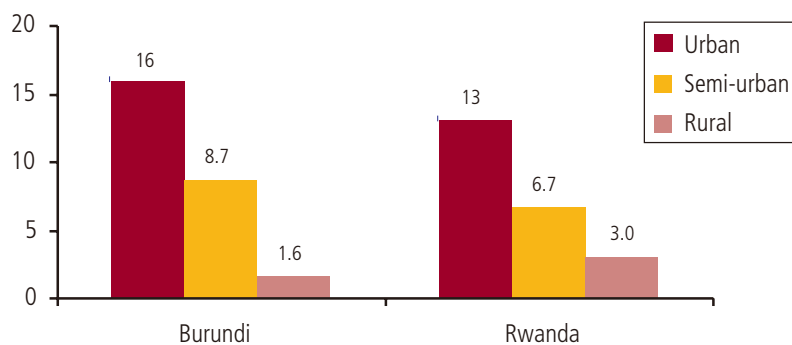
**Trends in median HIV prevalence among women attending antenatal care clinics in capital cities in eastern Africa, 1997-2002**



The prevalence of HIV in *Burundi* and *Rwanda* shows several similarities. HIV prevalence rates among women attending antenatal care clinics in the capital cities, Bujumbura and Kigali, were 16% and 13% respectively, and many semi-urban sites reported similarly high HIV prevalence rates. In rural clinics, however, HIV prevalence was much lower (Figure 37). The results of the national survey in Burundi were consistent with the antenatal care clinic data.

Figure 37

**Median HIV prevalence among women attending antenatal care clinics in Burundi and Rwanda, by location, 2002**

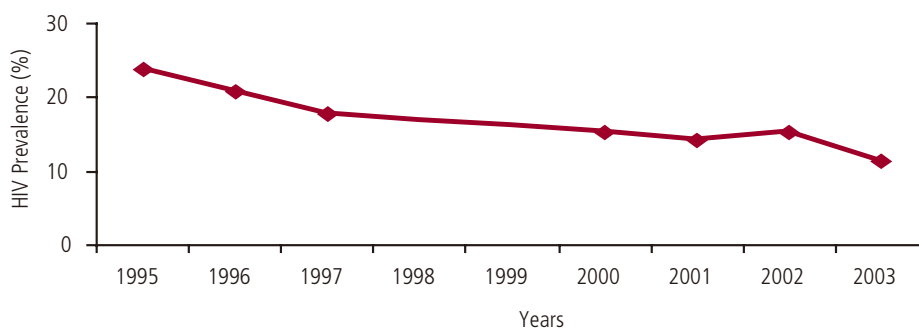


In 2001, *Eritrea* conducted a nation-wide AIDS survey that included several sub-populations. Sample size and notably number of sampling clusters were small, so the results should be interpreted with caution, but they do provide some insight into the prevalence of HIV. HIV prevalence among young women aged 15-24 years attending antenatal care clinics, and among students aged 15-19 years was 1.3% and 0.2%, respectively.

Based on the surveillance round of 2001, which included 34 antenatal care clinics, national HIV prevalence among pregnant women in *Ethiopia* was estimated at 11.2%. There are marked differences in prevalence between antenatal care clinics in Addis Ababa, other urban areas and rural areas: 16.2%, 12.0% and 1.7% respectively. Favourable changes have been observed among young women aged 15-24 years in inner and outer city antenatal care clinics of Addis Ababa between 1997 and 2002 (Figure 38).

Figure 38

**Trends in median HIV prevalence among young women aged 15-24 years attending antenatal care clinics in Addis Ababa, Ethiopia, 1995-2003**

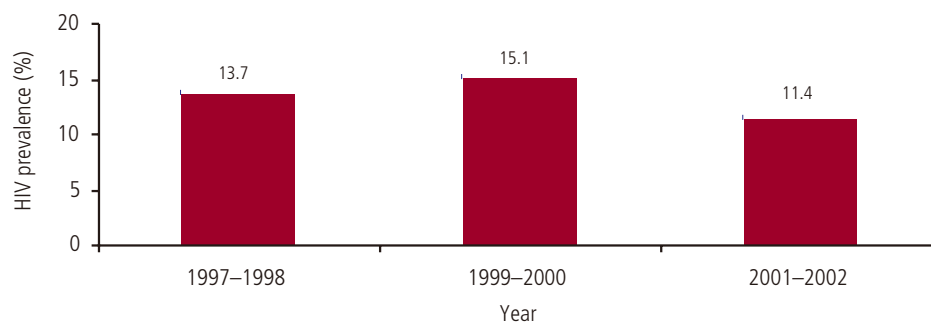


*Kenya* has consistently monitored the same antenatal care clinics throughout the past decade and gradually increased the number of sentinel sites to 34 to improve coverage of the rural population. Following the same 20 sites for the last six years shows that there has been a decrease in HIV prevalence in recent years (Figure 39). Based on data from 34 clinics, the national HIV prevalence in 2002 is estimated to be 6.5% among all pregnant women, and 9.8% among young women aged 15-24 years.



Figure 39

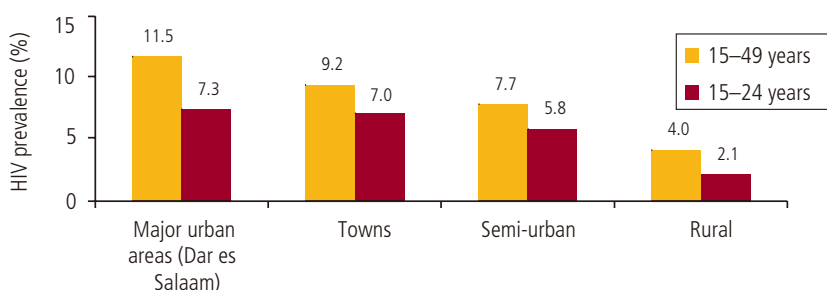
**Trends in median HIV prevalence among women attending antenatal care clinics in Kenya, data from the same 20 clinics, 1997-2002**



The United Republic of Tanzania recently changed its surveillance system to improve coverage and linkage of HIV prevalence and behavioural surveillance. On the mainland of the United Republic of Tanzania, HIV prevalence in urban pregnant women (both for all women and for young women) is about three times higher than among rural pregnant women (Figure 40). A national population-based survey in Zanzibar in 2001 reported continued low HIV prevalence among men and women aged 15-49 years (0.4% and 1.3% respectively).

Figure 40

**Median HIV prevalence among women attending antenatal care clinics in mainland United Republic of Tanzania, by location, 2002**



The decrease in HIV prevalence in Uganda since the early 1990s has been the subject of many studies. Surveillance data for 2001 indicate a continuation of the decline: among the same nine clinics, reported HIV prevalence decreased from 10.6% in 1997-1998 to 9.6% in 1999-2000 and 7.4% in 2001. This observation is supported by results of a longitudinal cohort study in Masaka district, which shows a reduction in incidence of HIV among young people during the 1990s (Mbulaitete et al., 2002).

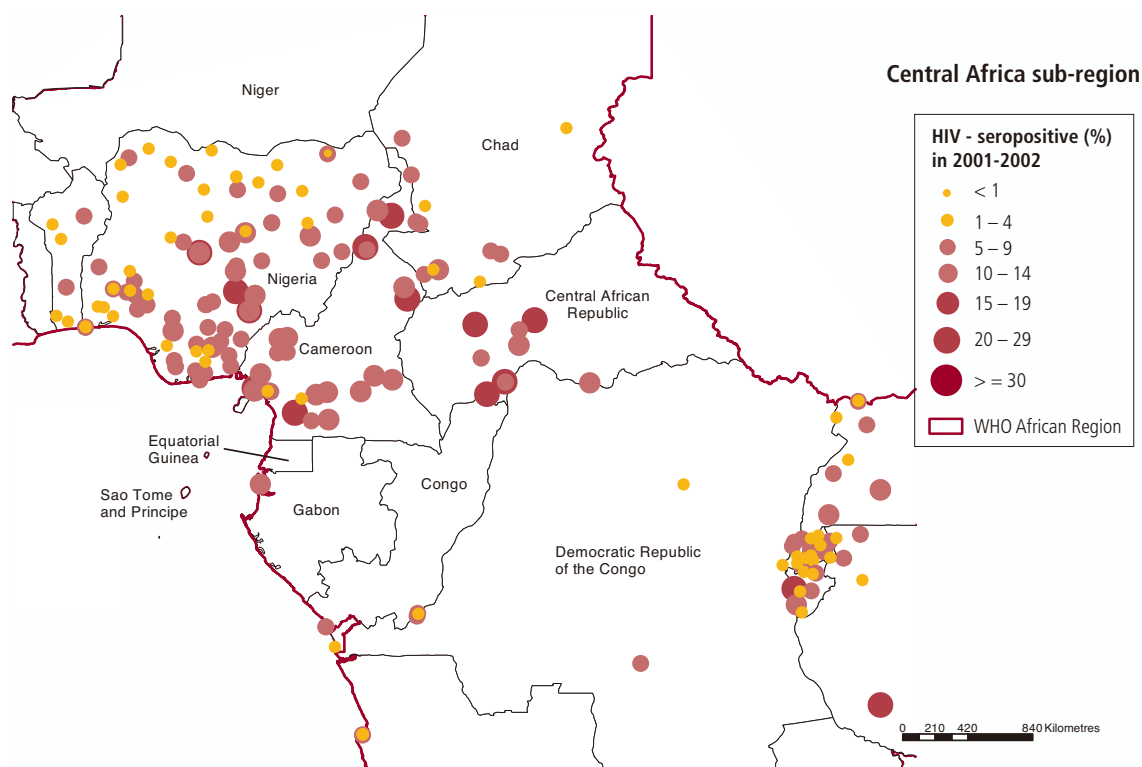
## Central Africa

By 2002, the population of the eight countries in central Africa was almost 85 million people, including 51 million people living in the Democratic Republic of Congo (United Nations, 2002). The population is predominantly rural: 37% of people live in urban areas (Table 1). Antenatal care clinic-based surveillance is the key source of information on the course of the HIV/AIDS epidemic, although only Chad and the Central African Republic carried out rounds of surveillance including at least 10 clinics during 2001-2002. Cameroon conducted an extensive round of surveillance in 2002 that the results were not yet available. Data from all other countries are very limited. The political instability in both the Democratic Republic of Congo and the Congo has prevented surveillance activities beyond those in a few urban sites.

As a consequence of these limited surveillance activities, it is difficult to assess the current situation in central Africa. Available data indicate that the highest HIV prevalence is found among pregnant women in the Central African Republic (14.8%), and that Cameroon also reports a high prevalence (Figure 41). Only three countries reported data on young pregnant women.

Figure 41

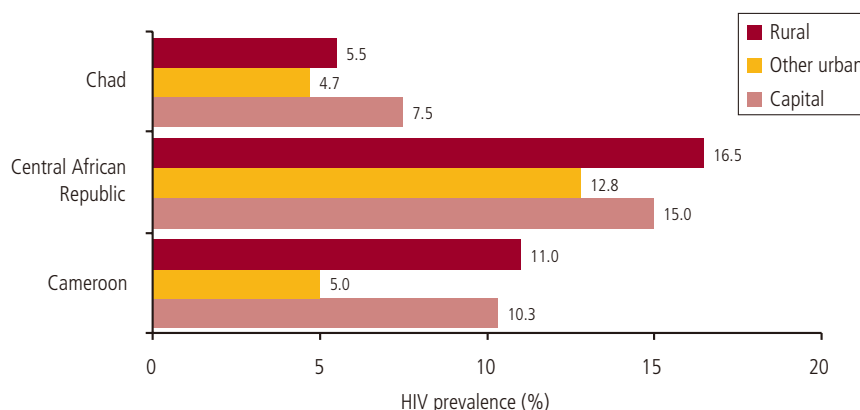
**HIV prevalence among women attending antenatal care clinics in central Africa, data reported by clinic site or city, 2001-2002**



Differences in HIV prevalence between urban and rural antenatal care clinics are small (Figure 42). This may be due to the location of the rural clinics; if such clinics are located in semi-urban areas (e.g. market places), then HIV prevalence may not be typical for rural areas, as has been shown in countries with extensive surveillance systems elsewhere in Africa.

Figure 42

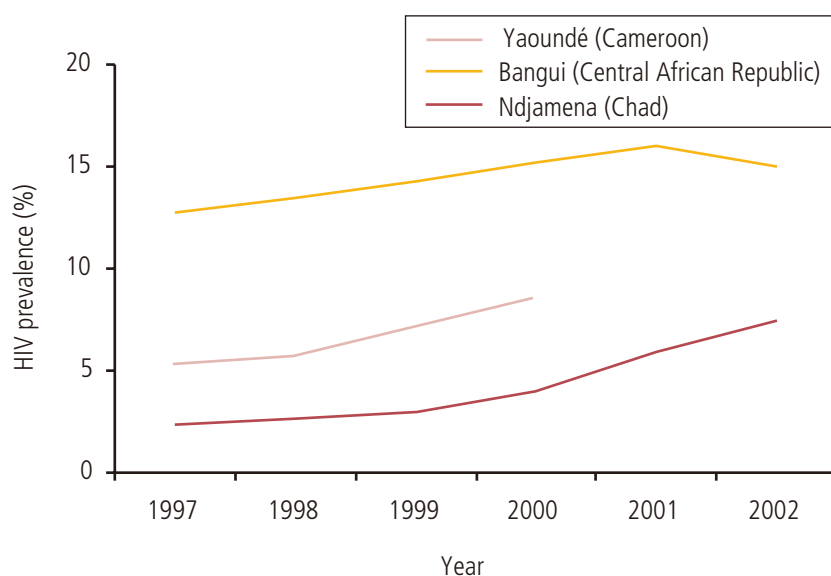
**Median HIV prevalence among women attending antenatal care clinics in Cameroon, Central African Republic and Chad, by location, 2000-2002**



Because surveillance is weak, it is difficult to assess time trends using data from the same clinics. In *Cameroon*, data from four clinics indicate that HIV prevalence increased from 7.8% to 10.1% between 1997-1998 and 1999-2000. In *Chad*, the median HIV prevalence of seven clinics increased from 4.2% to 6.9% between 1999-2000 and 2001-2002. Data from the capital cities also provide some indication of an increase in prevalence (Figure 43), at least in Ndjamená (Chad), and Yaoundé (Cameroon), while Bangui (Central African Republic) shows a levelling off at about 15%.

Figure 43

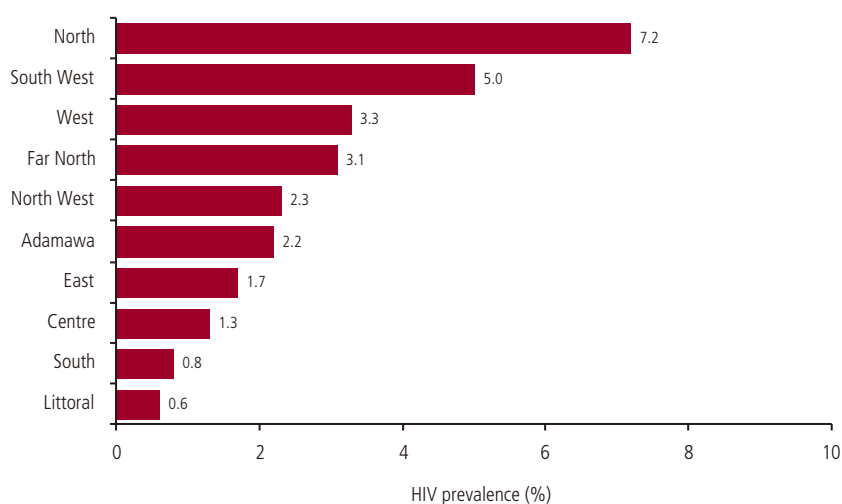
Trends in HIV prevalence among women attending antenatal care clinics in selected capital cities in central Africa, 1997-2002



There is marked variation within *Cameroon* by province. Some provinces have HIV prevalence levels of <1% among women attending antenatal care clinics, while 7% of women in the North province are infected with HIV (Figure 44). The limited data available from a few urban areas in the *Congo* and the *Democratic Republic of Congo*, indicate that HIV prevalence is in the order of 5%. HIV prevalence among rural and urban antenatal care clinic attendees aged 15-24 years were fairly similar. This finding may be specific to the situation in these countries, or may be due to the location of the clinics of the surveillance system (see Box: *HIV surveillance: methodological notes*).

Figure 44

Median HIV prevalence among young women aged 15-24 years attending antenatal care clinics in Cameroon, by province, 2000



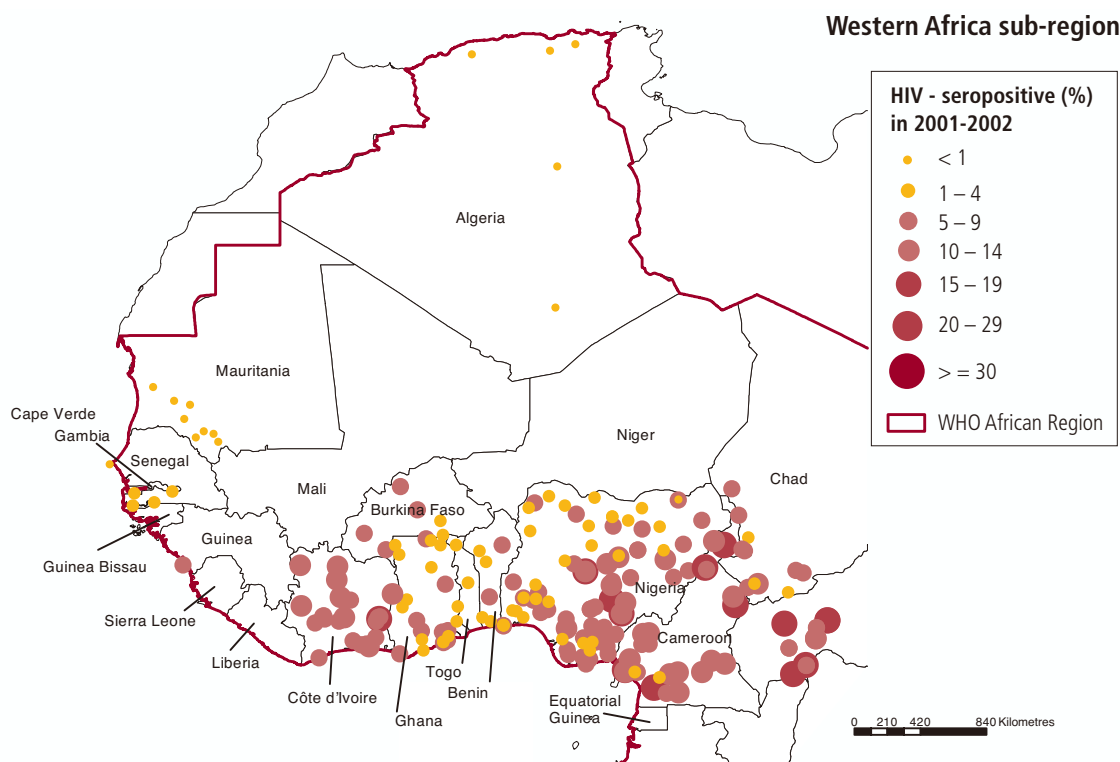
## Western Africa

By 2002, the population of the 17 countries in western Africa was 269 million people, including almost 121 million people living in Nigeria (United Nations, 2002). This part of the WHO African Region also includes Algeria. A fairly large proportion (43%) of the population lives in urban areas (Table 1). Antenatal care clinic-based surveillance is the key source of information on the course of the HIV/AIDS epidemic in most countries, although some countries have concentrated epidemics (HIV prevalence is >5% in any one high-risk group but <1% in the general population) or are on the border of concentrated and generalised (HIV prevalence is >1% in the general population) epidemics, which implies that risk group surveillance should also be a component of surveillance systems. Western Africa also includes countries where political instability has limited surveillance activities, including Sierra Leone and Liberia. In Côte d'Ivoire, about 80% of the planned surveillance sites provided data in 2002, in spite of the political unrest in the country. Ghana has the most developed antenatal care clinic-based surveillance system in western Africa; more than 20 clinics have provided surveillance data for almost a decade. Mali and Niger conducted national population-based surveys with HIV data collection in 2002. Guinea conducted a national survey of special populations in 2001.

There is considerable diversity in the scale of the epidemic in the countries of western Africa. On the higher end of the scale, very few clinics report HIV prevalence levels that exceed 10% (Figure 45). Côte d'Ivoire has reported the highest level of HIV prevalence since the beginning of the epidemic and still has higher levels of HIV prevalence among pregnant women than other countries. Nigeria has observed an increase in recent years and estimated national prevalence among pregnant women in 2001 to be 5.8%. At the lower end, HIV prevalence is 1% or lower in countries in the Sahel (Senegal, Gambia, Mali, Niger, Mauritania) and Algeria.

Figure 45

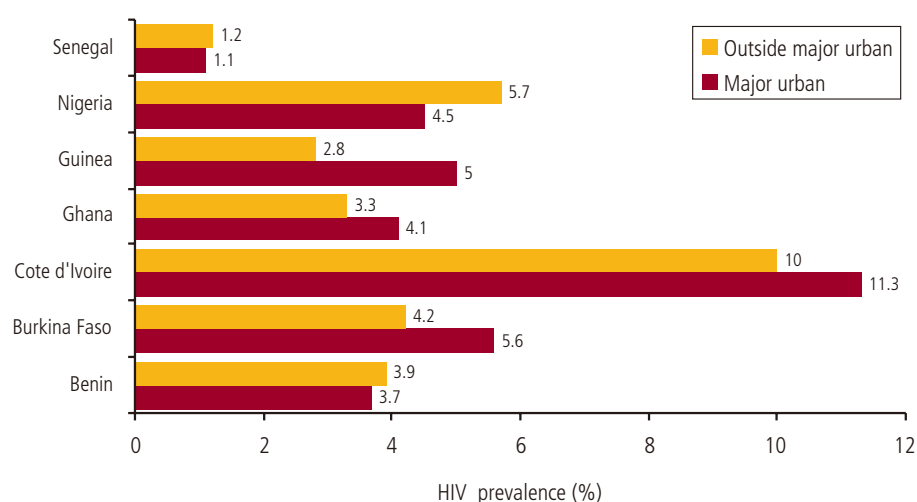
### HIV prevalence among women attending antenatal care clinics in western Africa, data reported by clinic site or city, 2001-2002



Differences in HIV prevalence between urban and rural antenatal care clinics are fairly small in most countries (Figure 46). This may be due to the location of the rural clinics. If such clinics are located in semi-urban areas (e.g. market places), then prevalence may not be typical for rural areas, as has been shown in countries with extensive surveillance systems elsewhere in Africa. In Nigeria, though the difference is small, HIV prevalence reported by urban clinics is lower than that reported by rural clinics.

Figure 46

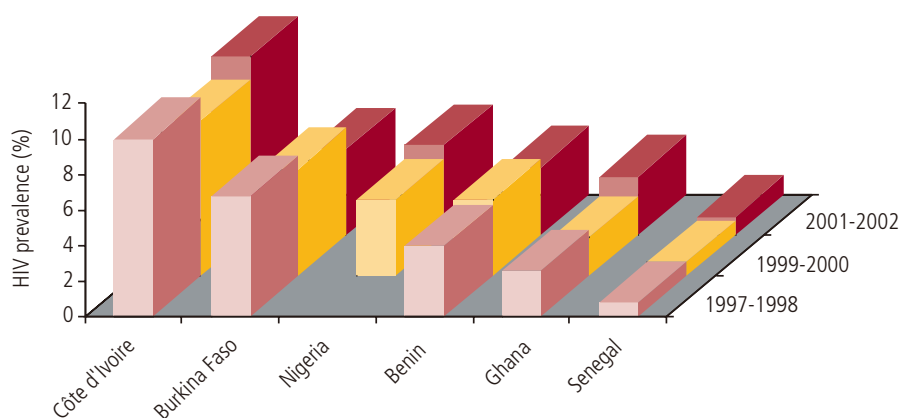
**Median HIV prevalence among women attending antenatal care clinics in western Africa, selected countries, by location, 2001-2002**



The comparison of the same antenatal care clinic sites in six countries with data for 1997-1998, 1999-2000 and 2001-2002 shows variation in trends (Figure 47). In Burkina Faso (5 clinics), data indicate a decline in HIV prevalence in recent years. Nigeria (67 clinics) and Ghana (20 clinics) reported modest increases in the most recent period, while little change occurred in Benin (6 clinics), Côte d'Ivoire (24 clinics) and Senegal (8 clinics).

Figure 47

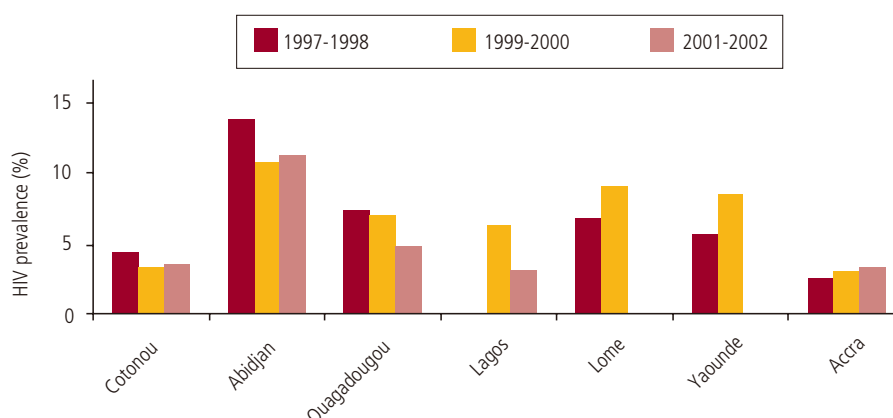
**Trends in median HIV prevalence among women attending antenatal care clinic in western Africa, data from the same clinics, by country, 1997-2002**



Data from the capital or major cities in the sub-region also provide some indication of trends in HIV prevalence (Figure 48). A decline in HIV prevalence is observed in Abidjan (Côte d'Ivoire), Ouagadougou (Burkina Faso), and Lagos (Nigeria). In Lomé (Togo), and Yaoundé (Cameroon), an increase in prevalence was reported between 1997-1998 and 1999-2000, but no data are available for the most recent two-year period.

Figure 48

**Trends in median HIV prevalence among women attending antenatal care clinics in major cities in western Africa, 1997-2002**

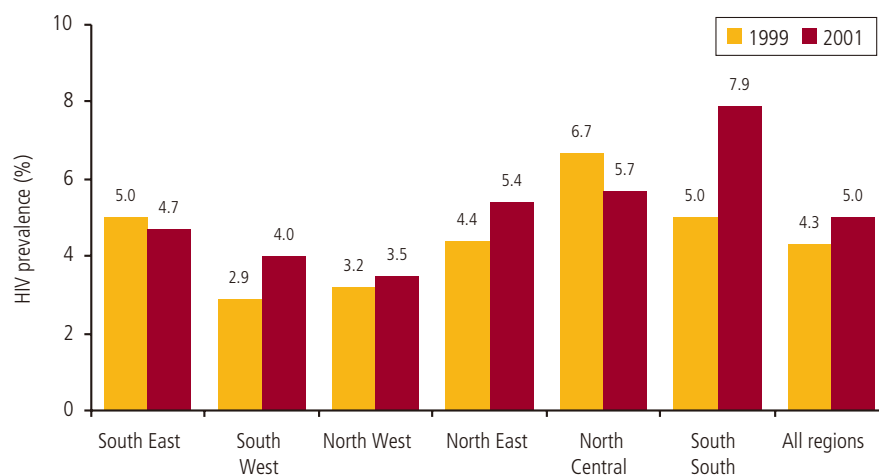


Nigeria conducts rounds of surveillance of antenatal care clinics once every two years. There is considerable variation within the country, with the South South zone having the highest prevalence of HIV infection (8%), and the North West the lowest (3%). There is limited variation between antenatal sites in the cities and the rural areas. Most major cities, including Lagos, Ibadan, Kano and Kaduna, report HIV prevalence rates of <5%, but several of the sites classified as rural report considerably higher values.

There are 67 antenatal care clinics in Nigeria with data for both 1999 and 2001. The median HIV prevalence increased from 4.3% to 5.0% during this two-year period (Figure 49). The increase was fairly similar in the urban and rural sites and occurred in five of the six zones. The largest increases were observed in the South and South West regions, with a small decline observed in the South East region. To assess whether the growth of the epidemic is changing pace, data from the mid 1990s were analysed. Data for 1994-1995, 1999 and 2001 are available from 34 antenatal care clinics. The median prevalence for 1994-1995 was 3.1%, increasing to 4.7% in 1999 (growth of 0.4% per year) and 5.5% in 2001 (growth of 0.4% per year). The increase in HIV prevalence over time is linear, 0.4% during 1995-1999 and again 0.4% during 1999-2001.

Figure 49

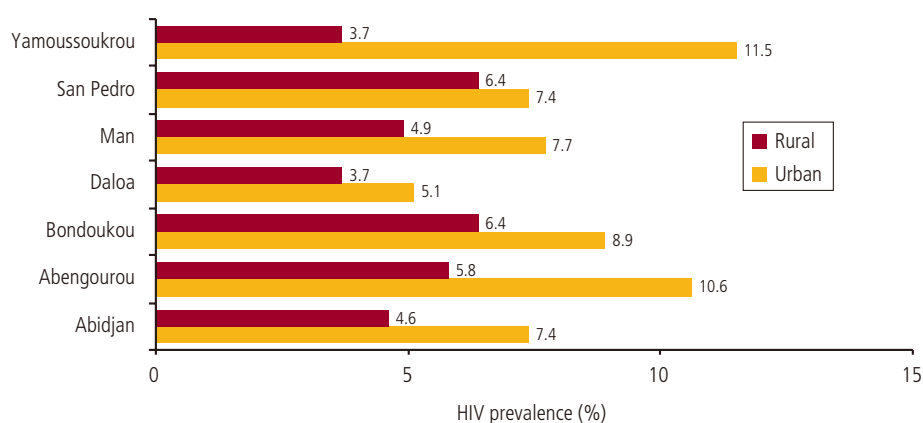
Trends in median HIV prevalence in Nigeria, data from the same 67 clinics, by state and location, 1999 and 2001



Côte d'Ivoire was the first country in western Africa to report a severe HIV/AIDS epidemic; in 2002, the HIV prevalence among pregnant women in Côte d'Ivoire was still higher than in other countries in the sub-region. All areas of the country are almost equally affected. Among young women aged 15-24 years, the median prevalence of HIV infection was 5.8% in Abidjan, 7.6% in other urban clinics and 4.8% in rural clinics (Figure 50).

Figure 50

Median HIV prevalence among women attending antenatal care clinics in Côte d'Ivoire, by region and location, 2002



Ghana has the most developed HIV surveillance system in western Africa. Since 1994, each of the ten regions in Ghana annually reports on one urban and one semi-urban antenatal care clinic site. In 2002, the median HIV prevalence of all 24 antenatal sites was 3.4%, with little difference between Accra, other urban areas, and semi-urban sites, and little change in recent years. The median HIV prevalence among young pregnant women aged 15-24 years has been close to 3% since 1994 (Figure 51).

Figure 51

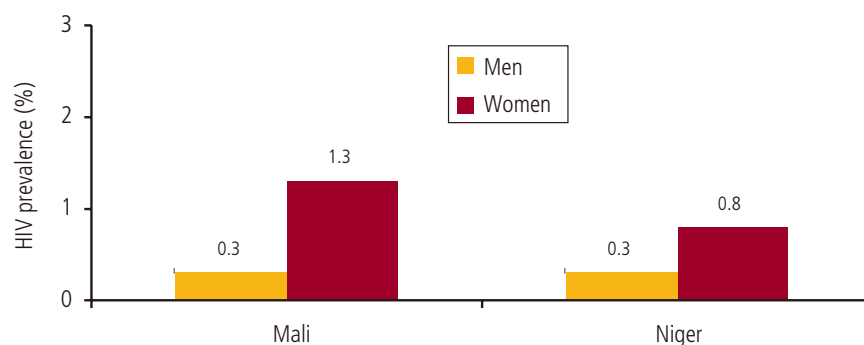
**Trends in median HIV prevalence among young women aged 15-24 years attending antenatal care clinics in Ghana, data from the same clinics, 1994-2002**



*Senegal* and *the Gambia* have maintained low levels of HIV prevalence. HIV prevalence among women attending antenatal care clinics in Senegal has been around 1% since the mid 1990s. Sex workers in several cities and urban areas are monitored on a regular basis for HIV infection; prevalence has remained fairly constant at around 20%. *Mali* and *Niger* conducted population-based surveys in 2001 and 2002, and report HIV prevalence levels of the same order of magnitude as Senegal. HIV prevalence among all men and women aged 15-49 years was 1.7% in Mali and 0.8% in Niger. The capital cities of Bamako and Niamey reported slightly higher HIV prevalence rates of 2.5% and 2.1% respectively. Among young women aged 15-24 years, HIV prevalence was considerably higher than among young men, in both countries. In Mali, the difference between young men and women was four-fold (Figure 52).

Figure 52

**HIV prevalence among men and women aged 15-24 years in Mali and Niger, national population-based surveys, 2001**



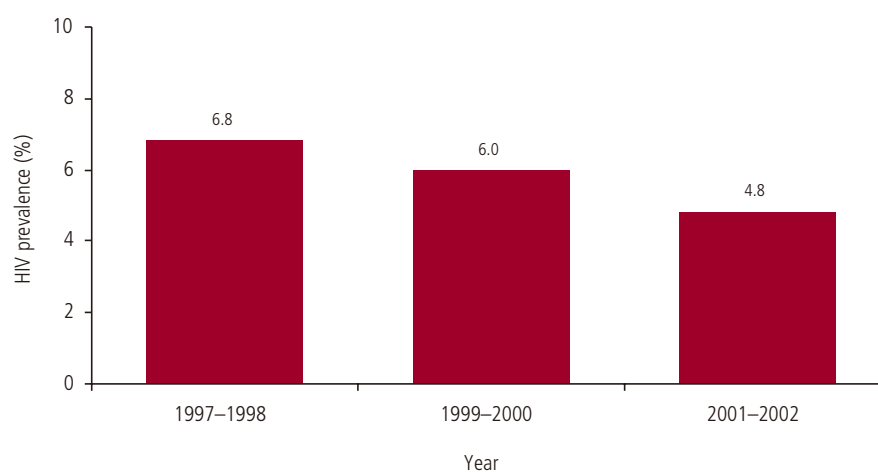
In 2002, *Benin* conducted the most extensive round of surveillance in its history, including 36 antenatal care clinics. HIV prevalence was found to be 2.5% in urban women and 1.4% in rural women attending antenatal care clinics, which is somewhat lower than previous years. No HIV sentinel surveillance has been conducted in *Togo* since 2000. However, HIV testing of military recruits indicated that 7.2% of men were infected, a value that was considerably higher than in the last report, in 1997 (2.3%). The age distribution of the men was not reported. There is virtually no information from *Liberia*, but in *Sierra Leone* a national survey reported that HIV prevalence was low (2.3%) among adults aged 15-49 years in the capital city and even lower (0.7%) outside of the capital city, indicating that years of civil unrest have not promoted the spread of HIV. In 2001, *Guinea* conducted a survey of a range of populations; HIV prevalence among women attending antenatal care clinics was 2.8% overall, and 2.5% among young women aged 15-24 years. HIV prevalence rates among young people aged 15-24 years in the general population was about



the same (2.7% for women and 2.4% for men). In *Burkina Faso*, a decline in HIV prevalence was observed during 1997-2002 in the same five antenatal care clinics with data for this period (Figure 53). *Algeria* and *Mauritania* have HIV prevalence levels below 0.5% among women attending antenatal care clinics in urban areas. There is no monitoring of populations that are at a higher risk of becoming infected with HIV. *Cape Verde* and *Guinea-Bissau* have not reported any HIV surveillance data in the past five years.

Figure 53

**Trends in median HIV prevalence among women attending antenatal care clinics in Burkina Faso, data from the same five clinics, 1997-2002**



## 9 Conclusions

### **Current HIV surveillance systems generate a wealth of data, but there is a need for expansion to cover rural areas and populations at higher risk of HIV infection, where appropriate**

- There is a wealth of data on the spread of HIV in the WHO African Region. Many countries have improved their antenatal care clinic-based surveillance systems and it is possible to assess trends in HIV prevalence in most countries. Population-based surveys with HIV data collection are being implemented in an increasing number of countries and provide important additional information on the status of the epidemic. Population-based surveys are not intended to replace a continuous sentinel surveillance system, but constitute a valuable addition, primarily because they provide data on men, on non-pregnant women and on rural populations. For many countries with generalised epidemics, an expansion of the surveillance system to ensure adequate coverage of rural populations is the main challenge.
- HIV surveillance among populations at higher risk of HIV infection should be the mainstay of epidemic tracking in countries with low levels of prevalence. While some countries continue to carry out regular surveys among sex workers in major cities, and a few countries have conducted special surveys among populations at higher risk of HIV infection, there is a need to strengthen such surveillance in countries where the prevalence of HIV infection is low.
- Consistent monitoring at the same antenatal care clinics over time will assist in the assessment of trends in HIV prevalence and provide an indicator of trends in new infections in young women aged 15-24 years.

### **Geographical coverage and reporting of HIV prevalence for young people needs to be improved**

- An increasing number of countries are now reporting on HIV prevalence among young pregnant women aged 15-24 years. There is a need to further standardize the reporting of HIV prevalence among young women attending antenatal care clinics in the same way as for pregnant women of all ages attending antenatal care clinics, using a median of values reported by clinics, by geographic stratum, to summarize the data. This may imply that data from multiple clinics with smaller numbers of young pregnant women will need to be combined.

### **The monitoring of STIs has improved, but in most countries, surveillance systems are still weak**

- Although an increasing number of countries now report on the prevalence of sero-syphilis among women attending antenatal care clinics, about half of countries in the WHO African Region still do not.
- There is also a large volume of data on STIs other than syphilis available from special studies, but regular monitoring of the burden of STIs is not common, or does not yield reliable data.

### **Many countries now collect data on key sexual behaviours among adults, young people and some populations at higher risk of HIV infection, and several countries are able to ascertain trends in behaviour over time**

- While there has been a marked increase in data collection through national and special-population surveys, more information and analysis is needed to ascertain whether behavioural data can be used to capture real trends in behaviour at the population level.
- There is a need to carefully assess the type of information on behavioural trends that countries need to collect, according to the type of epidemic.

### **Genuine second generation surveillance, which is able to link trends in prevalence of HIV infection, STIs and behaviour, is still in its early stages**

- Most countries have a fairly good picture of the course of the HIV epidemic, but the collection of data on behavioural and STI trends is less well established.
- The evidence that it is possible to link such trends data collection, e.g. to facilitate the evaluation of health interventions implemented, is still limited, as was recently shown in a multi-country comparison of trends (Bessinger et al., 2003).

**For health planning and programming purposes, it is not useful to consider that there is a single HIV/AIDS epidemic in sub-Saharan Africa, as there are very large differences within the Region**

- There is great heterogeneity by sub-region, with the epidemic being much more severe in southern Africa than in other parts of Africa. In general, HIV prevalence in southern Africa is at least five times higher than that in western Africa, while eastern and central Africa take an intermediate position.
- There are also substantial differences within sub-regions and within countries. In most countries, with the possible exception of most of southern Africa, rural populations are much less likely to be infected with HIV than are urban populations.
- The huge differences in HIV prevalence within the region have important consequences for the assessment of the impact of the epidemic and for planning health interventions, such as antiretroviral treatment.

**Many more women are infected than men, and this difference between the sexes is even larger among young people**

- Population-based surveys indicate that HIV prevalence among women may be as much as 1.5 times higher than that among men.
- This is partly due to the fact that women get infected at a much earlier age than men: among young people of 15-24 years of age, at least 70% of infected persons are young women.

**The trend in HIV prevalence in the same antenatal care clinics in recent years suggests that the growth of the epidemic levelled off in the late 1990s, but that there has not been a decline**

- Because several countries are collecting better data on rural populations, HIV prevalence estimates may have to be adjusted downward in the near future. This should not be confused with a decline in prevalence.
- The reported trends make clear that the large differences in HIV prevalence by sub-region are not simply a product of differences in the time at which the epidemic took hold, but that the disparity between the sub-regions is still widening.
- Recent trends by sub-region indicate a modest increase in prevalence in southern and central Africa, a modest decrease in eastern Africa, and little change in western African countries.

**The levels and trends in HIV prevalence in several countries should be the subject of further work to try to understand how the progression of the epidemic can be turned around**

- In eastern Africa, the course of the AIDS epidemic in Uganda has received substantial attention, but various degrees of decline in HIV prevalence have also been reported in Burundi, Ethiopia, Kenya and Rwanda.
- In western Africa, Senegal has been notable for its success in containing the epidemic at low levels, but population-based surveys in Mali and Niger could also provide important information on why the epidemic is not spreading.
- Recent data from post-conflict countries, such as Sierra Leone, the Democratic Republic of Congo, and Angola do not support conventional wisdom that the human suffering and high mobility associated with political instability lead to the rapid spread of HIV, but more data from the most affected areas are needed.
- Further study of the risk factors and determinants of HIV transmission, such as male circumcision, STI epidemiology, sexual mixing patterns and their relation to migration, is required.

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ISBN 92 9073 100 9

